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An Analysis of Local Economy in a Period of Rapid Transition - Southwestern Wyoming

Richard E. Lund E. Lund
University of Wyoming

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AN ANALYSIS OF A LOCAL ECONOMY
IN A PERIOD OF RAPID TRANSITION

SOUTHWESTERN WYOMING

Prepared by
THE UNIVERSITY OF WYOMING
COLLEGE OF COMMERCE AND INDUSTRY

Under The
Small Business Administration Management
Research Grant Program

By
RICHARD E. LUND
Research Associate

Project Director
FLOYD K. HARMSTON
Director, Division of Business and Economic Research

June, 1962

FOREWORD

This Small Business study, *An Analysis of a Local Economy in a Period of Rapid Transition*, has been conducted and prepared under the direction of Floyd K. Harmston, Project Director for the University of Wyoming.

The research was financed by a grant made by the Small Business Administration, United States Government, under the authority of Public Law 699 (85th Congress).

Only a limited number of copies of this report have been printed. It is available for reference in any of the Small Business Administration offices throughout the United States or at many reference libraries. Copies of the report also may be purchased for $2.00 directly from the Division of Business and Economic Research, College of Commerce and Industry, Box 3275, University of Wyoming, Laramie, Wyoming.

Summaries of this study have been printed and are available in reasonable quantities. These summaries may be secured from SBA field offices or from the Small Business Administration, Washington 25, D. C.

The Small Business Administration assumes no responsibility for the accuracy of the data contained herein, nor does it necessarily endorse any opinions, conclusions, or recommendations which may be a part of this report.

John E. Horne
Administrator
Small Business Administration

PREFACE

Since 1953, many drastic changes have occurred in the Southwestern Wyoming economy. Coal and railroad transportation lost their dominant position and were replaced in importance by oil, gas, and other minerals. Population and employment declined considerably after the shut-down of the coal mines, but an increase is now again underway. In general, the local economy suffered a substantial set-back, but a significant come-back has been made in recent years.

Southwestern Wyoming consequently offered a rather unique situation for studying economic change in a local economy since its period of rapid change was followed in recent years by a period of relatively stable activity of a magnitude similar to that which occurred before the change.

A technique, usually applied only to larger economies, has been used in this analysis. It is believed by the author to have proved of considerable value for this type of study.

The model constructed herein is quite adaptable to forecasting. This feature has been used in estimating the local economic effect of several pending changes. The author realizes the many weak areas of his forecast, but he sincerely hopes that his detailed discussion of the basis for these estimates and the analysis of this local economy will enable persons more familiar with particular developments to improve on his attempt.

Special thanks go to the many persons contributing to the successful completion of this study. The time given by businessmen and by other local residents to the interviewers is especially appreciated. Many state governmental agencies in supplying data on a continuing basis to the author's organization were instrumental in accurately completing the survey. Helpful suggestions and criticisms were generously contributed by several persons in close contact with Southwestern Wyoming economic development.

Considerable reliance was place on data pertaining to 1953 collected in an earlier survey of Southwestern Wyoming conducted by Floyd K. Harmston, Robert W. Birch, and H. Allen Fulton. This was published under the title: *A Study of Resources, People, Economy of Southwestern Wyoming* (The Wyoming Industrial Research Council, 1955).

Richard E. Lund

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CHAPTER I

INTRODUCTION

A growing economy is a changing economy. The more rapid growth becomes, the more rapid the rate of change usually becomes. Only a stagnant or slowly declining economy is not confronted with change.

Following World War II up through the mid-1950's, the national economy experienced a rather high rate of growth. This growth was accompanied by a nearly phenomenal rate of change among many of the activities making up the over-all economy. Even though the rate of growth has tapered off in the last few years and investment as a proportion of total output has declined, the rapid rate of change appears to be continuing onward at its earlier pace, if not actually increasing.

It is within this economic climate that the modern small business must function. It must be able to cope with the effects of technological progress, emphasis on new products, altered input or expenditure patterns, and utilization of new raw materials. The business must not only cope with these facts, but it must be able to overcome the multitude of problems accompanying rapid economic change if it wishes to survive.

The individual small business is, of course, an element in the over-all economy, and must face up to the challenges offered by it. But, it is the changes in the local economy, the economy containing the business, its suppliers and its customers, that is really most significant. Certainly a small business may be concerned about a general downward trend in durable consumption, but a possible loss of more than one-half of its own market is of more concern.

It is also at the local level that rapid changes in a national economy are manifested and becomes most evident. For example, it is here that a minor change from a national standpoint, such as a switch from coal to oil, becomes a crisis for local coal producing economies.

This study was conducted to provide a more penetrating insight into the actual workings of the local economy undergoing a rapid change. While the handling of the particular problems facing the individual businessman and his solution would be a worthwhile undertaking, this study was instead aimed at examining the larger, more encompassing *activities of the local economy*. For example, the particular loss of a market for a particular business was set aside in order to give more emphasis to examining the effects of an over-all loss of market of a substantial section of exports from a local economy.

While a great many local economies within this nation would be worth examining, it was decided to concentrate on a specific four county area in Southwestern Wyoming. Such a concentration, of course, narrows the conclusions which may be drawn that would be applicable to other local economies, but the task of adequately surveying several rapidly changing economies would have been much beyond the resources available for this

study. Nevertheless, the author is confident that many of the conclusions drawn here are sufficiently basic that they can provide added insight into the workings of other similar local economies with some slight innovations. As a consequence, it is felt that the information contained in this study is of considerable value to many communities faced with either loss of industry, introduction of new industry, or a combination of such events.

Southwestern Wyoming offered a rather unique situation conducive to studying change since its period of rapid change was followed in recent years by a period of relatively stable economic activity of a magnitude quite similar to that which occurred before the rapid change. Until the end of 1953, Southwestern Wyoming had a relatively stable economy. It was dependent upon coal mines supplying fuel for coal burning railroad locomotives, a fairly extensive livestock industry, railroad employment, travel over highway U. S. 30 and other visitors, and a minor amount of manufacturing.

At the beginning of 1954, it became apparent that three major changes were immediately going to take place.

1. The Union Pacific Railroad was going to replace its coal burning locomotives with diesel power. This would result in closing many of the coal mines and a reduction in the railroad work force as well. The coal mines had employed about 2,100 persons, or one-fifth of the over-all work force in 1953. The railroad itself was employing about 2,000 persons at the time, and this would be reduced by the conversion.

2. Oil drilling activities had discovered one of the very few commercial bits of natural trona in the world. Trona is a raw material from which soda ash can be produced. At that time, the Intermountain Chemical Company was developing its mine and processing plant and was ready to begin regular operations in the near future. They were hiring 500 miners and chemical workers.

3. The Pacific Northwest Pipeline Company was finishing plans for a pipeline from New Mexico to Washington and Oregon. This would furnish a vast new market for natural gas. Southwestern Wyoming is the only part of Wyoming where natural gas is more important and easier to find than oil.

While these changes represented increased activity for some local industries, they largely reflected a serious decline for the over-all economy. Such drastic changes, after a long period of stability, caused near panic among many of the businessmen of the area.

By 1959, most of the major adjustments had occurred. It was interesting to note that the over-all economy had in many ways returned to its pre-change level. While employment was down by some 1,300 persons, or 12.7 per cent, payroll, retail sales, and bank deposits had reached a new record level that was higher than that of 1953. Thus, the unique situation

was offered for a "before and after" comparison of the local economy operating at very similar levels.

A study of Southwestern Wyoming also offered one additional value. While most major adjustments foreseen in 1953 had occurred by 1959, there were still others pending on the horizon. Consequently, a study of this area also offered possibilities to apply the information gained to forecasting the effects of these future developments. While important from a pedagogic standpoint, such a forecast was also expected to be of considerable value to local businessmen in the area being studied.

More specifically, the objectives of this study are:

1. To compare the economy of Southwestern Wyoming in 1953 to that of 1959, thus determining the extent to which shifts and changes have occurred.

2. To examine the inter-relationships involved in order to acquire a deeper insight into the structure of a local economy at two different periods of time.

3. To determine the nature of economic adjustments in business operations as a result of the changes, and to measure the impact upon small businessmen from an economic standpoint.

4. To provide some information on development possibilities and the effects to be expected as a result of pending changes.

Analysis to Follow

Immediately following, special attention is paid to describing the economy in terms of historical and resource development. Discussion of these topics then leads directly into a detailed over-view of the economy during the period of examination, 1953 to 1959.

Chapter III then penetrates this general over-view given for the year 1953 to take a look at the actual inter-relationships of the many activities making up the aggregate local economy. An analytical framework is set up early in this chapter to serve as a basis for conducting this critical examination. From this framework, inter-relationships, as well as sources of basic income, are delineated and the dependence of over-all activity upon these basic sources is determined.

Throughout this analysis, 1953 has been chosen as the base or control year from which change is determined. This was done to direct thinking toward how changes "will" affect an economy instead of how changes "have" affected an economy. Hindsight is of value only in terms of its ability to describe the future. Nevertheless, even more detailed data than were collected for 1953 were obtained for the year 1959 in this analysis.

Consequently, the next step in the development of this analysis is to advance from what could have been expected to result from the change affecting the economy after 1953, to what actually did happen as determined by the information available for 1959. It is upon comparing these two

years that general conclusions are made as to what may generally be expected to result from rapid economic change in local economies.

Throughout the body of this report, little discussion concerns the sources and collection procedures for the data presented. Such discussion tends to be highly technical and would often be of little interest to the person concerned only with economic changes. Nevertheless, a section in the appendix of this publication discusses hurriedly some aspects of collecting information such as this.

A forecast of expected economic effect of most major pending changes is included as Chapter VI. Here, much more concentration has been placed on determining *effect* than has been given to determine when a certain change will reach a specific level. In other words, concentration was given to determining total effect of full utilization of certain recreation facilities being constructed by the U. S. Forest Service and the National Park Service. At what point in time these facilities would be fully utilized was not determined. The author has prepared a comprehensive forecast for a specific year in another publication. This may be obtained upon request.

GENERAL INFORMATION

The local economy of Southwestern Wyoming is oriented toward producing oil, gas, other minerals, and agricultural products, and toward providing service and commodity requirements for out-of-area travelers and truckers. Some processing of agricultural products and manufacturing of lumber for sale outside the local economy has arisen in recent years. In addition, a sizeable contribution is made by the railroad by employing local people to handle through traffic.

The modern economy was largely brought to life in 1868 by the entrance of the railroad. Coal mining soon became a big industry as local beds were developed to power the railroad. Oil and gas production had a very meager beginning in the early 1920's, but production did not become significant until the mid 1950's. While coal was king up to 1954, it has been largely replaced in value by oil, gas, and other minerals in recent years.

Agriculture, while not the greatest contributor to economic activity, has been significant throughout Southwestern Wyoming's economic history. This industry is oriented largely toward livestock raising. While many short season crops grow reasonably well, most crops are associated with the livestock industry.

Southwestern Wyoming's location on a major east-west highway and railroad is a significant aspect of the economy. Railroad employment associated with moving through traffic has been a very significant contributor throughout the area's history. A substantial income is also brought to the economy by the multitude of travelers and truckers passing over the area's major east-west highway.

Southwestern Wyoming is typical of much of the arid West in that it has a fairly dense population in limited areas, while other sections are largely uninhabited. Growth in population has been small, but steady, after the initial rush accompanying the entrance of the railroad in 1868. Nevertheless, a small decline occurred in recent years. The *Census of Population* showed 38,200 persons to be residing in Southwestern Wyoming in 1960.

An area's economic life is largely a product of its resource base, climate, and extent of development. For this reason, attention will now be turned toward examining Southwestern Wyoming's physiography, resources, and economic history. Upon this basic understanding details of the economy at a particular time, 1953, will become more meaningful in the next chapter.

PHYSIOGRAPHY

Physical and Climatic Features

Since this study is concerned with Sublette, Sweetwater, Uinta and Lincoln Counties, an area of about 14,000,000 acres in Southwestern Wyoming, it necessarily covers a wide variety of topographic features. A map

showing the location of this area is included as Figure 1. In general, the plateau area which occupies all of Sweetwater County, the middle portion of Sublette, and about half of Lincoln and Uinta Counties, is relatively level. Plains extend for many miles broken only by low ridges with flat-topped buttes, while rough areas due to eroding of soft rock formations are found near the major streams. As the plains merge into the foothills of the mountain ranges, they also assume more of a rough character. On the south and west, mountain ranges affecting the area under consideration, are located in Utah, but a substantial portion of their foothills are in Wyoming. The northwestern boundary of Sublette County is formed by a mountain range, while Sublette and Lincoln Counties are largely divided from each other by mountains. Thus, this area, with the exception of Star Valley in northern Lincoln County, is largely formed into an homogeneous economic area by mountain ranges on all sides.

In altitude, Southwestern Wyoming varies from 6,000 to 13,000 feet. However, most of it is plateau which varies between 6,000 and 7,500 feet.

The climate of this part of Wyoming varies from extremely arid to fairly humid depending upon the altitude and position with respect to mountains. Moisture laden air comes into the area largely from the Pacific Ocean and it must rise over the mountain barriers before moisture can be deposited on the plateau. As a result, annual precipitation amounts to about nine inches over most of the plateau, but becomes much higher in the mountainous area. Precipitation is distributed fairly evenly over the year, although spring months receive slightly more than do other months. Winter snowfall is heavy in the mountains, but fairly light on the plateau. Heavy winds often accompany snowstorms, thus creating blizzard conditions.

Growing season also varies with altitude, prevailing air currents and location. Generally, a season of about 110 days is expected in the southern plateau, while in the northwest plateau area the growing season drops to about 60 days. As will be seen later in this discussion, the agricultural components of this economy, as well as many other aspects, are largely determined by climate and physical features.

Natural Resources

Land. There are 13,785,100 acres of land in this section of Wyoming, or approximately one-fifth of the state's area. The Federal Government owns 68 per cent of the land, while private individuals and corporations own 29 per cent. The remainder is owned by state and local governments. Aside from railroad lands, which are those the railroad failed to sell in its early days, private lands are located on or adjacent to streams where irrigation can be practiced, or in the few towns. Most towns in Southwestern Wyoming are, as may be expected, located on streams of water.

Nearly all of the land in Southwestern Wyoming is used for grazing. Crop land constitutes only about 2 per cent of the total land area and an additional 1 per cent is in irrigated pasture.

Forested land in Southwestern Wyoming covers about 1,155,000 acres. Much of this forested land is subject to grazing, so it was included above. More than three-fourths of the forested land is considered to be commercial forest with total timber reserve amounting to 5,135,000,000 board feet of

Figure 1

PHYSICAL FEATURES

Southwestern Wyoming
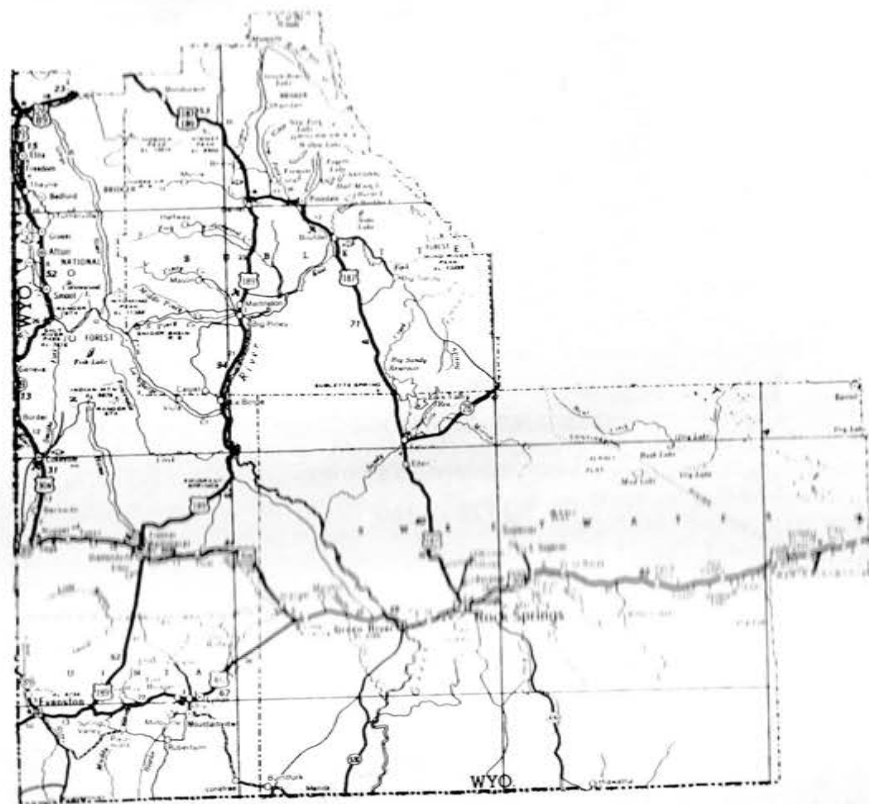
saw timber. The annual allowable cut for a sustained yield would be at least 57,000,000 board feet of saw timber. The United States Forest Service and the Bureau of Land Management control nearly all of the timber land.

Some exceedingly outstanding scenery is found in the Wind River, Wyoming and Uinta mountain ranges. Excellent highways pass near these ranges; however only secondary roads usually make actual entrance. This makes the scenic value somewhat less than it could be. The Forest Service is currently engaged in a program to up-grade roads and recreational facilities through the area.

Petroleum and Gas. Southwestern Wyoming is now the largest gas producing area in Wyoming. Total reserves are unknown, of course, but in the light of recent discoveries, they appear to be tremendous. This is one of the few sections of Wyoming where gas has become even more important than oil. Oil production has been small and sporadic for many years. However, in recent years, it has taken on some increased importance. Oil and gas production rates are shown as Figure 2.

Figure 2

GAS AND OIL PRODUCTION

Southwestern Wyoming

1920 - 1960
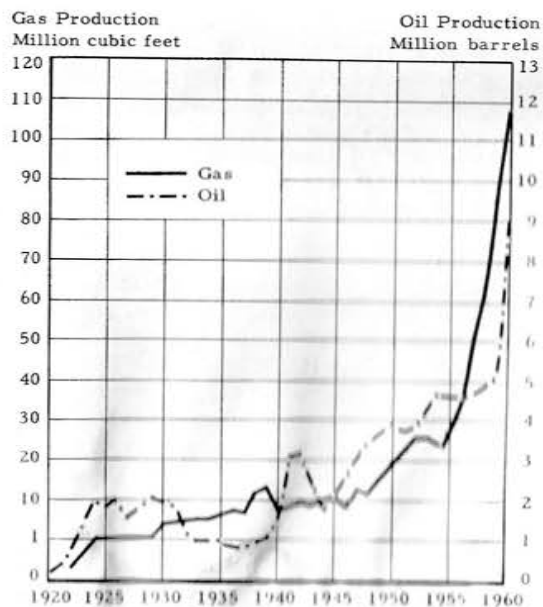
Source: Ad Valorem Tax Department, State Board of Equalization.

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Oil and gas pipelines radiate from this area in all directions. Major nearby markets are metropolitan Denver, and Salt Lake City. The Pacific Northwest Pipeline completed in 1956 opened up a vast new market in the Washington and Oregon area. Construction of a large pipeline to California is being proposed; if completed it will open up another large, new market. Several small gas processing plants have been completed recently near major producing fields. These plants are largely concerned with removing liquid gas products.

Coal. Estimates of coal reserves in Southwestern Wyoming range from 19,000,500,000 tons to as much as 450,000,000,000 tons.[1]

The coal of this area is low in sulfur and ash content, relatively low in moisture, and high in volatile matter. Bituminous coal occurs in relatively thick beds. One stripping operation near Kemmerer is now working on a seam reaching 120 feet in thickness.

There are two major coal mining districts in this section of Wyoming. The one near Rock Springs is the largest where coal is produced by underground operations. The other is located near Kemmerer and consists of both underground and stripping operations.

In the past, the railroad has always been the major customer for coal production, often taking as high as 90 per cent of total out-put. Due to the area's dependence on one customer, production was drastically curtailed with conversion by the railroad to diesel locomotives in 1953-54. Production has continued at a low level, since this curtailment because no new markets and uses have been found for the area's coal. Figure 3 shows annual coal production since operations were first begun in 1870.

A new 150,000 kilowatt power plant is now nearing completion near Kemmerer. This plant will utilize coal from a nearby strip mine and consequently, greatly increase the market. A pilot plant for producing metallurgical coke from Wyoming coal costing in excess of three million dollars was placed in operation in 1961 near Kemmerer. Prior to this time, it had not been possible to produce a satisfactory coke from Wyoming coals. Success in this venture could herald a new type of industry for the West, and, open the door for the development of Southwestern Wyoming's easily stripped beds of low-grade coal.

Trona. There are very few large natural soda ash deposits known in the world. The deposit in Southwestern Wyoming is the only known extensive

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[1] The first figure is based on estimates by the U.S. Geological Survey covering approximately 10 per cent of the 14,500 square miles of coal bearing area in this section of Wyoming. It covers only that portion about which it is possible to obtain some information and pertains only to coal in mineable seams (bituminous, over 14 inches, and sub-bituminous, over 30 inches) with less than 3,000 feet of over-burden.

The more optimistic figure, 450,000,000,000 tons, is also an estimate prepared by the U.S. Geological Survey.

Henry L. Berryhill, Jr., et. al., *Coal Resources of Wyoming* (Washington, D.C.) U.S. Geological Survey, September, 1950), Geological Circular 81.

M.R. Campbell, "The Coal Fields of United States," *U.S. Geological Survey*, 1929, Professional Paper 100, p.32.

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Figure 3

ANNUAL PRODUCTION OF COAL

Southwestern Wyoming

1870 - 1960
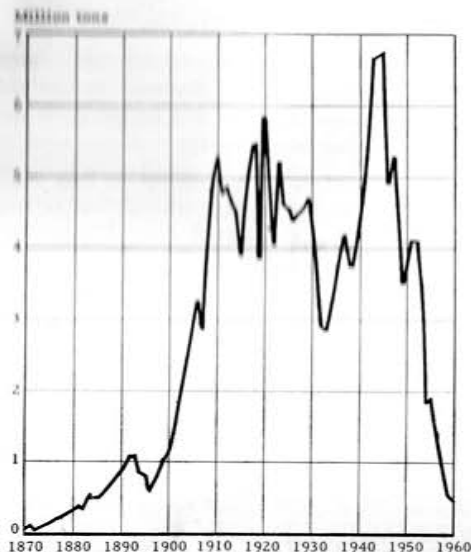
Source: 1908-1960, Coal Mine Inspector; 1870-1907, coal companies and other records.

deposit in this nation. A small deposit is located in California, and has been worked in recent years.

On the basis of core test information, there are 250,000,000 tons of "proven" reserves.[2] This amount would fulfill the entire United States consumption for a period of 35 years; however, reserves reportedly exceed 7,000,000,000 tons of commercial trona.

One chemical company is now operating a 700,000 ton per year mine and processing mill on this deposit. Another chemical company is nearing completion of facilities for a 175,000 ton per year operation. Considerable interest has been shown in this deposit by several other chemical companies. Annual production is shown in Figure 4 (raw trona).

Other Minerals. Phosphate rock is found in many deposits in the western part of this area; however, many of these deposits are not concen-

[2]F. W. Osterwald, D. B. Osterwald, J. S. Long, Jr., and W. H. Wilson "Mineral Resources of Wyoming," *The Geological Survey of Wyoming* (Laramie: University of Wyoming, 1959), Bulletin No. 50, p. 154.

trated sufficiently for commercial exploitation. Only one firm is now engaged in a phosphate mining operation in this area. Other firms have done some mining in the past. Reserves are estimated at around 100,000,000 tons of commercial deposits.[3]

Oil shale is a fine-grained sedimentary rock containing organic matter which can be made to yield a substantial quantity of oil. The only problem is, that to date, no techniques have been developed which will release the oil from the shale at a cost competitive with ordinary production of petroleum. Tremendous reserves of oil shale are located in this area at depths between 300 and 3,000 feet below the surface.

In addition to those minerals already discussed, this area contains deposits of many other minerals; however, most of these other deposits are not expected to affect the economy of Southwestern Wyoming for some time to come. Figure 5 shows the location of the important mineral deposits in Southwestern Wyoming.

Figure 4

TRONA AND PHOSPHATE PRODUCTION*

Southwestern Wyoming

1950 - 1960
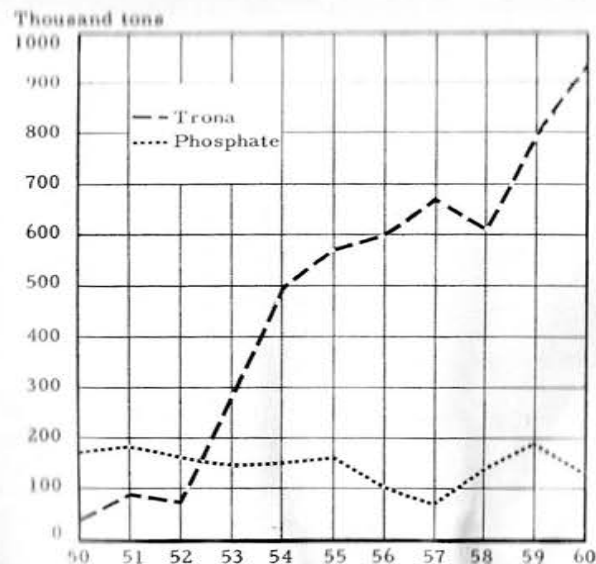
Source: Annual report of the State Inspector of Coal Mines.

[3]Osterwald, et. al., op. cit., p. 129.

Figure 5

MINERALS

Southwestern Wyoming

— Phosphate
O Uranium
▨ Leucite
✕ Mining activity
▨ Trona
▲ Sulphur
✦ Other sodium salts
● Tschermigate

✔ Oil field
Gas field
▲ Oil & Gas field
▨ Bituminous coal beds over 14" thick
▨ Sub-bituminous coal beds over 14" thick

HISTORY

Southwestern Wyoming's economic history necessarily begins with the Rocky Mountain trappers in 1824. This short, but colorful period, has received much more attention than its 16-year length alone would justify. Southwestern Wyoming furnished the sites for several of the rendezvous held by the fur companies in this period. Much of the appeal of this period lies in the fact that these men were the vanguard of a nation on the move. They bore the brunt of Indian hostility and provided guide service for official survey parties and troops sent to the frontier by the federal government. Only a very few of these men made any effort at permanency; however, one of their number, John Robertson, built a permanent home on Blacksfork River in 1834 to become the first white settler of the region. In 1842, Jim Bridger established his fort and trading post to become the second white settler of the region.[4]

The 1840's probably saw more people moving in search of homes and fortunes than at any time in history. Thousands of people crossed Southern

[4]Elizabeth Arnold Stone, *Uinta County, It's Place in History* (Laramie, Wyoming) The Laramie Printing Company, 1924), p 41.

Wyoming on the Oregon, Mormon, and Overland Trails; and most of them stopped for only a short time at Fort Bridger. Only gradually, did a few visionary and hardy men who saw possibilities of cattle and sheep ranches in the stream valleys, begin to take up land for that purpose. These early time local ranchers were at an extreme disadvantage in shipping stock to market and in fact, were dependent upon such markets as existed within economical driving distances.

The modern economy of Southwestern Wyoming was largely brought to life by the entrance of the railroad in 1868. Thousands of men were employed in building the road bed, laying the rails, and protecting one another from the Indians. Consequently, towns sprang up every twenty miles or so to house, feed, clothe, and entertain them. Some of these places were close to mineable coal. Finding the railroad a good customer, the settlers began mining coal and founded an industry that kept some small towns flourishing after the railroad moved on. Among prominent towns in the area today, Rock Springs and Evanston were founded in this manner. Mining of coal near both Rock Springs and Evanston was originally started by independent operators. However, since the railroad controlled most of the coal lands, it was to be expected that they would soon control coal mining also.

The second major economic change in this section was also associated with the railroad. The Oregon Shortline was begun in 1882 at Granger and was built in a northwesternly direction toward the state of Idaho and Oregon. Encouragement was then given for further expansion in the coal industry. The town of Kemmerer was thus founded near a major producing mine.

Beginning in 1919 another major technical change had occurred which was of great economic importance in this area. In that year, the grading of roads and building of highways had its beginning. While first efforts were somewhat feeble, momentum gradually increased until the highway building days of the 1920's and 1930's resulted in U. S. Highway 30, spanning Southwestern Wyoming. Being one of the most traveled roads in the nation, traffic on this highway has developed into a very significant contributor to Southwestern Wyoming's economic life.

The next major development was started in 1938 when trona was discovered in the core of a well being drilled for petroleum. After considerable investigation, a large body of ore was determined and a $20,000,000 plant built; subsequently, the first production of soda ash was in 1952. Recent years have seen substantial expansion of these first facilities.

In 1947 production of phosphate from a strip mine, 25 miles west of Kemmerer, was sarted. A small amount of phosphate had been mined near Cokeville in earlier days. This operation has since grown into one employing about 200 people in the Utah, Idaho, Wyoming mining belt.

The year 1954 saw the phasing out of the coal burning railroad locomotive. Not only did loss of a coal market have a drastic effect on the economy, but railroad employment in general showed substantial decrease which has been continuing to drop up to the present time.

Oil and gas production had a very meager beginning in the early 1920's. Production did not really become significant until the mid-1950's. Since this is one of the few sections of Wyoming where gas production

is even more important than oil production, development could not proceed until a large gas market was found. This market was supplied by the completion of the Pacific Northwest Pipeline in 1956; heretofore, only the nearby metropolitan markets of the Salt Lake Valley were being served.

A new era of Southwestern Wyoming coal utilization will be ushered in during the early 1960's upon the completion of the Utah Power and Light Company's 150,000 kilowatt steam electric plant near Kemmerer. In 1961, a 250 ton per day capacity (finished product) pilot plant for producing coke from Wyoming coal began operation; heretofore, satisfactory metallurgical coal could not be produced from Wyoming's abundant coal resources. Both of these developments represent a bright new page in Southwestern Wyoming's economic growth.

In 1958, construction of Flaming Gorge Dam on the Green River, near the Wyoming-Utah border, was started. Its completion will offer many new possibilities for further development of the area's already substantial traveler and recreation market. Water made available by this downstream storage is instrumental to the development of the 58,775 acre Seedskadee irrigation project.

An Overview of the Economy in Recent Years

The local economy of Southwestern Wyoming reached a high point in 1953. By some measures, the economy has moved downward since that time, while for others it has moved upward. Population declined by 6.5 per cent from 1950 to 1960, and indications are that most of this decline took place between 1953 and 1959—the period to be placed under critical observation. In this six year period a decline of 12.7 per cent occurred in hired employment. In contrast, retail sales exceeded its 1953 record by 3.8 per cent in 1959 (Figure 6), and payroll was up 1.0 per cent (Figure 7). Total commercial activity[5] increased by 37.1 per cent and value of exports[6] increased by 37.3 per cent.

Coal was the most important contributor to the local economy up to 1954 when it was replaced in importance by oil, gas, and other minerals. In terms of value produced, the replacement has been rather equal. The estimated total value of all minerals produced in 1959 was $40,667,000.[7] A comparable figure for 1953 before coal production took the big drop, was $35,599,000 for all minerals produced. The oil and gas share of the 1953 estimate was $13,610,000, while the 1959 value was $23,510,000.

From the standpoint of persons employed, the mineral extraction industry has become less important in recent years. The increase in oil and gas production was not accompanied by an equivalent increase in employment. Consequently, total hired employment for all mineral extraction industries dropped to 1,500 persons in very recent years from an earlier high of greater than 3,000 persons prior to 1954. Hired employment and

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[5]Nominally, total of sales by all retailers, wholesalers, general service firms, contractors, and local receipts by transportation and utilities. See Appendix C for greater detail.

[6]Value of exports will be explicitly defined in Chapter III. "Exports" here refers to non-local sales of commodities and services.

Figure 6

TRENDS IN RETAIL TRADE
SOUTHWESTERN WYOMING
COMPARED WITH THE STATE AND THE NATION
1947 - 1960
(1947 - 1949 — 100)
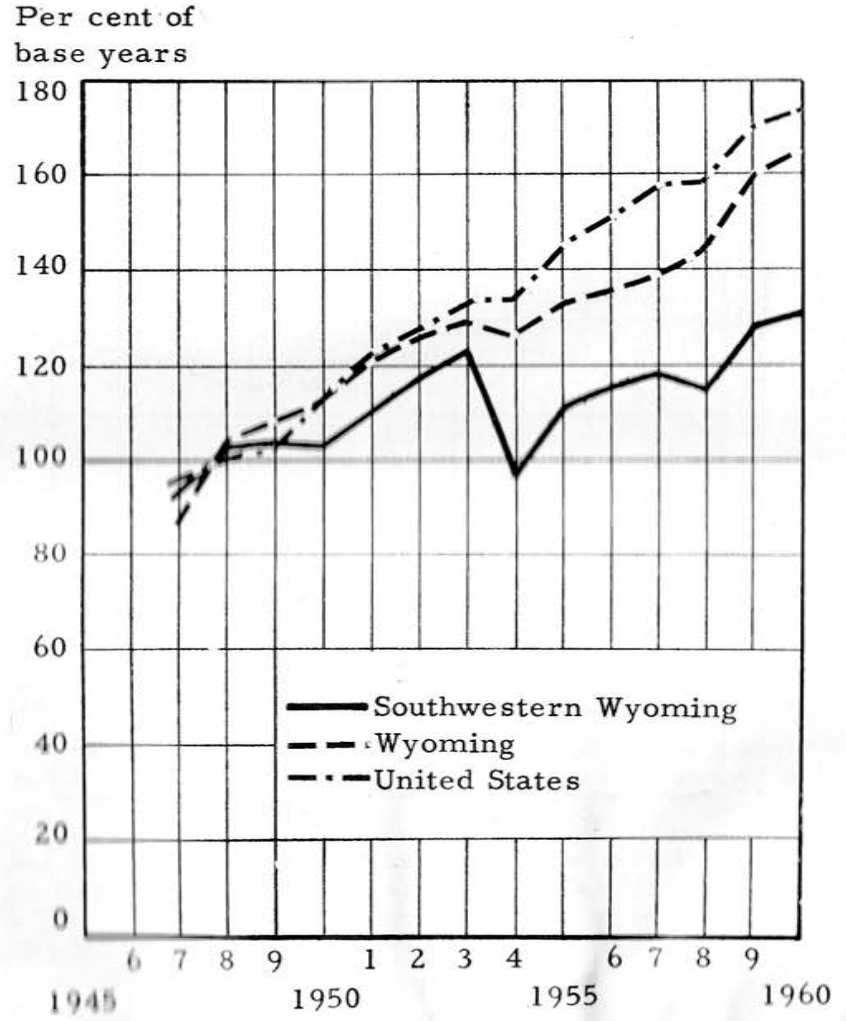
Source: U.S. Census of Business and estimates by the Division of Business and Economic Research, University of Wyoming.

Figure 7

ANNUAL TREND IN EMPLOYMENT AND PAYROLL
FOR ALL HIRED WORKERS
Southwestern Wyoming
1950 - 1960
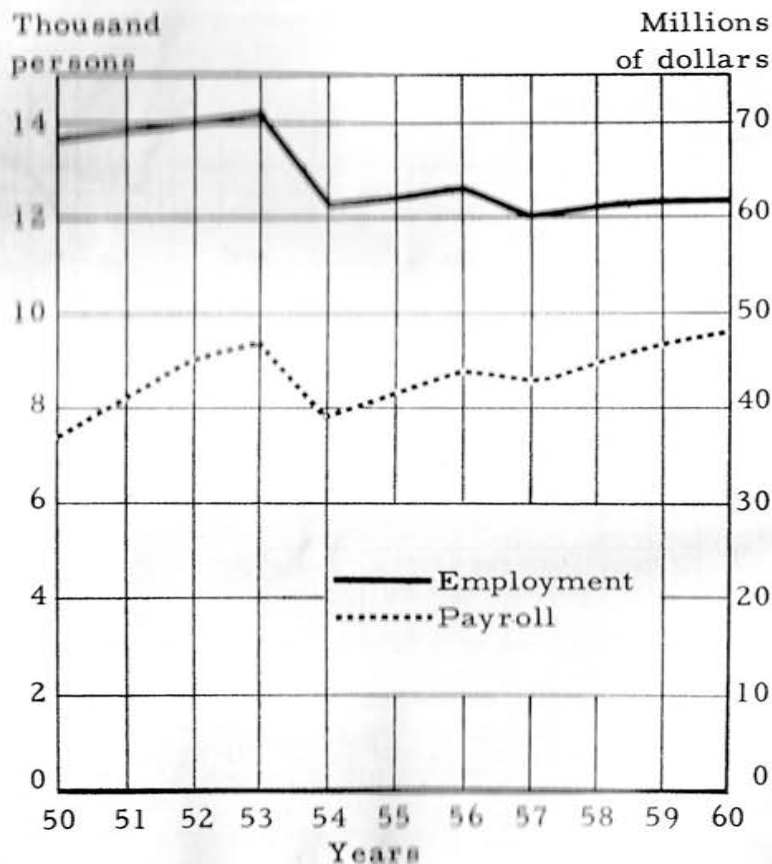
payroll data are shown in Figure 7 for all of Southwestern Wyoming, and employment for mineral producers is shown in Figure 8.

The railroad has been a very important contributor to the local economy since its early entrance. While coal production was largely associated with the railroad, a major contribution was also made in the form of hiring local people to service through traffic. This significant contribution has been declining in recent years as may be noted in Figure 9. Hired employment dropped from 2,130 persons in 1953 to 1,380 persons in 1959 for this industry.

Gross receipts for the agriculture industry amounted to $14,779,000 in 1953 and $18,106,000 in 1959.[8] In recent years, agriculture receipts have remained quite stable. There have, of course, been some fluctuations caused by changes in market prices and weather conditions.

Agriculture in Southwestern Wyoming is largely based on livestock raising. Nearly 90 per cent of the receipts mentioned above resulted from sale of livestock and livestock products. Receipts from all cattle, including dairy herds made up 51.7 per cent of the total, while sheep, lambs and wool contributed 27.2 per cent. Other livestock products produced 9.5 per cent of total receipts. While many short season crops grow very well in Southwestern Wyoming, most of the crops are associated with the livestock industry. In 1959, crop sales amounted to 5.5 per cent of the total gross receipts.

Southwestern Wyoming's location on a major east-west highway provides considerable basic income in terms of purchases by auto travelers and truck drivers. In addition, a significantly large contribution is made by parties traveling on highways north and south through Southwestern Wyoming in association with the Teton-Yellowstone Park recreation area and by the few travelers considering the recreation areas in the northern part of Southwestern Wyoming as their goal. These purchases by travelers and truck drivers represent basic income to retailers and service firms. Their total contribution is estimated to be $10,468,000 in 1953, and $12,411,000 in 1959.[9]

The economy of Southwestern Wyoming receives some support from several other sources. Among the more important are investment in construction, export sales by local wholesalers, a small amount of manufacturing, and income received by local residents from property owned outside the area (dividends, interest, etc.). In addition, money spent by the state and federal governments assists the local economy. Included here are salaries, welfare money, and many other contributions. These miscellaneous sources have become much more important to the local economy in recent years.

Source: Estimates from data obtained from the Employment Security Commission, railroad, various governmental agencies, and the U.S. Census of Agriculture.

[8]Estimates prepared by the author from U.S. Department of Agriculture and U.S. Census of Agriculture data.
[9]Estimates based on a survey by the author in 1960.

—16—

—17—

Figure 8

TREND IN AVERAGE ANNUAL HIRED EMPLOYMENT
FOR EXTRACTIVE INDUSTRIES
COVERED BY EMPLOYMENT SECURITY LAWS
Southwestern Wyoming
1950 - 1960
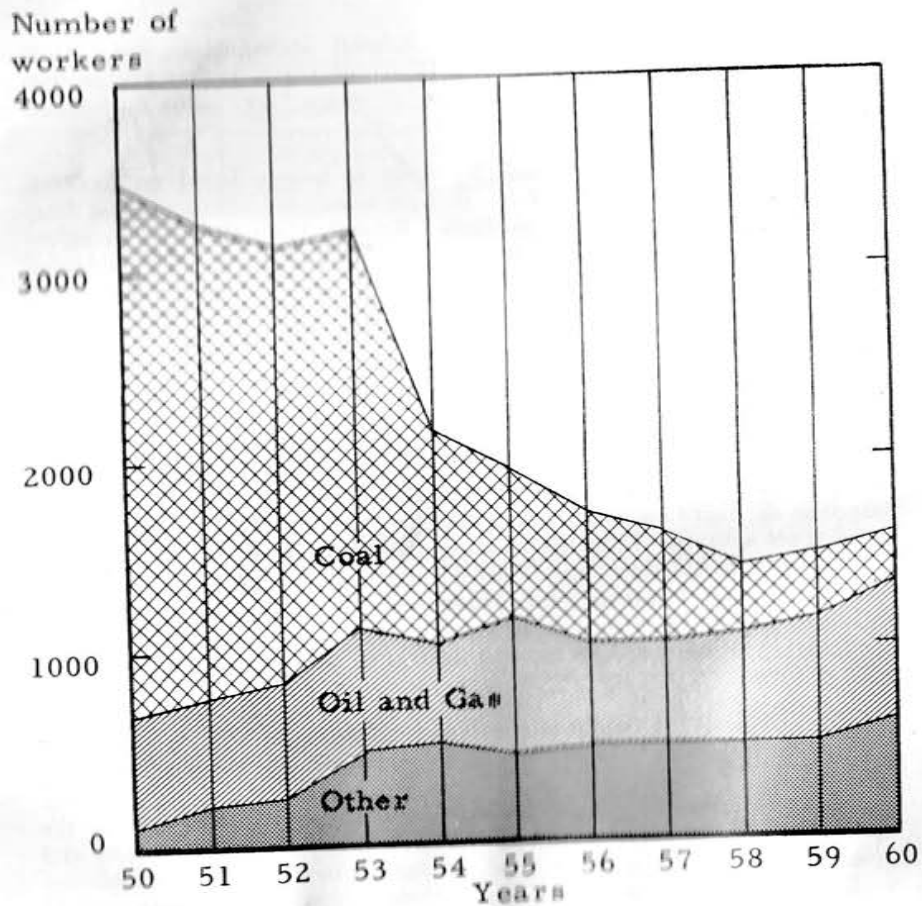
Figure 9

TREND IN AVERAGE ANNUAL HIRED EMPLOYMENT
FOR RAILROADS
Southwestern Wyoming
1950 - 1960
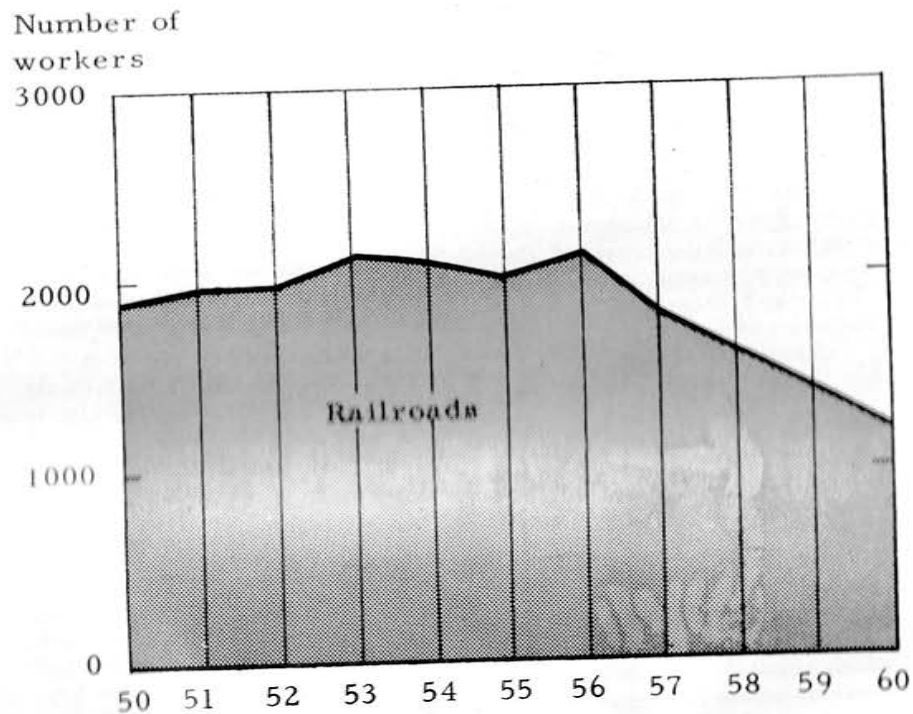
CHAPTER III

THE ECONOMY OF 1953

The over-all economy of Southwestern Wyoming was operating at a record level in 1953. Retail sales had surpassed all previous records. Total hired employment was at an all-time high. A high point in population was reached in the *1950 Census of Population* and without a doubt this level was maintained through 1953.

This high level was reached even though some sources of basic income were down somewhat from earlier levels. Of course, some sources were also at record highs. Coal production, a major supporter of the local economy, was down slightly from the war years of 1941 through 1945. Consequently, hired employment by this industry was also down. Railroad employment was holding a similar level to that of the war years. Oil and gas production was at the top of a long but steady upward trend. Oil and gas exploration, while down slightly from 1952, had remained at a quick pace, possibly in anticipation of the new gas market to be opened upon the completion of the proposed Pacific Northwest pipeline. The new trona mine and processing plant was just getting under way in quantity production. The agriculture industry's expenditures were still riding high on the record livestock and wool prices of 1951 and 1952.

Special concern will now be directed toward this record year in the life of the Southwestern Wyoming Economy. Primary aim will be to establish a base to which a later outstanding year, 1959, can be compared. However, in this chapter, emphasis is also given to developing an analytical scheme for making such a comparison and for use in a later forecast.

Premise Behind the Analysis

Every local economy can be considered as taking part in certain activities which tend to bring "new" money into the economy. Such activities are termed "basic activities" and the money they bring in is termed "basic income." These basic activities can be contrasted to "secondary activities" which result from this basic income working its way through the local economy before leaking to purchase additional goods and services from outside the local economy.

The local economy of Southwestern Wyoming was noted earlier to be oriented toward producing coal, oil, gas, and other minerals; agricultural products; and toward providing service and commodity requirements to travelers and truck drivers from outside the local economy. In addition, a sizeable contribution has occurred in the form of the railroad employing local people to handle non-local traffic.

These sources, along with contributors such as manufacturing for export,[1] payments by the state and federal governments to persons in the local

[1] As will be explained in the next few pages, export sales will denote selling of commodities or services to someone located outside the local economy.

area, and investment in construction projects can be represented as the life blood of the local economy. If all these sources were curtailed, according to the premise, the local economy would immediately crumble.

Secondary activity, in turn, results from these basic income dollars moving throughout the local economy while meeting the input needs of industries and workers taking part in basic activities. Much of the commercial activity, especially trade and local services, and even some producing functions, fall into this secondary activity category.

Total economic activity can be considered as the result of combining basic and secondary activity. This concept may be expressed mathematically as:

Total Economic Activity = Basic Activity + Secondary Activity.

This concept as developed so far is fine, but how can it be applied? What can be used to measure either total or basic economic activity? Where does the individual industry, business, or even person fit into the whole scheme? How is an industry serving both "within the economy" and "outside world" needs divided? Thus, considerable refinement is necessary before this concept can be applied to an actual situation.

"Economic activity" is manifested in units of output—that is, tons of coal, head of livestock, or man-hours of service? However, the usual convention is to convert these output units to an exchange medium or dollars. Different commodities then, take on a common denominator and are easily handled in combinations. Output is then measured in dollars of sales.

A single industry or often a single business seldom exists to serve strictly either the "outside world" or the "local economy." Thus, the procedure will be adopted to term a sale made to someone or a business outside the local economy to be a basic activity, and a sale made to someone inside the economy to be a secondary activity. Such a convention obliterates somewhat any clear distinction which may be possible in some cases between basic and secondary activity. For example, a business selling a raw material to a local processor for export from the economy would be thought by most persons to be taking part in basic activity. However, with little change in criteria, a retail store selling groceries to the work force of this industry making the actual export could also be considered as a basic industry. Consequently, the convention of considering a "within economy sale" as denoting secondary activity, and a sale to the "outside world" as denoting basic activity alters the basic concept slightly, but this convention is necessary to the workable model being developed. Possibly better nomenclature would be to orient discussion around "export sales," "local sales," and "total sales." The word "export" as used here refers to all "non-local sales" rather than sales to foreign countries exclusively.

The model being developed, may at this point, be expressed mathematically as:

Total Sales = Export Sales + Local Sales

or

$$X = Y + Z$$

Where: X = Total Sales
Y = Export Sales
Z = Local Sales

Since secondary activity is a result of basic income dollars moving throughout the local economy, it may be deduced that the two are somewhat related in magnitude—that is, as basic income increases, secondary activity increases by a somewhat proportional amount. Such a deduction is true. However more accurately, secondary activity increases more nearly in direct proportion to increases in total economic activity. In other words, local sales vary in direct proportion to total sales. The realism to such an argument can be seen more clearly by noting that total local sales are, of course, equal to total local purchases and that purchases such as raw materials or even labor costs tend to vary directly in proportion to total output or total sales. The model in mathematical notation becomes:

$$X = Y + AX \qquad \text{Where:} \quad AX = Z = \text{Local Sales}$$

In the above equation A is a proportionality constant showing the proportion of total sales that are contributed by local sales. To give feeling to these mathematical symbols, 1953 data for Southwestern Wyoming can be inserted:

In 1953:

X = Total Sales — $216,463,000
Y = Export Sales — $ 93,349,000
Z = Local Sales — $153,114,000

Thus: $A = \dfrac{\$153,114,000}{\$246,463,000} = 0.621$

And: $246,463,000 = \$93,349,000 + 0.621 (\$246,463,000)$

The reader is now probably far from exicited over this simple model: thus, an elementary application is appropriate at this point. It was known in 1953 that the coal mining industry was going to curtail operations drastically in future years. How much effect will this have on the economy? A rather unrefined answer will now be attempted using the data along with the following assumption:

1. Assume that the relationship of local to total sales remains constant (i. e., that A does not change) even though coal production is reduced.

2. Coal export sales amounted to about $17 million in 1953. Assume this decreases to $250,000 in the future or an overall decrease of $16,750,000 occurs.

Now insert this data into the above model.

A = 0.621   (same as before)
Y = $93,349,000 — $16,750,000 = $76,599,000
X is unknown.
X = Y + AX

or

$X = (1-A)^{-1}Y$
Thus: $X = (1 - .621)^{-1} (\$76,599,000)$
$X = \$202,068,000$

As a result of the drop in coal exports, total sales can be expected to decrease by *roughly* $44,395,000. This result must be qualified by "roughly" since there are a great many weaknesses in this model in its current state. For example, nearly every reader will argue that the proportionality constant A will change as one industry's contribution to the economy is changed. The most that can be hoped for is that the equivalent A pertaining to the purchases by an individual industry will remain constant as out-put of that industry varies.

In addition, the retailer is much more concerned about how total retail sales will change with a change in export sales than he is concerned about the entire local economy. Likewise, local government officials are concerned with how total local government revenues will change.

Thus, considerable improvement in the model is necessary. A usual refinement is to change X to represent a column where every element is the total sales of an individual industry and in a similar manner allowing Y to represent a column of export sales figures showing exports by industry. Symbol A then, represents an entire table of little "a's" where each "a" shows local sales by one local industry to another local industry (or in different wording, purchases by one local industry from another local industry). Use of matrix algebra then allows these tables of sales data to be manipulated in the same manner as was done above. Expected total sales by an individual industry can then be estimated if an export pattern can be forecasted (i. e., the pattern above considered all exports to remain constant except for a decline in coal).

This more refined mathematical model[a] is discussed in somewhat greater detail in Appendix A for interested readers. Attention will now be turned to constructing the tables required and performing a detailed analysis of the Southwestern economy in 1953. Such tables require a quantity of rather detailed data. A discussion of sources of data and additional survey work for supplying unavailable data is included as Appendix C.

Activity in 1953 as Described by Input-Output Tables

In applying this analytical scheme the economy is considered as being made up of several industries—each being related in some manner to another industry. Government is treated as being an industry as are transportation and mining. In like manner a "household" industry is created to signify receipts and disbursements by residents of the local area.

A table is then constructed showing the purchases by each local industry from every other local industry and from outside the local economy. Since each purchase also represents a sale by another industry, it is possible to view the table as representing sales by one industry to another as well. A special segment of the table indicates sales to persons or industries outside of the economy. It is these *sales* to persons outside the economy which denote *basic income* as described previously. The *purchases* from industries located outside the economy represents *leakage* or the parting of the dollar

[a]This model is technically known as Leontief's static input-output model.

brought into the economy in the form of basic income. Such a table representing inter-industry flow of dollars in 1953 is shown as Table I.[3] in a later chapter a similar table for 1959 has been constructed.

This table summarizes, in thousands of dollars, all transactions involving sale and purchase of goods or services in Southwestern Wyoming during the year 1953. The economic activity in the economy was divided into 27 different classifications or industries. There are row and column totals indicating the total output (or sales) for each one of the different classifications. The section set off by heavy lines at the far right containing columns labeled "Export" and "State and Federal Government Purchases and Payments" represents the *value of commodities or service sold outside of the local economy;* i. e., "basic income." The section divided off on the lower part of the table containing rows titled "State and Federal Government" and "Imports" represents *money leaving the economy* to either pay state and federal government taxes or to import commodities and services from persons or businesses located outside the local economy. The remaining large section of the table in the upper left-hand corner represents economic activities taking place within the economy between one industry and another. This is sometimes called the "processing sector" of the inter-industry table.

Since a complete understanding of these tables is vital to understanding much of the analysis to follow, considerable attention will now be given to examining their many details. Readers already familiar with input-output tables may wish to leaf through the next few pages.

Distribution of Each Industry's Input-Output

When Table I is read from left to right the reader is able to see how each industry distributes its goods and services. For example, agriculture (row number 1) had a total output of $14,779,000 during 1953. About three-fourths of this ($11,656,000) was exported—sold outside of the economy. Another $135,000 was received from the federal government in the form of agriculture stabilization and conservation payments. The remainder of output represents sales within the processing sector of the local economy. Agriculture itself received $1,269,000 in sales from agriculture. Another $1,178,000 went to non-lumber manufacturing in the form of sales to milk and cream processing plants. The reader, of course, may use this technique further to discover the other sales within the processing sector of agriculture. Of course, the same procedure applies for tracing sales by any other industry of interest.

As indicated previously, local government is treated the same as any other industry. The figures obtained by following the row left to right indicate taxes and other revenue collected by local governments instead of sales as indicated for other industries. The reader may wish to think of this activity as consisting of local governments selling their services to the different industries in return for their payment of taxes.

Total output for the "Household" industry was $68,453,000 in 1953. This essentially is the same as "realized personal income" which can be compared quite closely to the series developed by the Department of Com-

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[3]Appendix C includes a detailed definition of the types of businesses included in each industry grouping.

Table I

INTERINDUSTRY TRANSACTIONS
Southwestern Wyoming
1953
($1000's)

	1 AGRICULTURE	2 MINERALS: OIL & GAS PRODUCTION	3 MINERALS: OIL FIELD SERVICE	4 MINERALS: OTHER MINERAL PROD.	5 MANUFACTURING: LUMBER	6 MANUFACTURING: OTHER	7 TRANSPORTATION	8 UTILITIES	9 WHOLESALE: GENERAL	10 WHOLESALE: FARM PRODUCT HANDLERS	11 RETAIL: BLDG. MATERIAL & IMPLEMENT	12 RETAIL: GAS & AUTO	13 RETAIL: EAT & DRINK	14 RETAIL: ALL OTHER	15 SERVICE: LODGING	16 SERVICE: BUSINESS & PROFESSIONAL	17 SERVICE: REPAIR	18 SERVICE: ALL OTHER	19 REAL ESTATE RENTAL	20 FINANCE	21 CONTRACTORS: BUILDING	22 CONTRACTORS: OTHER	23 LOCAL GOVERNMENT	24 HOUSEHOLD CONSUMPTION	25 STATE & FEDERAL GOVERNMENT PURCHASING & PAYMENTS	26 EXPORTS	TOTAL OUTPUT
1 AGRICULTURE	1,269	—	—	—	—	1,178	329	—	43	84	29	—	—	55	1	—	—	—	—	—	—	—	—	—	135	11,656	14,779
2 MINERALS: OIL & GAS PRODUCTION	—	632	—	—	—	1	—	797	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12,180	13,610
3 MINERALS: OIL FIELD SERVICE	—	1,789	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3,304	5,093
4 MINERALS: OTHER MINERAL PROD.	—	2	—	4	—	19	—	7	—	—	—	—	—	2	—	—	—	—	—	—	—	—	8	368	—	21,581	21,989
5 MANUFACTURING: LUMBER	127	2	—	275	2	1	—	1	1	—	9	5	—	—	—	—	—	27	—	—	54	5	8	—	—	170	687
6 MANUFACTURING: OTHER	34	1	77	—	1	4	3	4	9	1	7	101	167	1,117	5	1	6	30	29	10	56	17	20	870	—	458	3,038
7 TRANSPORTATION	440	12	246	20	57	64	—	33	153	4	335	142	35	487	11	3	2	20	3	3	141	23	30	840	13	12,329	15,446
8 UTILITIES	203	61	16	858	18	38	213	12	28	7	25	166	194	244	191	17	16	125	109	29	51	21	244	1,174	39	257	4,356
9 WHOLESALE: GENERAL	826	147	57	28	64	16	346	385	83	44	38	3,228	1,563	2,554	396	160	79	171	44	—	110	71	105	138	246	—	10,899
10 WHOLESALE: FARM PRODUCT HANDLERS	509	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	318	827
11 RETAIL: BLDG. MATERIAL & IMPLEMENT	947	55	11	207	17	44	9	7	194	—	24	28	27	110	52	3	6	72	225	15	483	20	138	2,311	15	1,280	6,300
12 RETAIL: GAS & AUTO	723	—	—	—	11	20	200	4	43	64	64	458	11	144	3	25	62	70	—	20	107	107	234	10,410	33	4,964	17,777
13 RETAIL: EAT & DRINK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5,686	—	2,423	8,109
14 RETAIL: ALL OTHER	30	27	334	133	3	5	15	165	29	2	103	56	405	1,078	124	6	9	54	59	17	45	16	41	21,523	—	730	25,009
15 SERVICE: LODGING	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,945	1,945
16 SERVICE: BUSINESS & PROFESSIONAL	157	143	9	4	3	13	10	29	22	3	17	80	51	82	11	12	9	74	34	95	16	1	8	99	—	30	1,012
17 SERVICE: REPAIR	—	2	44	5	13	7	58	44	22	3	15	—	25	36	22	6	1	38	19	3	20	82	17	269	3	—	754
18 SERVICE: ALL OTHER	—	1	16	145	—	3	2	1	4	1	3	26	27	49	72	—	2	43	6	3	2	—	445	2,522	710	406	4,489
19 REAL ESTATE RENTAL	—	11	44	4	8	24	22	7	36	—	15	152	179	232	68	39	25	72	—	71	14	3	5	834	25	—	1,890
20 FINANCE	314	4	92	—	23	52	44	74	38	7	86	114	71	93	55	5	16	87	196	27	26	39	16	1,080	—	156	2,715
21 CONTRACTORS: BUILDING	179	28	—	87	24	57	3	12	10	1	4	18	28	68	26	—	5	40	154	22	199	—	70	1,055	11	2,900	5,001
22 CONTRACTORS: OTHER	167	464	—	1,420	—	—	—	—	—	—	4	14	—	—	—	—	—	—	—	—	3	612	—	—	—	3,904	6,584
23 LOCAL GOVERNMENT	993	277	54	268	3	16	743	180	21	3	26	92	93	79	12	4	3	27	205	16	21	25	—	332	—	—	5,701
24 HOUSEHOLD: PAYROLL	3,459	1,495	1,810	11,321	275	553	10,326	981	524	37	735	1,311	1,563	1,751	424	156	95	1,532	—	515	1,706	1,429	2,643	—	—	2,480	47,121
PROFIT & OTHER	2,907	1,011	337	329	63	98	149	56	300	71	177	3,005	805	1,709	237	414	212	297	465	983	556	175	546	—	—	2,638	21,332
25 STATE & FEDERAL GOVT. REVENUE	265	937	104	295	84	31	785	125	1,243	8	76	165	354	555	22	9	12	71	51	30	63	57	48	7,549	—	—	12,937
26 IMPORTS	1,230	6,511	1,842	6,586	18	794	2,189	1,431	8,096	490	4,512	8,616	2,511	14,564	214	152	194	1,639	291	856	1,328	3,873	1,083	11,393	4,381	—	84,793
TOTAL INPUT	$14,779	$13,610	$5,093	$21,989	$687	$3,038	$15,446	$4,356	$10,899	1827	$6,300	$17,777	$8,109	$25,009	$1,945	$1,012	$754	$4,489	$1,890	$2,715	$5,001	$6,584	$5,701	$68,453	$12,937	$84,793	$344,193

Source: Survey 1964; See appendix B.

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merce. "Households" may be regarded as selling their labor services to each of the industries denoted at the top of each column of data.

Each entry in Table I is a *sale* from the viewpoint of the industry listed at the *left* of the row and *also* each entry is a *purchase* from the viewpoint of the industry listed at the *top* of the column. Therefore, each column records all the purchases of the industry listed at the top as does each row represent all sales by the industry listed at the left. From the accounting point of view, each industry's row shows receipts while each industry's column shows expenditures.

As an example, agriculture is also considered to have made a total expenditure of $14,779,000 during 1953. This, of course, is the same figure as was previously shown to be the total output or sales by agriculture. In following the column for agriculture downward, we note that agriculture purchased $1,269,000 from agriculture, and $826,000 (largely motor fuel) from general wholesalers. And, in addition, agriculture purchased a total of $6,366,000 worth of services from the household sector. This represents payroll, profit, and a few other receipts occurring to "Household." Agriculture imported or made purchases outside of the economy amounting to $1,230,000. The reader at this time may wish to examine purchases by other industries of his interest.

The columns labeled "local government" and "state and federal government" indicates purchases by these governmental organizations. Likewise, the column labeled "exports" may be thought of as a purchase by persons or industries located outside of the local economy.

Total Input-Output

Previously, total output was represented as equaling total selling activity by an industry. Nevertheless, selling is defined somewhat differently for some industries. In agriculture total output represents total dollars received by farmers and ranchers from all products and equipment sold plus conservation and stabilization payments received from the federal government. In a similar manner, total output for retail stores are simply gross sales. Total output for the finance industry represents the receipt of interest, commissions, service charges, dividends, etc.

Since the home office of most mineral producers is located outside of Southwestern Wyoming, a decision had to be made as to what "sales" figure to use. The actual dollars received from product sales usually goes to the home office and only dollars for paying local expenses find their way to the local area. Most non-locally purchased supplies, state and federal government taxes, and amortization of investments are handled from the home office.

For the study the convention of using *value of minerals shipped* from the economy was adopted. Such a measure had meaning to most persons and it could easily be determined for different years. The mineral producer could then be regarded as a local entity which purchases services from the home office amounting to much of the difference between value of product shipped and local expenses. These purchases from the home office located outside the economy would be regarded as an import and thus represent dollars leaving the economy.

Total output by the transportation industry represents total services performed by local people as determined by the amount paid to these local people, paid in taxes, and by purchases made locally. This total output does not agree with total receipts from local operation discussed in association with commercial activity. For this economy transportation receipts are less than was paid out in services to local people and businesses as a result of the through nature of the railroad.

The total output figure for local governments and for state and federal governments represents the total amount of taxes and other revenue collected from within the economy. In addition, the total output for local government includes an estimate of payments received from the state and federal governments in the form of school foundation equalization payments, welfare payments, etc.

Total input (purchasing) has been made to equal total output. This convention has undoubtedly troubled the reader since such a situation would only occur by coincidence. Nevertheless, it is generally recognized that in the long run receipts do equal disbursements. This convention also assists understanding by accounting for all dollars moving both in and out of the economy.

Direct Purchases per Dollar Total Activity (Input Coefficients)

The usefulness of Table I in its present form is limited to examining aggregate economic relationships which bind together various industries within southwestern Wyoming. In this form, Table I might be of value to a particular type of retailer who can trace the consumption pattern of his product among different industries and determine export sales. In noting this pattern he can estimate the results of changing economic factors on the sale of his product. However, purchasing patterns by any certain industry can be analyzed more easily if they are placed on a percentage basis— that is on a fraction of total purchases made by the industry.

As mentioned previously, the column of figures for each industry listed at the top of the column indicates how much that industry purchased from every industry listed at the right. If the figures in each column are divided by the total of the column, (actually by total output) the result represents purchases by a decimal equivalent (percentage). These decimal amounts would then show the distribution of a particular industry's purchases from all other industries as a fractional amount of total purchases (or total output). The total of each column is then, of course, 1.0000. This division process was used to produce Table II.

Through use of Table II, it may be seen that for each dollar of total output (input) by agriculture, that about nine cents, or .0859 of one dollar is used in purchasing other products from agriculture. In a like manner, about seven cents is paid out for local government taxes and about forty-three cents is paid out in terms of payroll or goes as profit to the farmer or rancher.

Further Application

The input-output technique of analysis does not stop with the mere construction of the gross transaction table and a table of input coefficients.

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Table II

DIRECT PURCHASES PER DOLLAR OF TOTAL ACTIVITY*
(Input-Coefficients)
Southwestern Wyoming
1953

	1 AGRICULTURE	2 MINERALS: OIL & GAS PRODUCTION	3 MINERALS: OIL FIELD SERVICE	4 MINERALS: OTHER MINERAL PROD.	5 MANUFACTURING: LUMBER	6 MANUFACTURING: OTHER	7 TRANSPORTATION	8 UTILITIES	9 WHOLESALE: GENERAL	10 WHOLESALE: FARM PRODUCT HANDLERS	11 RETAIL: BLDG. MATERIAL & IMPLEMENT	12 RETAIL: GAS & AUTO	13 RETAIL: EAT & DRINK	14 RETAIL: ALL OTHER	15 SERVICE: LODGING	16 SERVICE: BUSINESS & PROFESSIONAL	17 SERVICE: REPAIR	18 SERVICE: ALL OTHER	19 REAL ESTATE RENTAL	20 FINANCE	21 CONTRACTORS: BUILDING	22 CONTRACTORS: OTHER	23 LOCAL GOVERNMENT	24 HOUSEHOLD CONSUMPTION	25 STATE & FEDERAL GOVERNMENT PURCHASES & PAYMENTS	26 EXPORTS	TOTAL OUTPUT
1 AGRICULTURE	.0859	—	—	—	—	.3878	.0213	—	.0039	.1016	.0046	—	—	.0022	.0005	—	—	—	—	—	—	—	—	—	.0104	.1375	.0429
2 MINERALS: OIL & GAS PRODUCTION	—	.0464	—	—	—	.0003	—	.1830	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.1436	.0395
3 MINERALS: OIL FIELD SERVICE	—	.1314	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.0390	.0148
4 MINERALS: OTHER MINERAL PROD.	—	—	—	.0002	—	.0063	—	.0016	—	—	—	—	—	.0001	—	—	—	—	—	—	—	.0012	—	.0054	—	.2545	.0639
5 MANUFACTURING: LUMBER	.0086	.0001	—	.0125	.0029	.0003	—	.0002	.0001	.0014	.0003	—	—	—	—	—	.0060	—	—	.0108	.0008	.0014	—	—	—	.0020	.0020
6 MANUFACTURING: OTHER	.0023	.0001	.0151	—	.0015	.0013	.0002	.0009	.0008	.0012	.0011	.0057	.0206	.0447	.0026	.0010	.0080	.0067	.0153	.0037	.0112	.0026	.0035	.0127	—	.0055	.0088
7 TRANSPORTATION	.0298	.0009	.0483	.0009	.0830	.0211	—	.0076	.0140	.0048	.0532	.0080	.0043	.0195	.0057	.0030	.0027	.0045	.0016	.0011	.0282	.0035	.0053	.0123	.0010	.0030	.0449
8 UTILITIES	.0137	.0043	.0031	.0390	.0262	.0125	.0138	.0028	.0036	.0040	.0093	.0239	.0098	.0982	.0168	.0212	.0276	.0577	.0107	.0102	.0032	.0428	.0171	.0030	.0030	—	.0127
9 WHOLESALE: GENERAL	.0559	.0108	.0112	.0013	.0932	.0053	.0224	.0884	.0076	.8532	.0060	.1816	.1927	.1021	.2036	.1581	.1048	.0381	.0233	—	.0220	.0108	.0184	.0020	.0190	—	.0317
10 WHOLESALE: FARM PRODUCT HANDLERS	.0344	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.0038	—	.0024
11 RETAIL: BLDG. MATERIAL & IMPLEMENT	.0641	.0040	.0022	.0094	.0247	.0145	.0006	.0016	.0178	—	.0038	.0016	.0033	.0044	.0267	.0030	.0080	.0160	.1190	.0055	.0966	.0030	.0242	.0338	.0151	.0183
12 RETAIL: GAS & AUTO	.0489	—	—	—	.0160	.0066	.0129	.0009	.0039	.0774	.0102	.0258	.0014	.0058	.0015	.0247	.0822	.0156	—	.0074	.0214	.0163	.0410	.1521	.0585	.0516
13 RETAIL: EAT & DRINK	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.0831	.0026	.0286	.0236
14 RETAIL: ALL OTHER	.0020	.0020	.0656	.0060	.0044	.0016	.0010	.0379	.0027	.1024	.0163	.0031	.0499	.0431	.0638	.0059	.0119	.0120	.0312	.0063	.0090	.0024	.0072	.3144	.0086	.0727
15 SERVICE: LODGING	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	.0229	—	.0057
16 SERVICE: BUSINESS & PROFESSIONAL	.0106	.0105	.0018	.0002	.0044	.0043	.0006	.0067	.0030	.0036	.0027	.0045	.0063	.0033	.0057	.0119	.0119	.0165	.0180	.0350	.0032	.0002	.0014	.0014	.0004	.0029
17 SERVICE: REPAIR	—	.0001	.0086	.0002	.0189	.0023	.0038	.0101	.0030	.0036	.0024	—	.0031	.0014	.0113	.0059	.0013	.0085	.0101	.0011	.0040	.0125	.0030	.0039	.0002	—	.0022
18 SERVICE: ALL OTHER	—	.0001	.0031	.0066	—	.0010	.0001	.0002	.0084	.0012	.0005	.0015	.0033	.0020	.0370	—	.0027	.0096	.0032	.0011	.0004	—	.0781	.0368	.0549	.0048	.0130
19 REAL ESTATE RENTAL	—	.0008	.0086	.0002	.0116	.0079	.0014	.0016	.0013	—	.0024	.0086	.0221	.0093	.0350	.0385	.0332	.0160	—	.0262	.0028	.0005	.0009	.0122	.0019	—	.0055
20 FINANCE	.0212	.0003	.0181	—	.0335	.0171	.0028	.0170	.0015	.8085	.0137	.0064	.0088	.0037	.0283	.0049	.0212	.0194	.1037	.0099	.0052	.0059	.0028	.0153	—	.0018	.0079
21 CONTRACTORS: BUILDING	.0121	.0021	—	.0040	.0349	.0189	.0002	.0028	.0029	.0012	.0006	.0010	.0035	.0027	.0134	—	.0066	.0089	.0815	.0081	.0398	—	.0123	.0154	.0009	.0342	.0145
22 CONTRACTORS: OTHER	.0113	.0341	—	.0646	—	—	—	—	—	—	.0008	—	—	—	—	—	—	—	—	—	.0006	.0930	—	—	—	.0460	.0191
23 LOCAL GOVERNMENT	.0672	.0204	.0106	.0122	.0044	.0053	.0481	.0413	.0019	.8036	.0041	.0052	.0115	.0032	.0062	.0040	.0040	.0060	.1085	.0059	.0042	.0038	—	—	.0049	.1707	.0166
24 HOUSEHOLD CONSUMPTION	.4307	.1841	.4216	.5298	.4920	.2143	.6782	.2381	.0656	.0006	.1448	.2428	.2920	.1384	.3398	.5632	.4672	.4074	.2460	.5518	.4523	.2436	.5594	—	.3956	.0447	.1989
25 STATE & FEDERAL GOVT. REVENUE	.0179	.0688	.0204	.0134	.1223	.0102	.0508	.0289	.1140	.8160	.0121	.0093	.0437	.0222	.0113	.0089	.0159	.0158	.0270	.0110	.0126	.0087	.0084	.1103	—	—	.0376
26 IMPORTS	.0832	.4784	.3617	.2995	.0262	.2614	.1417	.3285	.7409	.3925	.7162	.4847	.3097	.5824	.1095	.1502	.2573	.3651	.1540	.3153	.2655	.5882	.1900	.1664	.3386	—	.2464
TOTAL INPUT**	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

*Each entry in Table I divided by the total input at the bottom of each column.
**Slight difference from actual sum due to rounding of detail.
Source: Survey 1954; See appendix D.

While data shown in these tables are of considerable value, by making certain assumptions, it is possible to extend the analysis to acquire a considerably greater understanding of the actual dollar movements within an economy.

While several assumptions are actually required before the following analysis can be made, the major assumption required for the following analysis is that the purchases by an industry are directly related to the total output of that industry.[4] This means, somewhat more specifically, that the input coefficients previously described hold true regardless of output by an industry. This is analogous to saying earlier that the proportionality constant A would not change.

Of course, the assumption that the purchasing pattern of an industry does not change as the output of that industry changes is never completely true in the real situation. It is changes such as these that will be given a detailed examination in the next chapter. As an example of how puchasing patterns may change, if the receipts from sales of farm products were reduced considerably by declining prices of these farm products, it would alter the purchasing pattern of the agriculture sector since the prices of the purchases by the agriculture sector are controlled by both non-agriculture and agriculture oriented industries. In other words, the price of cattle probably has very, very little influence on the price of motor fuel purchased by the rancher. Nevertheless, it is possible to live with this assumption for the analysis currently at hand, as it will be shown in a later chapter that the purchasing pattern does remain fairly constant and aggregate purchases are to a large extent related to total output.

As in the earlier simplified model, the above described assumption says that the processing sector as a unit has a definite relationship to the export column as a unit, and to the total output column as a unit. This induction regarding *all* industries is essentially just an extension of the assumption being applied to individual industries.

Since these three units have a defineable relationship, it is possible to manipulate them through the use of matrix algebra in the same manner as was done earlier for the simplified model. The results of such an algebraic manipulation is included as Table III which shows both direct and indirect economic activity resulting from one dollar in basic income entering the local economy.

Each element in Table III indicates the amount of business that the industry noted at the row heading on the left will receive for each dollar's worth of export made by the industry noted at the top of the column. In other words, if $1 worth of export is made by the agriculture industry, then total output, or business resulting to agriculture, amounts to this original $1 plus approximately an additional $.11. In a like sense, moving down the column for agriculture, this $1 worth of export by agriculture produces about $.31 worth of business for the "other retail" category. Thus, if the data given in each column for all different industries, excluding local government and household, is summed, the total amount of business produced from $1 worth of export would be obtained. The original $1, of course, is included in this aggregate estimate. Consequently, it may seem that for

[4]See Appendix A.

each dollar of export by agriculture (basic income finding its way to agriculture) that approximately $2.33 worth of total business is created. New business amounts to $1.33 while $1 represents the original amount. In addition, about $.09 worth of taxes result for local government and about $.82 worth of income is derived for the household sector.

It is common knowledge that when a dollar's worth of basic income enters an economy, that the effect of this dollar is felt by many different industries. Table III quantifies this effect after the original basic income has moved throughout all of the remaining inter-related industries of the economy, and eventually leaks away to sources outside of the economy. As a result, it may be thought that the model displayed by Tables I and II are static while Table III injects an infinite time element into the analysis. It shows both the direct and indirect effects to each industry after the original basic income has had a chance to work its way throughout the entire system.

While the above example for ariculture concerned an export valued at only $1, the reader can undoubtedly project this example forward to the situation of multi-dollar exports made by several different industries. For example, it is possible to take the $10,468,000 figure representing export sales to out-of-area travelers and truck drivers; divide this up into the amount of export sales made by different classes of retailers and service firms, and after proper multiplications are made to determine the resulting business produced for all classes of retailers, service firms, the finance industry, and even revenue to governments. The business produced would, of course, represent the ultimate effect of this basic income on the economy after the new money had had a chance to work its way into all segments of it. While this analysis is described in greater detail for travelers and truck drivers a little later, it may be noted that a total of $19,285,000 results from this original $10,468,000 in export sales. Thus, $8,817,000 worth of additional business is produced.

Major Sources of Basic Income and Their Economic Impact

As may be noted by viewing the inter-industry table, the industries delineated for Southwestern Wyoming cannot be readily divided into those strictly producing basic income and those strictly producing secondary activity. It can be seen that the usual so-called basic industries often depend, to some extent, upon the local market and many usually so-called secondary industries take part in some activities which introduce new money. In consequence, this section concerns export *activity* instead of particular industries. Nevertheless, the export activity can often be separated for discussion into the actual exports by one particular industry.

Major activities contributing basic income to Southwestern Wyoming in 1953 were the export of minerals and agriculture products, sales made to out-of-area travelers and trucks, purchases by the state and federal governments, investment in construction projects, and payroll and local tax revenue resulting from the railroad transportation activities. In addition, some manufacturing for export was carried out and wholesalers made some sales to persons located outside of Southwestern Wyoming. Table IV shows the value of exports considered to be in each one of these different activities. In all, a total of $93,349,000 worth of export and other basic income pro-

Table III
DIRECT AND INDIRECT ACTIVITY PER DOLLAR OF EXPORT
Southwestern Wyoming
1953

	1 AGRICULTURE	2 MINERALS: OIL & GAS PRODUCTION	3 MINERALS: OIL FIELD SERVICE	4 MINERALS: OTHER MINERAL PROD.	5 MANUFACTURING: LUMBER	6 MANUFACTURING: OTHER	7 TRANSPORTATION	8 UTILITIES	9 WHOLESALE: GENERAL	10 WHOLESALE: FARM PRODUCTS HANDLERS	11 RETAIL: BLDG. MATERIAL & IMPLEMENT	12 RETAIL: GAS & AUTO	13 RETAIL: EAT & DRINK	14 RETAIL: ALL OTHER	15 SERVICE: LODGING	16 SERVICE: BUSINESS & PROFESSIONAL	17 SERVICE: REPAIR	18 SERVICE: ALL OTHER	19 REAL ESTATE RENTAL	20 FINANCE	21 CONTRACTORS: BUILDING	22 CONTRACTORS: OTHER	23 LOCAL GOVERNMENT	24 HOUSEHOLD CONSUMPTION
1 AGRICULTURE	1.1145	.0078	.0198	.0125	.0171	.4393	.0389	.0100	.0075	.1182	.0117	.0100	.0192	.0282	.0156	.0149	.0154	.0140	.0200	.0147	.0182	.0076	.0139	.0201
2 MINERALS: OIL & GAS PRODUCTION	.0089	1.0523	.0051	.0122	.0107	.0087	.0087	.1951	.0015	.0042	.0027	.0044	.0083	.0042	.0239	.0087	.0088	.0097	.0168	.0072	.0067	.0031	.0138	.0073
3 MINERALS: OIL FIELD SERVICE	.0012	.1383	1.0007	.0016	.0014	.0011	.0011	.0258	.0002	.0006	.0004	.0006	.0011	.0005	.0031	.0011	.0012	.0013	.0022	.0009	.0009	.0004	.0018	.0010
4 MINERALS: OTHER MINERAL PROD.	.0047	.0023	.0039	1.0047	.0048	.0102	.0054	.0044	.0008	.0018	.0016	.0022	.0030	.0020	.0039	.0047	.0038	.0037	.0040	.0045	.0042	.0035	.0049	.0073
5 MANUFACTURING: LUMBER	.0107	.0006	.0007	.0134	1.0042	.0051	.0011	.0004	.0003	.0014	.0018	.0007	.0007	.0006	.0012	.0008	.0008	.0069	.0021	.0009	.0121	.0012	.0828	.0011
6 MANUFACTURING: OTHER	.0303	.0155	.0398	.0251	.0298	1.0252	.0312	.0190	.0055	.0125	.0110	.0188	.0396	.0564	.0282	.0286	.0310	.0285	.0406	.0301	.0355	.0156	.0320	.0410
7 TRANSPORTATION	.0630	.0195	.0690	.0241	.1110	.0574	1.0276	.0252	.0192	.0196	.0621	.0223	.0237	.0323	.0320	.0289	.0250	.0254	.0327	.0241	.0566	.0152	.0320	.0344
8 UTILITIES	.0463	.0188	.0265	.0635	.0435	.0453	.0453	1.0220	.0076	.0219	.0143	.0232	.0431	.0217	.1247	.0454	.0457	.0504	.0875	.0376	.0347	.0161	.0718	.0380
9 WHOLESALE: GENERAL	.1649	.0551	.0850	.0799	.1864	.1086	.1192	.1463	1.0235	.1096	.0394	.2276	.2531	.1408	.2906	.2475	.1908	.1116	.1088	.0848	.1013	.0540	.1155	.1191
10 WHOLESALE: FARM PRODUCTS HANDLERS	.0384	.0003	.0007	.0004	.0006	.0151	.0013	.0003	.0003	1.0041	.0004	.0003	.0007	.0010	.0005	.0005	.0005	.0005	.0007	.0005	.0006	.0003	.0005	.0007
11 RETAIL: BLDG. MATERIAL & IMPLEMENT	.1142	.0242	.0358	.0458	.0713	.0790	.0476	.0287	.0253	.0243	1.0181	.0247	.0349	.0239	.0690	.0489	.0465	.0505	.1645	.0468	.1360	.0218	.0668	.0582
12 RETAIL: GAS & AUTO	.1993	.0666	.1117	.1272	.1590	.1448	.1736	.0835	.0273	.1390	.0578	1.0916	.0856	.0557	.1126	.1618	.1942	.1232	.1198	.1395	.1435	.0830	.1830	.2110
13 RETAIL: EAT & DRINK	.0684	.0325	.0550	.0633	.0696	.0564	.0795	.0396	.0112	.0263	.0230	.0321	1.0409	.0235	.0534	.0681	.0544	.0528	.0547	.0660	.0596	.0320	.0701	.1075
14 RETAIL: ALL OTHER	.2844	.1447	.2935	.2663	.2913	.2352	.3258	.2046	.0492	.1113	.1114	.1357	.2216	1.1423	.2923	.2864	.2376	.2306	.2634	.2772	.2553	.1335	.2967	.4368
15 SERVICE: LODGING	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.0000	—	—	—	—	—	—	—	—	—
16 SERVICE: BUSINESS & PROFESSIONAL	.0199	.0146	.0081	.0062	.0130	.0158	.0082	.0137	.0035	.0084	.0056	.0085	.0120	.0069	.0150	1.0196	.0195	.0233	.0290	.0423	.0096	.0035	.0098	.0089
17 SERVICE: REPAIR	.0069	.0047	.0135	.0068	.0257	.0078	.0102	.0142	.0031	.0062	.0046	.0032	.0075	.0041	.0182	.0123	1.0067	.0136	.0166	.0069	.0096	.0163	.0098	.0081
18 SERVICE: ALL OTHER	.0393	.0181	.0310	.0383	.0347	.0314	.0423	.0233	.0061	.0151	.0123	.0177	.0247	.0142	.0649	.0338	.0300	1.0361	.0390	.0337	.0299	.0158	.1129	.0515
19 REAL ESTATE RENTAL	.0203	.0113	.0247	.0171	.0324	.0246	.0224	.0144	.0067	.0086	.0094	.0185	.0350	.0171	.0531	.0580	.0500	.0321	1.0200	.0452	.0197	.0097	.0214	.0274
20 FINANCE	.0480	.0138	.0374	.0211	.0589	.0468	.0283	.0315	.0080	.0206	.0219	.0187	.0263	.0146	.0538	.0313	.0439	.0396	.1273	1.0337	.0268	.0171	.0278	.0320
21 CONTRACTORS: BUILDING	.0337	.0113	.0162	.0213	.0565	.0415	.0219	.0150	.0044	.0102	.0074	.0108	.0176	.0115	.0330	.0215	.0249	.0255	.1030	.0282	1.0582	.0087	.0324	.0274
22 CONTRACTORS: OTHER	.0148	.0399	.0008	.0723	.0011	.0067	.0014	.0079	.0002	.0019	.0004	.0014	.0008	.0007	.0015	.0010	.0010	.0009	.0013	.009	.0016	1.1030	.0012	.0012
TOTAL BUSINESS MULTIPLIER* (Sum of 1-22)	2.3320	1.6922	1.8788	1.9230	2.2355	2.4043	2.0411	.9253	1.2113	1.6658	1.4172	1.6730	1.8993	1.6021	2.2905	2.1238	2.0317	1.8801	2.2540	1.9257	2.0209	1.5615	1.1231	1.2399
23 LOCAL GOVERNMENT	.0909	.0302	.0256	.0262	.0254	.0493	.0653	.0549	.0058	.0181	.0122	.0141	.0250	.0128	.0275	.0227	.0207	.0204	.1256	.0222	.0193	.0109	1.0168	.0192
24 HOUSEHOLD CONSUMPTION	.8231	.3910	.6621	.7626	.8377	.6787	.9570	.4772	.1350	.3166	.2766	.3868	.4918	.2824	.6434	.8198	.6555	.6358	.6584	.7946	.7179	.3849	.8441	1.2936

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ducing activity took place in 1953. This basic income produced $90,080,000 worth of additional business. Thus, each dollar of export produced about $.96 worth of additional business.

It should possibly be pointed out at this point, that no one source of basic income as they are classified in Table IV, really outranks the other sources. The ranking of these different sources of basic income depends entirely upon the criteria used. For example, if the value of additional business produced is considered, agriculture outshines transportation and utilities which was noted above to be third in terms of value of export. Again in contrast, the agriculture industry produces greater additional business than does transportation and utilities, but produces less retail sales.

The value of export by a certain industry does not by itself determine the magnitude of economic activity resulting from that export. It is the manner in which this new money moves through the economy that is the major determinent. For example, if receipts from the export of a product immediately leave the economy in the form of taxes paid to the state and federal governments and in terms of paying for expenditures and investments made by the home office of the industry which is located outside of the local economy, very little additional business is actually produced. This is what happens in the oil and gas industry where local purchases and payroll are small compared to the high value of a product being produced. If the new dollars entering the economy are immediately spent for commodities which must be shipped in from the outside, some additional business is, of course, produced; but the new dollars rapidly leak from the economy to pay for the commodities being shipped in. If the new basic money is distributed in the economy for payrolls and service activities, a much greater amount of additional business is created per dollar of new money brought in.

Table IV also shows a business generator factor which indicates the amount of local business activity resulting from various types of export activity. It can be seen here that the largest amount of additional business is produced by exports made by the manufacturing industries. Agriculture exports are ranked next with each dollar's worth of produce sold outside of the economy producing an additional $1.33 in local business. Wholesaling ranks lowest with each dollar's worth of export creating only an additional $.67 worth of local business.

Agriculture

As noted in the prior chapter, gross receipts by agriculture amounted to $14,779,000 in 1953. Only about $11,656,000 represents exports made directly by agriculture for sales to local manufacturers (milk) and farm to farm sales represent a significant amount of total receipts. As explained in the prior section, the reader interested in additional sales and purchasing details can find this information in the detailed input-output tables.

While the agriculture export activity was not the greatest source of basic income to Southwestern Wyoming in 1953 as these sources are delineated in Table IV, these "new" dollars were, nevertheless, of considerable value. Basic income dollars resulting from agriculture exports have a tendency to "stick around" much longer than other new dollars. As a result, the $11,656,000 worth of exports produced $15,515,000 in additional

business. Thus, each dollar produced an additional $1.33 in business. This rather high turnover rate is a direct result of the agriculture industry's purchasing pattern as shown in Table I. Much of this additional business represented sales by retail, wholesale, and service firms to the delight of these small businessmen.

Mineral Export

Nearly all production by the mineral extraction industry is exported. A very small amount of inter-industry gas sales takes place and some coal, sand, and gravel are sold locally. In addition to product exports, some oil field service activity is performed for firms located outside Southwestern Wyoming by local firms or local branch offices of outside firms.

Total exports by the oil and gas industry, including oil and gas field services, amounted to $15,484,000 in 1953. These exports produced $11,-329,000 in additional business. This amounts to $1 in export producing about $.73 in additional business. Of course, not all of this additional business found its way into what may be called the commercial sector of the Southwestern Wyoming economy. As can be seen by reference to Table IV, $2,381,000 of this additional business represented sales between different firms in the mineral industry—largely the sales by oil field service firms to the producing firms.

Table IV shows the value of exports for "other mineral" producers to be $21,581,000 in 1953. This represents largely exports of coal, but includes some trona and phosphate. An additional $19,908,000 was generated by this export activity to give a business generating factor of $1 worth of export producing about $.92 worth of additional business. Thus, $1 worth of "other mineral" exports is worth more to the local economy than $1 worth of oil and gas exports. Exports for other mineral producers become even more important to the commercial side of the local economy since very little inter-industry sales are included in this generated business. This was not the case for oil and gas production.

Mineral producers largely effect the local economy through their payroll, royalties payment, and taxes. Rather insignicant purchases are made from most other industries. An exception here is that the utilities industry received a significant amount and the general construction industry received nearly two million dollars for construction undertaken. Included here are activities such as stripping mineral seams.

Some idea of the over-all importance for the mineral extraction industry to Southwestern Wyoming is shown by the fact that about 34.2 per cent of total realized personal income can be attributed to exports by the mineral industry. Personal income will be discussed in greater detail later in this chapter.

Exports by Transportation and Utility Industries

The export picture for transportation and utilities is somewhat less clear than was the case for mining and agriculture. It is easy to conceive of exporting a commodity, but it is somewhat more difficult to understand what exporting a service means.

In the case of transportation, services are exported largely by the fact that services are performed for someone who lives outside of the local area.

TABLE IV
SOURCES OF BASIC INCOME
AND THEIR EFFECT ON VARIOUS INDUSTRIES
1953
($1000's)

INDUSTRIES:	Agriculture Value of Export	Agriculture Produced Business	Oil & Gas Value of Export	Oil & Gas Produced Business	Other Minerals Value of Export	Other Minerals Produced Business	Manufacturing Value of Export	Manufacturing Produced Business	Trans. & Utilities Value of Export	Trans. & Utilities Produced Business	Wholesaling Value of Export	Wholesaling Produced Business	Travelers & Trucks Value of Export	Travelers & Trucks Produced Business	All Const. Value of Export	All Const. Produced Business	All Other State & Fed. Govt. Direct Purchases	All Other State & Fed. Govt. Produced Business	All Other Value of Export	All Other Produced Business	Total Value of Export	Total Produced Business
AGRICULTURE	$11,656	$ 1,334		$ 160		$ 269		$ 209		$ 482		$ 38		$ 153		$ 98	$ 135	$ 167		$ 78	$11,791	$ 2,988
MINERALS		173	$15,484	2,381	$21,581	398		13		247		2		136		68		147		62	37,065	3,677
MANUFACTURING		477		330		833	$ 638	18		403		4		308		220		328		166	638	3,087
TRANSPORTATION & UTILITIES		1,275		781		1,888		75	$12,586	911		13		762		485	52	686		287	12,638	7,164
WHOLESALE		2,360		954		1,727		90		1,518	$ 318	36		2,452		556	246	998		473	564	11,164
RETAIL		7,765		4,902		10,848		342		7,814		95	$ 8,117	3,729	$ 1,280	3,048	48	6,024		3,183	9,445	47,730
SERVICE		1,007		849		1,469		56		1,043		13	2,351	797		418	738	931	$ 30	388	3,119	6,571
FINANCE		559		292		456		32		357		7		288		173		267	156	128	156	2,559
CONTRACTORS		565		680		2,020		32		292		4		192	6,804	619	11	252		114	6,815	4,770
LOCAL GOVERNMENT		—		—		—		—		—		—		—		—	2,208	—		—	2,208	—
HOUSEHOLD		—		—		—		—		—		—		—		—	5,118	—	3,792	—	8,910	—
TOTALS	$11,656	$15,515	$15,484	$11,329	$21,581	$19,908	$ 638	$ 868	$12,586	$13,067	$ 318	$ 212	$10,468	$ 8,817	$ 8,084	$ 5,685	$ 8,556	$ 9,800	$ 3,978	$ 4,879	$93,349	$90,080
BUSINESS GENERATOR		1.331		.731		.923		1.361		1.038		.667		.842		.703		1.145		1.227		.964
LOCAL GOVERNMENT REVENUE		$ 1,061		$ 452		$ 566		$ 27		$ 819		$ 6		$ 201		$ 114		$ 2,378*		$ 77		$ 5,701*
STATE & FEDERAL GOVT. REVENUE		$ 1,779		$ 2,034		$ 2,719		$ 102		$ 2,377		$ 20		$ 1,184		$ 622		$ 1,391		$ 709		$12,937
REALIZED PERSONAL INCOME		$ 9,594		$ 6,949		$16,454		$ 460		$11,920		$ 101		$ 4,828		$ 3,939		$ 9,155*		$ 5,054*		$68,453*

Source: Summarization of data in Tables I, II, and III.
*Includes both basic and produced income.

For example, a shipment placed in a boxcar or on a truck in Chicago and destined to Los Angeles must be taken care of as it passes through Southwestern Wyoming. Local people taking care of the shipment while it passes through Southwestern Wyoming are paid essentially "new" money by the shipper in Chicago. In somewhat different wording, carriers having lines through Southwestern Wyoming pay out considerably more in payroll and taxes than are needed to serve the local transportation needs. These additional purchases constitute new money and, hence, represent basic income. To this "surplus purchases" figure must be added the receipts received by local firms from hauling contracts performed for persons located outside of the local area.

Exports performed by utilities result from utility firms selling some of their utilities outside of the local area. The value of this service sold outside of Southwestern Wyoming is considered to correspond to the expenditure made within the local area for providing that service.

Summarizing the above discussion in terms of numbers, it was estimated in 1953 that the transportation industry exported $12,329,000 worth of services or, in other words, received this amount for services performed in Southwestern Wyoming for persons or businesses located outside the local area. A corresponding export figure for the utilities industry is $257,000. This gives a total of $12,586,000 in value of export for both utilities and transportation.

As may be seen in Table IV, exports by transportation and utility industries produced $13,067,000 in additional business, hence, each dollar of export activity produced $1.04 in additional business. Much of this additional business went to retail and general service industries as a result of the expenditure made by the persons receiving the sizeable payroll from transportation and utility industries. In 1953 the payroll for the transportation industry was $10,326,000 while the payroll for utilities was $981,000. A rather small amount of this additional business result from direct purchases by transportation and utilities.

Out-of-Area Highway Travelers and Truck Drivers

Southwestern Wyoming's location on a major east-west highway provides considerable basic income in terms of purchases by out-of-area travelers and truck drivers. In addition, a sufficiently large contribution is made by parties traveling highways north and south through Southwestern Wyoming in association with the Teton-Yellowstone Park recreation area and by the few travelers considering the recreation areas in the northern part of Southwestern Wyoming as their goal.

These purchases by travelers and truck drivers represent export sales largely by retailers and service firms. Purchase of transportation services by such travelers from the transportation industry itself, in other words, from railroads, airlines, and buses was considered in the previous section to be an export by this industry and is not considered here. Persons entering Southwestern Wyoming from nearby Utah and Idaho communities for shopping are included in the above estimates.

The total contribution to the local economy by out-of-area highway travelers and truck drivers was $10,468,000 in 1953. This basic income, in turn, created $8,817,000 in additional business.

Only about one-fourth of these purchases were for services. This is especially significant since purchase of services tends to create more additional business per dollar of basic income than does a similar amount of commodity purchases.

State and Federal Government Expenditures

Money spent in Southwestern Wyoming by state and federal government agencies has been considered to represent basic income. Expenditures here include salaries, supply purchases, stabilization payments to agriculture, welfare money turned over to the county for distribution, repairs to building and equipment, rent, utilities, and other such items. The money spent by state and federal government units for heavy construction has been purposely left out of this picture for it is included in a later section.

Since local people pay taxes to both the state and federal governments, they are in a sense paying for these contributions. This leads to an argument for defining state and federal government units located in the county to be "local-area" industries. However, the amount of money spent in a community by state and federal government agencies can be more or less than the amount of taxes and other revenue collected. As a result, total state and federal government revenue (total input-output) has no direct relationship to the amount of money spent locally by the state and federal governments and, consequently, one assumption necessary to use the analytical framework defined earlier is not complied with. Because of that situation, the payment of state and federal taxes has been treated as a leakage of funds from the area, and the expenditures by the state and federal governments treated as new basic money entering the economy.

All local governments have been defined as part of the local industry picture since the extent of their activities relates more directly to the functioning of the local economy. They perform services only for local people and are consequently controlled by local people. In other words, there is a direct relationship between taxes collected and services performed for the local economy.

As may be seen in Table IV, the state and federal governments contributed $8,556,000 to the local economy not including payments made for heavy construction. The largest share of this contribution, $5,113,000, went directly to the household sector in the form of payrolls, Old Age and Survivors Insurance payments, unemployment compensation, veterans payments, and other forms of government assistance.

Local governments received $2,208,000 which constituted largely payments from the state government as part of the state school foundation equalization plan. The remainder of local government receipts were payments by state and federal government to local government for distribution to welfare recipients. Included in the total state and federal government contribution are $135,000 in agriculture stabilization and conservation payments to farmers and ranchers.

This basic income of $8,556,000 generated an additional $9,800,000 worth of local economic activity. Thus, it is seen that the contribution by the state and federal governments is presently very important to the Southwestern Wyoming economy.

In any discussion of the large contribution that state and federal governments make to an economy, it is highly important to also mention the drain which they make upon the economy. In 1953, $12,937,000 was collected from the Southwestern Wyoming economy in terms of taxes, oil royalties, and license fees. Thus, if government construction projects are excluded, it is seen that the great contribution to the economy by state and federal governments is more than offset by their drain from the economy in taxes. More than one-half of this collection by the state and federal government comes directly from the householder who, in 1953, paid $7,549,000 for personal taxes. Most of this was, of course, income tax.

Investment in Construction

The year 1953 was about average from the construction standpoint with $12,054,000 worth being completed. Pessimism about the future did not show up here as may have been expected. Construction work during 1953 on the new trona plant and one large dam are included. The remainder represented small amounts of highway construction, building construction at scattered locations, and work by contractors in developing oil and gas wells and other mining activity.

Much of this construction activity represented new construction and as a result, represented an investment of capital as opposed to paying for maintenance type of construction from normal operating revenue. Construction activity representing the investment of "new" money in Southwestern Wyoming was considered to be an export activity by contractors and building material dealers. Yearly payments by persons or industries located in the local area for amortizing such investments were represented as leakage from the economy or, in other words, an "import."

Outside investment in construction projects was estimated to be $8,084,000 in 1953. This produced $5,685,000 in additional business or about $.70 additional for every $1.00 invested. More than one-half of this additional business went to local retailers.

Much of the additional business produced by investment in construction was caused by the high payroll of the contractors. Building contractors do make substantial purchases from building material retailers and local sawmills and both types of contractors purchase gasoline from local petroleum bulk dealers. However, from an over-all standpoint, 26.5 per cent of the dollars finding their way to building construction contractors immediately leave to pay for expenses of home offices located outside of the local economy and for purchasing materials from outside. In contrast from this rate of leakage, about 58.8 per cent of the dollars spent with non-building construction contractors immediately leaks from the economy. Leakage rates are a major cause of the low generating power of construction contractors.

Other Sources of Basic Income

A substantial sum of money, $3,792,000 was received in 1953 by persons living in Southwestern Wyoming from sources outside of the area. Among these are income from property, interest, stocks and bonds, and several other miscellaneous sources. This new money is, of course, spent in the economy and has considerable effect. When a few miscellaneous sources of basic

income going to other industries are added to the above income to the household segment, a total of $4,934,000 worth of new basic income is brought into the economy by sources not previously discussed. This new basic income produces an additional $5,959,000 worth, or $1.21, of business for every $1.00 of export activity. Data on the small amount of manufacturing for export and outside sales by farm product handlers are included here.

Basic Income Summary

It can be seen that the economy of Southwestern Wyoming is dependent upon several different basic activities. While mineral production does stand out in most respects, the importance of other basic income sources depend upon particular criterion used to measure importance. Each source is particularly important to certain other industries.

In order to provide some measure of the importance for each source, Figure 10 has been constructed to show "realized personal income" produced by each source as classified in the preceding discussion. It can be seen that "other" mineral exports, largely coal, was most important and transportation and utilities (railroad) exports were next in importance.

Origin of Commercial Activity

The comparative efficiency of different sources of basic income in producing additional business was concentrated on in the last section of this Chapter. Some discussion concerned the amount of a particular type of commercial activity which was produced by a certain source of basic income.

Table IV also allows the viewpoint to be reversed—that is to determine toward which sources of basic income a certain industry looks for its existence. For example, it is possible to determine what proportion of total retail sales is due to out-of-state travelers.

Figure 11 was constructed to illustrate the basic income origin of all commercial industries. Data used in making up this figure were taken from Table IV which describes in numerical form the various industries. In cases where basic income went directly to a certain industry the export sales were included with the produced business (for example, the export sales made by the retail industries directly to the out-of-area travelers). As a result, it is possible to show the basic income origin of all sales made by commercial or trade and service industries. In other words, this figure takes into account both basic and produced business in order to show total commercial activity. This is a somewhat different viewpoint than was taken in Table IV.

Dependency of a certain industry upon a specific type of basic income is shown as a per cent. Nevertheless, the interested person can obtain the actual figure from Table IV if he accounts for both original and produced business.

As may be expected, oil, gas, and other mineral basic income were the greatest producers of commercial activity by contributing 27.1 per cent to the total. It is interesting to note, however, that 39.7 per cent of the total value of exports was made by oil, gas, and other minerals. This difference is attributed to the lower multiplier associated with the mineral industries, especially gas and oil production.

Figure 10

REALIZED PERSONAL INCOME RESULTING FROM DIFFERENT SOURCES OF BASIC INCOME
Southwestern Wyoming
1953
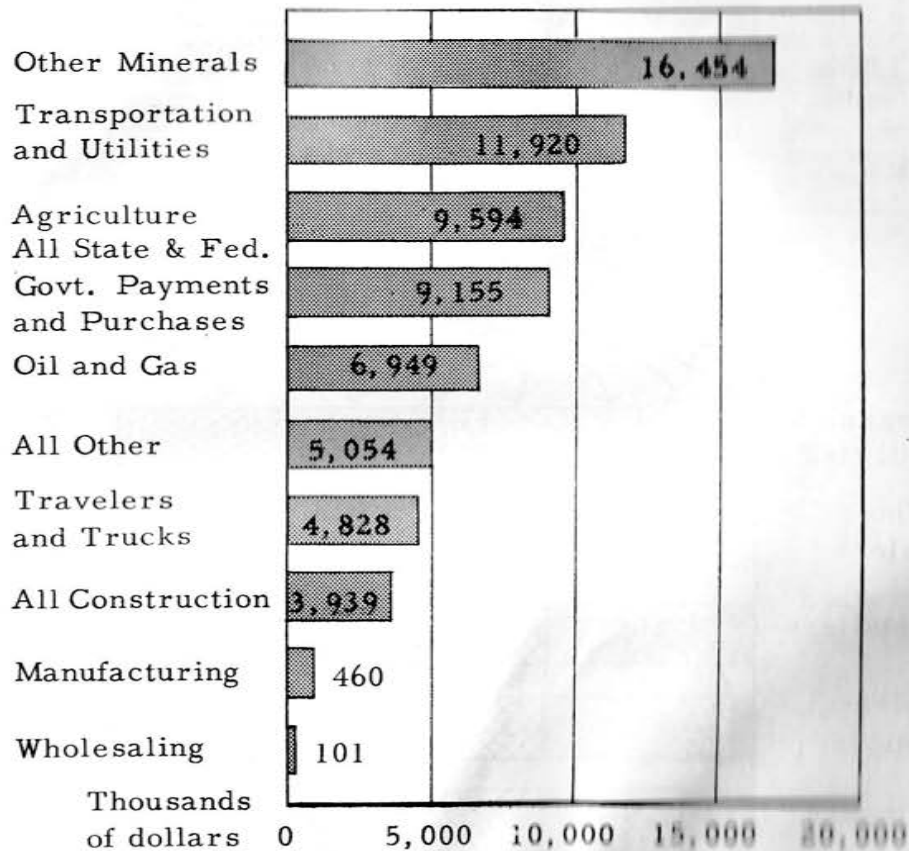
Source	Thousands of dollars
Other Minerals	16,454
Transportation and Utilities	11,920
Agriculture	9,594
All State & Fed. Govt. Payments and Purchases	9,155
Oil and Gas	6,949
All Other	5,054
Travelers and Trucks	4,828
All Construction	3,939
Manufacturing	460
Wholesaling	101
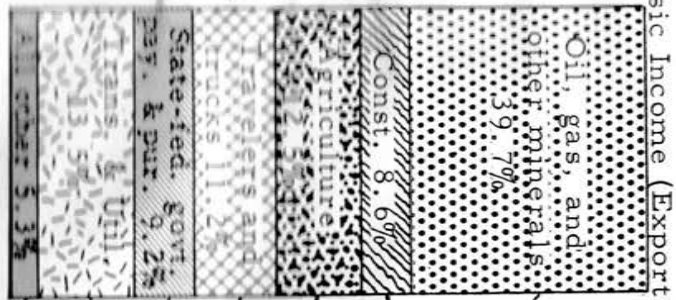
Thousands of dollars   0   5,000   10,000   15,000   20,000

Source: Summary of Table V.
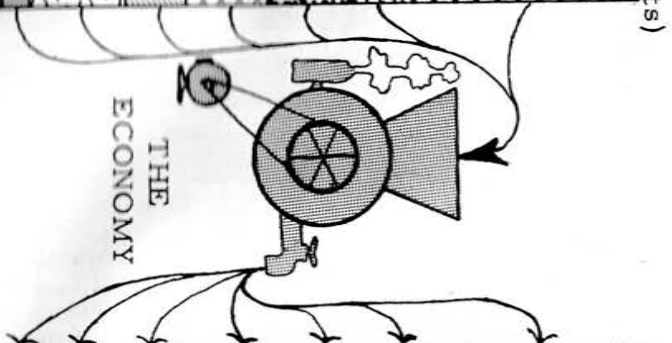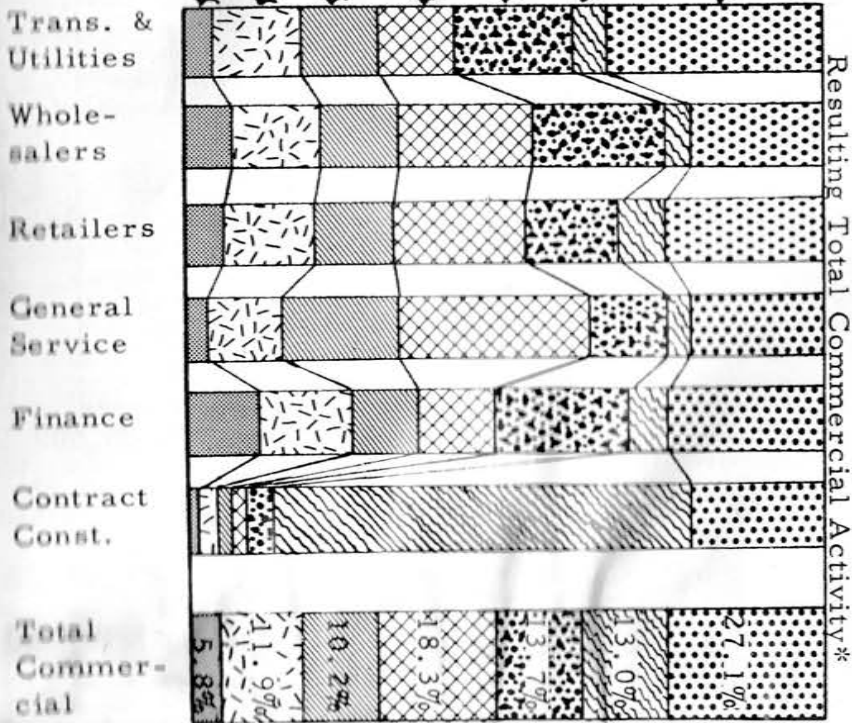
ORIGIN OF COMMERCIAL ACTIVITY
Southwestern Wyoming--1953

Figure 11

Out-of-area travelers and truck drivers were next in importance by producing 18.3 per cent of total commercial activity. The reader may note that only 11.2 per cent of basic income came from travelers and trucks. While minerals are more important to most types of commercial activity, service firms are more dependent upon these important travelers.

Agriculture exports were next in importance followed closely by investment in construction. While agriculture is equally important to most types of commercial activity, investment in construction was largely important only to the construction industry. This should be expected since the "new" dollars going into the construction industry leak from the economy quite rapidly.

The reader can easily examine the importance of the other sources of basic income to commercial activity. The total commercial activity accounted for is $105,037,000 which agrees with the "total output" of all trading and service type of industries shown in Table I. Only local revenue of the railroad is included, however.

While a detailed analysis of 1953 can be carried much farther than has been done here, it seems more appropriate to proceed into the actual comparison of 1959 to 1953. This comparison is the major purpose behind this examination of 1953. It is thought that much more detail about the real workings of the economy can be obtained through this comparison than by going ever deeper into detail for only one year. Nevertheless, persons interested in any particular industry can make many detailed analyses similar to those generalized in the latter part of this chapter.

CHAPTER IV

THE ECONOMY IN TRANSITION

The year 1953 marked the end of a long stable period of growth for Southwestern Wyoming. While 1953 marked a high point according to many economic indicators, 1954 was equally pronounced by the new lows reached. Retail sales and hired employment were at an all time high in 1953, while in 1954 hired employment dropped to a lower level than had been experienced for several years and retail sales declined to a pre-1948 level. (See Figure 6.)

Nevertheless, following the drastic decline of 1954, the economy made a significant recovery by 1959, at which time retail sales exceeded the record set in 1953.[1] Hired employment did not recover, but remained at the 1954 level. (See Figure 7.) Nevertheless, payroll did surpass the 1953 record by 1958.

An economy does not decline, grow, or rearrange itself without cause. And, very significant causes were at work in this local economy during this six year period. It is toward these causes of change that attention will now be turned.

Changes in Basic Income

According to the premise established and explained in detail early in the prior chapter, all economic activity within a local economy is dependent upon, and determined by, basic income finding its way to that economy. This basic income was considered to take the form of money entering the economy from the outside world as a result of exports being made from the local economy. Consequently, it would be expected that the most outward cause of change within a local economy would be changes in the volume and pattern of exports from that economy.

As was discussed cursorily in Chapter II, several very significant changes did occur in the volume and pattern of exports from the Southwestern Wyoming economy in recent years. In summary, coal output nearly ceased, while oil and gas production nearly doubled. A new mineral, trona, became an important contributor. From an over-all standpoint, value of exports increased from $93,349,000 in 1953 to $128,213,000 in 1959, or an increase of 37.3 per cent in this six year period. Since it is known from the prior chapter that different forms of basic income have different business producing power, some attention to the individual components making up this change in exports is now warranted.

[1] Price changes were not taken into account in these measures. Nevertheless, it should perhaps be noted that the non-farm wholesale price index constructed by the Department of Labor increased 12.5 per cent from 1953 to 1959.

Declining Sources of Basic Income

In 1953 it became apparent that the local economy would very soon lose much of its coal market as a result of the Union Pacific Railroad's programmed conversion to diesel locomotives. In the past the railroad had used up to 90 per cent of local coal production.

In 1953 coal production had amounted to more than 3,600,000 tons, and hired employment had stood at 2,100 persons. By 1954 production had been reduced to about one-half, and hired employment had declined to 1,000 persons. In later years coal production continued downward, with output reaching 600,000 tons in 1959 and average employment amounting to only 330 persons. In terms of value of coal produced, coal production decreased from $17,339,000 in 1953 to only $2,817,000 in 1959. Annual coal production data were shown earlier as Figure 3, while hired employment in coal production was shown as Figure 8.

While the phasing out of coal-burning locomotives had an immediate effect on the number of miners in Southwestern Wyoming, it did not affect the number of railroaders until after 1956. Railroad employment was held up by both a booming national economy and the slow rate at which labor savings were effected in the local area from use of the newer railroad equipment. Nevertheless, a definite downward trend began in 1957 in railroad employment which has continued onward through the present time. From an over-all standpoint, railroad employment decreased from 2,130 persons in 1953 to 1,380 persons in 1959. These data were illustrated earlier in Figure 9.

It was seen in a prior chapter that basic income resulting from exports of coal and railroad employment was a very important contributor to the economic life of Southwestern Wyoming. In particular, calculations similar to those made in a prior chapter, showed that about 14.4 per cent of total commercial activity was dependent upon exports of coal while 11.3 per cent was dependent upon basic income received through railroad payroll and purchases within the local economy. About 35.8 per cent of total realized personal income was dependent upon these two particular industries.

In consequence, the decline in these two forms of basic income by 1959 was exerting a rather strong downward force upon the local economy. An application of the model constructed for 1953 indicates that a decline of 19.1 per cent in commercial activity would be associated with this basic income change. It, of course, should be mentioned that such a reduction in commercial activity did not occur for many other forces were at work increasing over-all basic income to the local economy. Some of these will now be examined.

Increasing Sources of Basic Income

In contrast to the sharp reduction in coal production from 1953 to 1959, an equally sharp increase in gas, oil, and other mineral production occurred. In terms of value of production these non-coal minerals increased from $18,260,000 in 1953 to $37,876,000 in 1959. From an over-all standpoint, mineral production was valued at $35,500,000 in 1953 and $40,667,000 in 1959. According to the model constructed for 1953 and described in the prior chapter, about 12.3 per cent of total commercial activity in 1953 was

dependent upon basic income associated with exports of these non-coal minerals. Since these sources of basic income doubled by 1959, it would be expected, according to the 1953 model, that they alone exerted an upward force in commercial activity of about 12.3 per cent. A side note of interest here is that while the value of minerals produced actually increased from an over-all standpoint during this six year period, the 1953 model does not show that this increase would support a higher level of commercial activity because of the lower business producing power of oil and gas exports.

As noted in the previous chapter, about 18.6 per cent of total commercial activity was dependent upon purchases by out-of-area travelers and truck drivers. The dependency of such industries as retailers, and especially service firms, was significantly higher. Thus, an increase in this form of income from $10,468,000 in 1953 to $12,411,000 in 1959 exerted an upward force of about 3.4 per cent in commercial activity according to the 1953 model. Such an increase, while small, nevertheless, made a significant contribution to growth in the economy during this six year period.

Agriculture receipts were estimated at $14,779,000 in 1953 and $18,-106,000 in 1959—an increase of 22.5 per cent. This increase does not especially represent an upward trend in the agriculture industry for 1953 was a below normal year in price and production, while 1959 was slightly above normal. Of course, a general upgrading in both production costs and market prices occurred during this period. Not all of this increase in receipts to agriculture was reflected in an increase in exports by agriculture for an additional proportion of the agriculture product was sold to local manufacturers in 1959. Actual exports by agriculture increased from $11,656,000 in 1953 to $13,036,000 in 1959. Since these exports were responsible for 13.5 per cent of total commercial activity in 1953, this increase in agriculture exports would be expected to cause commercial activity to rise by about 1.6 per cent during the period under study.

Receipts to manufacturers in Southwestern Wyoming made a very substantial rise from $3,725,000 in 1953 to $6,170,000 in 1959. Of much more value at this point, however, was an increase in exports by those manufacturers from $638,000 in 1953 to $2,860,000 in 1959, or an increase of about three and one-half times. Thus, the manufacturing industry of the local economy moved from one oriented toward only supplying the local market to one making significant sales outside the local economy. While 0.6 per cent of total commercial activity was traceable to exports by manufacturers in 1953, the large increase occurring in exports during this six year period caused an upward pressure in commercial activity of about 2.8 per cent according to the relationships contained in the 1953 model.

In the past, nearly all wholesaling activity in Southwestern Wyoming was directed toward serving local area markets. Only a minor amount of sales by farm product handlers (classified as wholesalers) was made outside the economy. Nevertheless, in 1959, sales by wholesalers outside of the local economy had grown to $7,337,000. As was noted earlier, wholesale exports had a very low business producing power. This amount created an upward pressure of 8.7 per cent on total commercial activity. Of course, much of this increase in commercial activity actually constituted the original sale by the local wholesaler.

In the prior chapter, investment in construction was considered as a basic income since it represents new dollars moving into the economy. This form of basic income increased from $8,084,000 in 1953 to $22,381,000 in 1959, or nearly tripled. Of importance here was a considerable outlay for highway construction in 1959, initial construction work at Kemmerer on the Utah Power and Light Company Power Plant and the pilot coke plant. Of course, many smaller projects were under way at that time, and local building construction was not insignificant. Since about 13.3 per cent of total commercial activity was dependent upon investment in construction in 1953, it can be estimated that this increased investment in construction caused an upward force of about 23.5 per cent in commercial activity according to the 1953 model. As noted in the prior chapter, however, much of this increase benefited the local construction industry only, for a high rate of immediate leakage occurs in this industry.

So far it has been noted that reductions in coal export and railroad employment caused a downward force of 19.1 per cent in commercial activity while other sources of basic income caused an upward force of 52.3 per cent in commercial activity or a net change of 33.2 per cent. Several other changes in exports of lesser importance occurred during this six year period which would cause total commercial activity to rise to an over-all amount of 42.9 per cent according to the relationship set up in the 1953 model. Some of these other changes worthy of mention are a 55.5 per cent increase in the contribution to the local economy by the state and federal governments in the form of payroll, welfare payments, social security payments, etc., and a significant increase in the amount local people received from dividends and interest on property held outside the local area. A summary of changes in export activity is included as Table V.

Effect of Basic Income Changes in Summary

It has just been noted that a strong downward force was present in the Southwestern Wyoming economy within the last six years as a result of the declining coal exports and railroad employment. If no other changes in the export picture had occurred, commercial activity would have been expected to have declined by 19.1 per cent in 1959 according to the model constructed for 1953.

Changes offsetting these declining sources occurred as increases in oil, gas, and other mineral production, an increase in travelers and truckers, a slightly larger agriculture income, and increases in many other basic income producing activities. These increases sufficiently exceeded the decreases in basic income to the extent that when the over-all export picture for 1959 is applied to the 1953 model, an expected increase of 42.9 per cent in commercial activity is determined.

In the discussion so far, resulting alterations in the level of only commercial activity have been the major indicators of the effects of changes in export activity. However, the use of the input-output model for 1953 can be extended to show the effects of these basic income changes on total output for each industry manipulated in the model. The results of inserting the entire pattern of 1959 exports into the 1953 model are shown as one

Table V

VALUE OF EXPORTS
Southwestern Wyoming
1953 - 1959
(1000's)

TYPE	Value of Export 1953	Value of Export 1959	Percentage Change
Agriculture Products	$11,656	$ 13,036	11.8
Oil and Gas	15,484	29,073	87.7
Other Minerals	21,581	11,660	−45.9
Manufactured Products	638	2,860	348.2
Transportation and Utilities	12,586	11,278	−10.4
Wholesaling	318	7,337	2,207.2
Travelers and Trucks	10,468	12,411	18.5
All Construction	8,084	22,381	176.8
All State and Federal Government Purchases & Payments	8,556	13,304	55.5
All Other	3,978	4,873	22.5
Total Value of Exports	$93,349	$128,213	37.3

Source: Summary of export columns in Tables I and VII.

column of Table VI. Points of interest here are that while value of exports increased by 37.3 per cent, total output activity would be expected to increase by only 22.0 per cent. Commercial activity would be expected to increase by the 42.9 per cent previously mentioned, and household income would be expected to experience only 20.2 per cent. Of course, industries serving largely the outside market would be expected to experience an increase or decline largely in relation to the change in their own specific export activities.

Expected Changes Compared to Actual

Discussion has been oriented toward how basic income changes occurring between 1953 and 1959 should have affected the local economy according to the relationship established by the 1953 model constructed in the prior chapter. But, how do these anticipated alterations in the economy compare with the actual levels reached in 1959? Table VI also contains information to answer this question. Here, actual data on output in 1959 is compared by industry to an "estimated output" through use of the 1959 export picture and the 1953 model.

From Table VI it may be noted that the use of the 1953 output model along with 1959 exports provided quite reasonable indications of the actual level of output to be expected in 1959. For example, the use of the 1953 model and 1959 exports indicated that total output should have risen by 28.4 per cent during this period, while it actually increased about 23.3 per cent. Similarly, an increase of 42.9 per cent in commercial activity was expected as compared to an actual increase of 37.1 per cent.

While the use of the 1953 model and 1959 exports provided reasonable over-all indications of the actual situation, it should be noted that consider-

Table VI

PARTICULAR EFFECT OF CHANGES IN EXPORTS BETWEEN 1953 AND 1959 COMPARED TO ACTUAL CHANGES FROM 1953 TO 1959
Southwestern Wyoming   ($1000's)

Industry	1953 Actual Output	1959 Estimated* Output	Estimated Percentage Change	1959 Actual Output	Actual Percentage Change
Agriculture	$ 14,779	$ 18,464	+24.9	$ 18,106	+22.5
Minerals: Oil and Gas Production	13,610	30,185	+121.7	30,595	+124.7
Oil Field Service	5,093	5,172	+1.5	5,227	+2.7
Other Mineral Production	21,989	12,168	−44.7	12,127	−44.9
Manufacturing: Lumber	687	1,074	+56.3	1,124	+63.6
Other	3,038	5,453	+79.5	5,046	+66.0
Transportation	15,446	14,944	−3.4	14,650	−5.2
Utilities	4,356	4,996	+14.7	7,124	+63.5
Wholesale: General	10,900	20,458	+87.7	21,761	+99.6
Farm Product Handlers	827	1,219	+47.4	1,518	+83.6
Retail: Bldg. Material & Implement	6,300	8,425	+33.7	7,996	+26.9
Gas and Auto	17,777	21,651	+21.8	20,367	+14.6
Eat and Drink	8,109	9,722	+19.9	6,860	−15.4
All Other	25,009	29,694	+18.7	24,106	−3.4
Services: Lodging	1,945	2,563	+31.8	2,563	+31.8
Business and Professional	1,012	1,453	+43.6	1,562	+54.3
Repair	754	1,038	+37.6	1,833	+143.1
All Other	4,489	5,598	+24.7	6,213	+38.4
Real Estate Rental	1,890	2,357	+24.7	1,996	+5.6
Finance	2,715	3,537	+30.3	3,366	+23.9
Construction: Building	5,001	10,871	+117.4	10,931	+118.5
Other	6,584	16,073	+144.1	16,013	+143.2
Local Government	5,701	7,092	+24.4	8,345	+46.3
Household: Payroll, Profit & Other	68,453	82,232	+20.2	74,471	+8.8
Total Output	$246,463	$316,439	+28.4	$303,900	+23.3
Summary: Total Commercial Activity	$105,037	$150,122	+42.9	$143,976	+37.1
Retail	57,195	69,492	+21.5	59,129	+3.8
Service	10,090	13,009	+28.9	14,167	+40.4

Source: Total values of Tables I and VII and (*) multiplication of export column in Table VII by Table III (inverse matrix).

able difference between estimated and actual did occur for many individual industries. In general, these *differences* largely denote *internal changes* within the economy that were *not determined by the change in export picture.* It is toward these particular internal changes that attention will now be directed.

Internal Changes Within the Local Economy

Changes within the internal structure of the local economy can best be seen by constructing an input–output model for 1959 on a basis similar to that used for 1953. This has been done and the various tables are included as Table VII, VIII, and IX. A summary table showing the basic income origin for various businesses and economic activities is included as Table X, and is summarized as Figure 12 later in this chapter. Each of these tables has a 1953 equivalent to which they can be compared.

Possibly the most outward sign of change within the internal structure of this local economy is the drop of the business multiplier from .964 in 1953 to .842 in 1959. This, in essence, indicates the reason for overshooting the actual level of activity in 1959 by use of the 1959 export picture and the 1953 model. However, only by going deeper into the 1959 model, can the reason for this change in business producing power be determined. Of major concern in this examination of changes within the internal structure of the local economy will be changes between input coefficients[2] for 1953 and 1959. As discussed earlier, these input coefficients indicate the interrelationships among various industries in relative terms— that is, without taking into account the actual dollar amount of export activity being carried on by the various industries. In making this examination several summary tables have been constructed to show and compare the various trends occurring in the internal structure. Readers interested in comparable detail for a specific industry may examine Tables II and VIII.

Household

People are very important in any economy; needless to say, without people an economy would not exist or have a reason to exist. In the same sense, people are the heart of the economy in Southwestern Wyoming. Consequently, when looking for structural changes within this economy, the first place to look would be at its people and their dealings with the local economy—that is, their sources of income and their expenditures.

In the model constructed for making this analysis a household sector was created for handling the receipts and expenditures by local residents. Data here concern both receipts in the forms of wages, salary, and profits from local industries and receipts from activities outside the local economy. In turn, these receipts are offset by household purchases from local industries and imports. The reader may wish to consider "household" as another industry which sells labor services to local industries and in turn, purchases from these local industries in order to provide that labor service.

It is within the components making up the total income and expenditures of the household sector that a considerable change occurred between

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[2]Purchases by industry A from industry B divided by total output of industry A.

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Table IX

DIRECT AND INDIRECT ACTIVITY PER DOLLAR OF EXPORT

Southwestern Wyoming

1959

	1 AGRICULTURE	2 MINERALS: OIL & GAS PRODUCTION	3 MINERALS: OIL FIELD SERVICE	4 MINERALS: OTHER MINERAL PROD.	5 MANUFACTURING: LUMBER	6 MANUFACTURING: OTHER	7 TRANSPORTATION	8 UTILITIES	9 WHOLESALE: GENERAL	10 WHOLESALE: FARM PRODUCT HANDLERS	11 RETAIL: BLDG. MATERIAL & IMPLEMENT	12 RETAIL: GAS & AUTO	13 RETAIL: EAT & DRINK	14 RETAIL: ALL OTHER	15 SERVICE: LODGING	16 SERVICE: BUSINESS & PROFESSIONAL	17 SERVICE: REPAIR	18 SERVICE: ALL OTHER	19 REAL ESTATE RENTAL	20 FINANCE	21 CONTRACTORS: BUILDING	22 CONTRACTORS: OTHER	23 LOCAL GOVERNMENT	24 HOUSEHOLD CONSUMPTION
1 AGRICULTURE	1.1044	.0065	.0185	.0093	.0151	.4345	.0359	.0097	.0075	.1183	.0113	.0098	.0168	.0268	.0132	.0104	.0143	.0129	.0198	.0134	.0146	.0064	.0150	.0187
2 MINERALS: OIL & GAS PRODUCTION	.0126	1.0530	.0085	.0184	.0162	.0124	.0157	.2025	.0027	.0063	.0047	.0067	.0119	.0068	.0330	.0110	.0138	.0155	.0283	.0122	.0083	.0044	.0182	.0133
3 MINERALS: OIL FIELD SERVICE	.0017	.1384	1.0011	.0024	.0021	.0016	.0021	.0266	.0004	.0008	.0006	.0009	.0036	.0009	.0043	.0014	.0018	.0020	.0037	.0016	.0011	.0006	.0024	.0017
4 MINERALS: OTHER MINERAL PROD.	.0047	.0020	.0038	1.0037	.0045	.0100	.0054	.0045	.0008	.0021	.0016	.0023	.0025	.0020	.0033	.0033	.0036	.0036	.0041	.0044	.0031	.0032	.0049	.0073
5 MANUFACTURING: LUMBER	.0079	.0006	.0008	.0213	1.0049	.0042	.0013	.0011	.0004	.0012	.0018	.0009	.0007	.0006	.0012	.0007	.0009	.0069	.0022	.0010	.0120	.0012	.0030	.0013
6 MANUFACTURING: OTHER	.0278	.0130	.0375	.0187	.0257	1.0224	.0290	.0185	.0056	.0134	.0104	.0182	.0344	.0538	.0192	.0286	.0263	.0401	.0276	.0284	.0131	.0303	.0360	
7 TRANSPORTATION	.0566	.0179	.0680	.0205	.1093	.0539	1.0273	.0260	.0200	.0202	.0620	.0230	.0214	.0315	.0298	.0230	.0242	.0247	.0338	.0231	.0514	.0136	.0317	.0339
8 UTILITIES	.0654	.0223	.0442	.0959	.0844	.0625	.0815	1.0551	.0140	.0330	.0244	.0350	.0619	.0352	.1717	.0572	.0716	.0808	.1473	.0633	.0433	.0231	.0946	.0615
9 WHOLESALE: GENERAL	.1767	.0583	.0969	.0784	.2185	.1168	.1377	.01795	1.0295	.1346	.0461	.2757	.2932	.1645	.3432	.2707	.2246	.1311	.1566	.0954	.0981	.0585	.1346	.1235
10 WHOLESALE: FARM PRODUCT HANDLERS	.0568	.0003	.0010	.0005	.0008	.0224	.0019	.0005	.0004	1.0061	.0006	.0006	.0013	.0014	.0007	.0006	.0008	.0007	.0010	.0007	.0008	.0003	.0008	.0010
11 RETAIL: BLDG. MATERIAL & IMPLEMENT	.1047	.0219	.0350	.0390	.0680	.0732	.0485	.0305	.0271	.0250	1.0183	.0261	.0320	.0237	.0653	.0372	.0450	.0497	.1667	.0449	.1276	.0194	.0671	.0539
12 RETAIL: GAS & AUTO	.1979	.0574	.1079	.0996	.1488	.1375	.1705	.0860	.0290	.1451	.0573	1.0918	.0728	.0547	.0948	.1224	.1853	.1180	.1230	.1331	.1111	.0735	.1810	.1981
13 RETAIL: EAT & DRINK	.0433	.0178	.0340	.0316	.0410	.0337	.0498	.0259	.0076	.0193	.0146	.0207	1.0220	.0148	.0281	.0307	.0324	.0322	.0356	.0404	.0278	.0172	.0446	.0657
14 RETAIL: ALL OTHER	.2502	.1120	.2545	.1877	.2406	.1963	.2350	.1862	.0464	.1138	.0989	.1222	.1366	1.0879	.2276	.1831	.1996	.1968	.2421	.2366	.1688	.1007	.2627	.3702
15 SERVICE: LODGING	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0000	---	---	---	---	---	---	---	---	---
16 SERVICE: BUSINESS & PROFESSIONAL	.0285	.0144	.0084	.0057	.0134	.0192	.0091	.0144	.0037	.0095	.0058	.0090	.0119	.0072	.0150	1.0185	.0192	.0239	.0335	.0427	.0086	.0034	.0103	.0074
17 SERVICE: REPAIR	.0128	.0080	.0247	.0115	.0452	.0144	.0191	.0267	.0059	.0114	.0084	.0065	.0133	.0077	.0334	.0195	1.0129	.0250	.0432	.0134	.0154	.0290	.0182	.0132
18 SERVICE: ALL OTHER	.0480	.0201	.0378	.0380	.0422	.0370	.0561	.0301	.0082	.0209	.0158	.0227	.0263	.0172	.0597	.0314	.0360	1.0407	.0474	.0420	.0288	.0176	.1076	.0682
19 REAL ESTATE RENTAL	.0186	.0066	.0220	.0127	.0229	.0187	.0211	.0140	.0066	.0090	.0085	.0180	.0287	.0146	.0446	.0339	.0426	.0293	1.0192	.0388	.0146	.0081	.0199	.0228
20 FINANCE	.0476	.0124	.0371	.0180	.0579	.0455	.0286	.0327	.0084	.0221	.0221	.0192	.0244	.0144	.0520	.0242	.0423	.0394	.1293	1.0331	.0222	.0160	.0281	.0289
21 CONTRACTORS: BUILDING	.0315	.0109	.0169	.0193	.0575	.0400	.0240	.0180	.0182	.0120	.0080	.0146	.0195	.0133	.0348	.0185	.0265	.0266	.1059	.0283	1.0553	.0083	.0340	.0291
22 CONTRACTORS: OTHER	.0107	.0398	.0009	.0723	.0012	.0052	.0014	.0081	.0003	.0016	.0004	.0015	.0009	.0007	.0017	.0009	.0011	.0011	.0017	.0010	.0014	1.1030	.0013	.0014
TOTAL BUSINESS MULTIPLIER* (Sum of 1-22)	2.3083	1.6359	1.8594	1.8046	2.2203	2.3614	2.0508	1.9965	1.2427	1.7269	1.4216	1.7256	1.8341	1.5794	2.2806	1.9178	2.0272	1.8870	2.3345	1.8968	1.8428	1.5208	1.1104	1.1571
23 LOCAL GOVERNMENT	.0939	.0374	.0345	.0327	.0353	.0542	.1230	.0716	.0083	.0227	.0180	.0202	.0327	.0177	.0349	.0225	.0260	.0369	.1350	.0283	.0231	.0136	1.0234	.0246
24 HOUSEHOLD	.8031	.3310	.6311	.5869	.7619	.6254	.9247	.4801	.1411	.3591	.2716	.3851	.4089	.2748	.5218	.5706	.6012	.5970	.6606	.7494	.5161	.3191	.8280	1.2856

Source: Survey by Author, 1960; see appendix B.

*Slight difference from actual sum due to rounding of detail.

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Table X

SOURCES OF BASIC INCOME
AND THEIR EFFECT ON VARIOUS INDUSTRIES
1959
($1000's)

INDUSTRIES	AGRICULTURE		OIL & GAS		OTHER MINERALS		MANUFACTURING		TRANS. & UTILITIES		WHOLESALE		TRAVELERS, TRUCKS		NON-GOVT. CONST.		ALL GOVT. CONST.		ALL OTHER STATE & FEDERAL GOVT. PURCHASES & PAYMENTS		ALL OTHER		TOTAL	
	Value of Export	Produced Business	Value of Export	Produced Business	Value of Export	Produced Business	Value of Export	Produced Business	Value of Export	Produced Business	Value of Export	Produced Business	Value of Export	Produced Business	Value of Export	Produced Business	Value of Export	Produced Business	Direct Purchases	Produced Business	Value of Export	Produced Business	Value of Export	Produced Business
INDUSTRIES:																								
AGRICULTURE	$13,036	$1,363		$203		$109		$1,008		$393		$119		$161		$162		$56	$1,099	$307		$90	$14,135	$3,971
MINERALS		246	$29,073	5,408	$11,660	287		68		349		32		224		149		66		280		107	40,733	7,216
MANUFACTURING		464		427		466	$2,860	79		338		49		323		403		126		458		177	2,860	3,310
TRANSPORTATION & UTILITIES		1,593		1,256		1,357		376	$11,278	1,215		261		1,187		1,043		335	64	1,347		462	11,342	10,432
WHOLESALE		3,044		1,753		921		442		1,591	$7,337	283		3,528	$1,424	1,141	$318	479	366	1,787		607	11,165	15,576
RETAIL		7,770		6,348		4,174		1,292		6,148		921	$9,363	3,665		4,733		1,765	60	8,085	64	3,263	4,269	48,164
SERVICE		1,407		1,537		792		274		1,180		208	3,048	1,043		887		457	1,157	1,520	297	141	297	9,898
FINANCE		630		384		210		137		325		69		344	13,072	288	7,567	131		410		146	20,652	3,069
CONTRACTORS		550		1,435		1,068		137		288		133		268		1,051		819	13	397		—	2,838	6,292
LOCAL GOVERNMENT		—		—		—		—		—		—		—		—		—	2,838	—	4,512	—	4,512	12,219
HOUSEHOLD		—		—		—		—		—		—		—		—		—	7,707	—		—	—	—
TOTALS	$13,036	$17,067	$29,073	$18,751	$11,660	$9,384	$2,860	$3,813	$11,278	$11,827	$7,337	$2,075	$12,411	$10,741	$14,496	$9,857	$7,885	$4,234	$13,304	$14,591	$4,873	$5,588	$128,213	$107,928
BUSINESS GENERATOR		1.309		.645		.805		1.333		1.049		.283		.865		.680		.537		1.097		1.147		.842
LOCAL GOVERNMENT REVENUE		$1,225		$1,084		$381		$145		$1,365		$69		$325		$276		$113		$3,242*		$120		$8,345*
STATE & FEDERAL GOVT. REVENUE		$2,013		$3,522		$1,182		$403		$1,996		$934		$1,320		$1,103		$466		$2,102		$831		$15,877
REALIZED PERSONAL INCOME		$10,469		$9,983		$6,843		$1,871		$10,239		$1,162		$5,242		$6,059		$2,598		$13,945*		$6,060*		$74,471*

*Includes both basic and produced income.

Source: Summarization of data in Tables VII, VIII, and IX.

1953 and 1959. As noted previously in Table VI, total household income, and consequently expenditures, increased by only 8.8 per cent from 1953 to 1959 as compared to the expected increase of 20.2 per cent in this interim when only alterations in the export picture were considered.

Much of the difference between estimated and actual household income for 1959 can be traced to a general lowering of household requirements per dollar of output for nearly all industries in Southwestern Wyoming. As may be noted in Table XI, household input amounted to .242 dollars for every dollar of output in 1953, but dropped to .205 dollars in 1959. This drop in household input requirement occurred for every industry as summarized in Table XI, except agriculture. The increased household input requirement per dollar of output by agriculture can be traced to the higher net profit obtained in 1959; agricultural payroll by itself was down in 1959, even though gross receipts were up.

A very substantial change occurred in the household input requirements per dollar of output for mineral extraction industries. This change occurred, not only because of the switching from coal production, which required a substantial amount of local labor to the oil and gas industry which required less labor, but it also occurred in the form of the oil and gas industry itself requiring a household input of only .15 dollars in 1959 as compared to .18 dollars in 1953 per dollar of output. Because of the many modern techniques used in the new trona mine and the upgrading of methods of production for the small amount of coal still being mined, one dollar of output by "other" minerals required only .39 dollars of household input in 1959 as compared to .53 dollars in 1953. The total effect of this drop in household input requirements for all mineral extraction industries as shown in Table XI, is a drop of some 40.8 per cent. Included within this 40.8 per cent drop is the effect of the switching from a large "other" mineral output to a large oil and gas output. In terms of actual number of employees, hired employment by the entire mineral industry amounted to 3,200 persons in 1953, and only 1,600 persons in 1959.

The construction industry also made a substantial shift in the amount of direct household input requirements. In 1953 about .33 dollars were paid to the household sector for each dollar of construction output; yet, in 1959 this industry required only .24 dollars worth of direct household input per dollar of output. A significant amount of this change can be traced to much of the growth in the construction industry during the interim falling into the "heavy" area.

It is also interesting to note that local manufacturers, retail stores, finance businesses, and service firms were all operating more efficiently in 1959 than in 1953 in terms of household input required per dollar output (sales). Input requirements from the household sector to transportation and utilities also dropped as railroad employment decreased.

The over-all effect of this decreased input requirement of household services was that local earnings in the form of wages, salary, profits, and other income increased by only 4.5 per cent from 1953 to 1959. As noted previously, a substantial increase occurred to the household sector from outside of the economy. Included here are interest, dividends, and other property income, and increased social payments from the federal govern-

ment. The increase in household income from outside the economy amounted to 37.1 per cent.

These changed input requirements from the household sector reflect a considerable change in the working force and population of Southwestern Wyoming. Average hired employment dropped from 14,200 persons in 1953 to 12,400 persons in 1959, or a drop of 12.7 per cent. Payroll was able to hold its own despite this drop by an increase in average pay per person hired amounting to 15.6 per cent. It is noteworthy that this rate of increase is only about one-half the state of Wyoming rate during this period, and is significantly less than the national rate. The labor force, in terms of occupation, made a substantial increase in the proportion of professional, technical, and clerical positions during this period, yet made a considerable decrease in the proportion of farming and operative (coal miners) occupations.

During the decade from 1950 to 1960 population decreased by 6.5 per cent. It is expected that most of this drop occurred between 1953 and 1959. Over-all population decline, however, by no means reflects population changes for different age groups. During the past decade the number of persons in the group 65 years and over increased 25 per cent, while in contrast, the number of persons between 15 and 34 years of age decreased by over 24 per cent. Relatively minor changes occurred in other age groups. Of course, Southwestern Wyoming followed the national pattern in these age group changes, but these local area changes are considerably more pronounced.

Upon considering the changed age composition of the population in Southwestern Wyoming, the increased proportion of technical, managerial and clerical workers, and the economy's new orientation toward oil, gas, and trona instead of emphasis on railroad and coal mining, it may be expected that the household consumption pattern made substantial changes. This it did!

As the population changed during the period of 1953 to 1959, a definite trend toward purchasing substantially more services and less commodities was noted. Of course, a similar trend was noted nationally; however, it was more pronounced in Southwestern Wyoming. While the total realized personal income increased 8.8 per cent in Southwestern Wyoming, purchases from service firms increased by 36.9 per cent, and purchases from retailers and wholesalers decreased 0.7 per cent.

Individual items making up this changed purchasing pattern are included as Table XII. Among the items of particular interest are that a spectacular decrease occurred in eating and drinking retailer sales, with a loss of 30.2 per cent. In particular, this reflects that the bars in Southwestern Wyoming were hit extremely hard upon the loss of the coal miners. Another change of note is that taxes being paid to the local government moved up by 57.8 per cent as administration costs increased and improvements were made in public schools and teaching staffs. Even though population declined, school enrollment made a slight increase during this period. The more than doubling of utility service purchases as shown in Table XII

is a result of gas service being introduced to some towns in Southwestern Wyoming during this interim.

While nearly all industries lowered their input requirements from the household sector during this period, the household sector also reduced its requirements from local industry. This is reflected by an increase in imports by the household sector from outside the economy of 21.9 per cent. The imports by the household sector still did not become a serious source of leakage from the economy since only 18.6 per cent of total purchases by householders were made outside of the local economy in 1959.

The reader may be questioning how the business producing power of the purchases by the household industry changed from 1953 to 1959. Three major factors have been examined which influence this business generator. It was seen earlier that from 1953 to 1959 the over-all business generator decreased a small amount. In addition, it was just noted that the leakage of dollars which did find their way to the household sector increased by 21.9 per cent from 1953 to 1959. A third trend affecting the business generating power of the household sector is the increased trend toward purchasing services. It was noticed in Table III and Table IX that service industries have higher business generating power than do retailers. Thus, two of these factors would cause a downward movement of business generating power for the household sector while the third one would cause an upward movement. The final result was that the business generator for the household sector decreased from 1.240 in 1953 to 1.157 in 1959, or a decrease of about seven per cent.

This low amount of business generating power change occurred even though rather high amounts of change occurred in the individual elements making up the over-all business generator. The interested reader may wish to examine these individual elements by comparing the household column of Table III and Table IX.

Tendency for Industry Sectors to Buy More From the Local Economy

While the value of household requirements (wages and salary) per dollar of output decreased between 1953 and 1959 for nearly all industries, the value of input from other local industries increased. Thus, the over-all activity in the local economy became slightly more integrated. Summary data, in this regard, are included in Table XI also.

Increased purchases within the local economy spring from two major developments. One development was the large growth taking place within the wholesale industry. Increased activity here sprang largely from retailer and consumer types of service firms purchasing more from the local economy. A significant amount of this increase took place in bulk gasoline distribution; and consequently, local firms oriented toward this line are the ones causing a significant amount of this upward trend.

The conversion from high coal output to high oil and gas and other mineral output increased local purchases by the mineral industry. In 1953 each dollar's worth of mineral output required about .20 dollars of local non-household input. While coal mining was a big user of local labor, this industry required very little local supporting industry. A shift to oil,

Table XI

SUMMARY OF CHANGES IN INPUT AGGREGATES AND COEFFICIENTS
Southwestern Wyoming
1953-1959
($1000's)

Industry	1953 Local Purchases	1953 House-hold	1953 Imports*	1953 Total Input	1959 Local Purchases	1959 House-hold	1959 Imports*	1959 Total Input
Agriculture	$ 6,918	$ 6,366	$ 1,495	$ 14,779	$ 8,254	$ 7,939	$ 1,913	$ 18,106
Minerals	8,114	16,303	16,275	40,692	11,655	11,367	24,927	47,949
Manufacturing	1,809	989	927	3,725	3,064	1,436	1,670	6,170
Trans. and Utilities	3,759	11,512	4,531	19,802	6,101	10,868	4,805	21,774
Wholesaling	960	932	9,834	11,726	2,281	1,907	19,091	23,279
Retail	14,786	11,056	31,353	57,195	15,703	11,040	32,586	59,329
Services	3,604	3,832	2,654	10,090	5,487	4,735	3,945	9,167
Finance	331	1,498	886	2,715	430	1,787	1,149	3,366
Construction	2,398	3,866	5,321	11,585	5,784	6,509	14,651	26,944
Local Government	1,381	3,189	1,131	5,701	2,064	4,664	1,617	8,345
Household	49,511	....	18,942	68,453	52,612	....	21,859	74,471
All Industries	$93,571	$59,543	93,349	$246,463	$113,435	$62,252	$128,213	$303,900
Fraction of Total:								
Agriculture	.4681	.4307	.1011	1.0000	.4559	.4385	.1056	1.0000
Minerals	.1994	.4006	.4000	1.0000	.2431	.2371	.5198	1.0000
Manufacturing	.4856	.2655	.2489	1.0000	.4966	.2327	.2707	1.0000
Trans. and Utilities	.1898	.5814	.2288	1.0000	.2802	.4991	.2207	1.0000
Wholesaling	.0819	.0795	.8386	1.0000	.0980	.0819	.8201	1.0000
Retail	.2585	.1933	.5482	1.0000	.2647	.1861	.5492	1.0000
Services	.3572	.3798	.2630	1.0000	.3873	.3342	.2785	1.0000
Finance	.1219	.5517	.3264	1.0000	.1277	.5309	.3414	1.0000
Construction	.2070	.3337	.4593	1.0000	.2147	.2416	.5437	1.0000
Local Government	.2422	.5594	.1984	1.0000	.2473	.5589	.1938	1.0000
Household	.7233	....	.2767	1.0000	.7065	....	.2935	1.0000
All Industries	.3797	.2416	.3787	1.0000	.3733	.2048	.4219	1.00000

*Includes State-Federal Government taxes.
Source: Summary of data in Tables I and VII.

gas, and other minerals in 1959 raised the local non-labor input requirements to .24 dollars per dollar of output.

Another change worthy of mention occurred as a general increase in consumption of utility services and the initial offering of such services in some communities. Such action not only increased local consumption of utility service, but indirectly increased local consumption of local gas production.

Increased purchases from the local economy by local industries was one key factor toward the growth in commercial activity amounting to 37.1 per cent, even though household purchases made very little increase. From an over-all standpoint, purchases by local industries from local commercial firms increased from $29,133,000 in 1953 to $42,706,000 in 1959, or an increase of 46.6 per cent. These data are noted in Table XIII along with the increase in commercial activity that is directly attributable to the increased export sales by commercial firms, and the change in sales to local households.

Tendency for Local Industries to Offset Decreased Household Input by Increased Imports

As the household input requirements (largely wages and salary) decreased in proportion to total output between 1953 and 1959, the amount of purchases or payments to businesses outside the local economy increased as a proportion of total output. This pattern was reflected in nearly all industry classifications within the local economy. Summary detail may be examined in Table XI; further detail is included in Tables II and VIII.

The most outstanding change of this sort occurred within the mineral extraction industries as coal was replaced by oil and gas and other mineral. About $.40 was immediately spent outside the local economy for each dollar of output by mineral extraction industries in 1953; this rate increased in 1959 to $.52 per dollar of output. There are several reasons for this change. The oil and gas industry has long been noted as one requiring an extremely high initial investment, but low production costs after this investment is once made. As a consequence, many of the receipts from products sold go for amortizing the original investment which, of course, was made in Wyoming in earlier years. As a consequence, the increased production 1959 was being partially used to pay off earlier investments.

As coal was replaced by "other" mineral mining, newer, more advanced mining techniques were used. Thus, personnel were replaced in many instances by machines and these machines must be amortized from local production which takes money away from the local economy. In the earlier years the larger use of local man power would have contributed these amortizing dollars to the local economy.

When manufacturing was being expanded during the period under survey, it was necessary to go outside the local area for additional raw materials and component parts. This caused the increase in import activity by the manufacturing industry. As construction activity became heavier in nature during this period, contractors also found it necessary to obtain more materials from outside the economy.

Table XII

HOUSEHOLD PURCHASES FROM VARIOUS INDUSTRIES

Southwestern Wyoming

1953 - 1959

($1000's)

Industry	Purchases		Per Cent of Total		Per Cent Change*
	1953	1959	1953	1959	1953-59
Mining (largely coal)	$ 368	$ 400	0.5	0.5	8.9
Manufacturers	870	947	1.3	1.3	8.9
Transportation	840	914	1.2	1.2	8.8
Utilities	1,174	2,617	1.7	3.5	122.9
Wholesalers	138	183	0.2	0.3	32.6
Retailers: Building Material	2,311	2,515	3.4	3.4	8.8
Gas and Auto	10,410	11,186	15.2	15.0	7.5
Eat and Drink	5,686	3,968	8.3	5.3	−30.2
Other Retailers	21,523	21,943	31.4	29.5	2.0
Service: Professional	99	108	0.2	0.2	9.1
Repair	269	523	0.4	0.7	94.4
Other Service	2,522	3,558	3.7	4.8	41.1
Real Estate Rental	834	908	1.2	1.2	8.9
Finance	1,080	1,170	1.6	1.6	8.3
Building Contractors	1,055	1,148	1.6	1.5	8.8
Local Government (taxes)	332	524	0.5	0.7	57.8
State & Fed. Govt. (taxes)	7,549	7,968	11.0	10.7	5.6
Import	11,393	13,891	16.6	18.6	21.9
Total Purchases	$68,453	$74,471	100.0	100.0	8.8

*The estimating procedures used obliterates the actual change in some of the smaller items. These are reflected as percentage changes of nominally 8.8 per cent which agrees with the total change.

Source: Household columns of Tables I and VII.

Change in Business Generators

As was cursorily noted earlier, the over-all business producing power of exports from the local economy dropped from $1 in exports producing $.96 in additional business in 1953 to $.84 in 1959. Prior discussion on both the changing pattern of exports and the alterations in internal structural relationships lead to the reasons for this change. Nevertheless, a summary is warranted at this point.

By reviewing Table V it may be noted that much of the expansion in exports occurred among low additional business producing activities. The three lowest additional business producing activities in 1953 as per Table IV were oil and gas exports, wholesaling exports, and outside investment in local construction. Overall, value of exports increased by 37.3 per cent between 1953 and 1959. However, the three export activities with the lowest additional business producing power, quite ironically, increased two and one-half times while all other export activities as a whole remained at the same level as in 1953.

Secondly, in the preceding discussion it was noted that household input requirements (largely wages and salary) decreased for all industries except agriculture. This change exerts a very substantial downward force on the over-all additional business producing power since about three-fourths of the dollars received by the household sector are again spent in the local economy which give the household sector a rather high multiplier.

Even though local industries substantially increased their local purchases, they also increased their importing activity from outside the local economy. While increased local purchases tended to increase business producing power of exports, the increased leakage greatly exceeded the influence and again exerted a pressure toward reducing business generating power. Even the household sector made more purchases outside the local economy in 1959, and consequently, the household sector multiplier decreased.

The total result was a drop in the over-all business multiplier as noted above. As may be seen by comparing Table III to Table IX, a similar drop was recorded for the individual multiplier for nearly all industries. A slight increase was recorded by gas and auto retailers as a result of increased purchasing from local wholesalers. The utility multiplier increased because of an expansion in gas utility service and the consequential increased purchases from local producers.

New Origin of Commercial Activity

Figure 12 has been constructed from data in Table X to obtain a visual comparison of the importance of various sources of basic income to several classes of commercial firms in 1959. A basis similar to that of Figure 11 was used so that 1959 can be compared to 1953.

In general, commercial firms were considerably less dependent upon mineral exports, but investment in construction became much more important. The contribution by transportation and utility exports (largely railroad payroll) was significantly less. Even though the traveler business was up in 1959 and some gain was made in agriculture exports, their proportion of the total decreased as other forms of basic income made more

Table XIII

SOURCE OF RECEIPTS TO COMMERCIAL FIRMS

Southwestern Wyoming

1953 - 1959

($1000's)

| | Receipts | | Percentage |
	1953	1959	Change
Source:			
Sales to Local Industries	$ 29,133	$ 42,706	+46.6
Sales to Households	47,941	50,741	+ 5.8
Sales Outside Local Economy	27,963	50,529	+80.6
Total Receipts	$105,037	$143,976	+37.1
Per Cent of Total Receipts:			
Sales to Local Industries	27.8	29.6	
Sales to Households	45.6	35.3	
Sales Outside the Local Economy	26.6	35.1	
Total Receipts	100.0	100.0	

Source: Summary of data contained in Tables I and VII with actual transportation receipts substituted.

significant gains. A considerable increase in dependency upon "other" exports occurred from 1953 to 1959 since this is where such exports as those made by wholesalers and manufacturers were classed in this figure.

Per cent of Total Value of Export:
$127,092,000

Basic Income (Exports)

Oil, gas, and other minerals 31.7%

Construction 17.4%

Agriculture 10.2%

Travelers and Agriculture 9.7%

te-fed. govt 8.9%

Day & per 10.3%

rate&Util 8.9%

All other 11.5%

*Excludes original "export" so that total activity adds to $143,976,000.

Source: Summary of Table X.

THE ECONOMY

Trans. & Utilities

Whole-salers

Retailers

General Service

Finance

Contract Const.

Total Commer-cial 12.4%

9.0%
11.0%
16.0%
10.0%
25.1%
15.6%

Per cent of $143,976,000

Resulting Total Commercial Activity*

ORIGIN OF COMMERCIAL ACTIVITY
Southwestern Wyoming--1959

Figure 12

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CONCLUSIONS AND IMPLICATIONS

In the prior chapter, it has been seen that rather drastic alterations occurred among the basic income producing activities in Southwestern Wyoming in recent years. It was then seen that much of the change in the economy between 1953 and 1959 could be traced to these changes in pattern and volume of exports. Nevertheless, some alterations in the economy were determined to have resulted from changed local industry input patterns. In particular, nearly all industries were using significantly less manpower per dollar of output. In contrast, they were purchasing more local services, yet also sending more money outside the economy to amortize higher investments, to pay for additional supplies, merchandise and raw materials, and to pay increased out-of-local-area administrative expenses.

While the prior chapter dwelt in considerable detail on the above summarized changes, it concerned only indirectly the implications to be drawn from these changes regarding how similar changes may affect other economies and the small business operations taking place in them, or how pending changes may affect the future of Southwestern Wyoming. A forecast of future economic activity in Southwestern Wyoming follows in Chapter VI. Attention will now be turned toward some of the aspects of economic change occurring in Southwestern Wyoming which may hold implications for other local economies. Of course, it must be remembered that an examination of only one local economy will provide only indications rather than invariable principles about how similar changes would affect other local economies.

Implications for Local Economies

As was hypothesized when developing the analytical scheme used herein, and substantiated in Chapter IV, *total economic activity in a local economy has a measurable relationship to basic income to that economy.* Thus, it becomes possible to forecast resulting total economic activity, or components thereof, upon knowing, or obtaining likely estimates of volume and pattern of basic income producing exports for a future time period. Hence, a community faced with a loss or gain of a basic income producing industry can determine ahead of time the likely effect of that loss or gain on its entire economy. Of course, paramount to this idea is the ease with which changes in basic income producing exports can often be determined in contrast to the usual difficulty in forecasting alterations in the total economic activity.

This relationship between basic income and total economic activity is not entirely simple, but it can be explained largely by the ideas incorporated in the input-output model. Actually, the over-all relationship represents a special kind of summation of individual relationships which in turn are associated with individual purchases (or sales) by one local industry

—55—
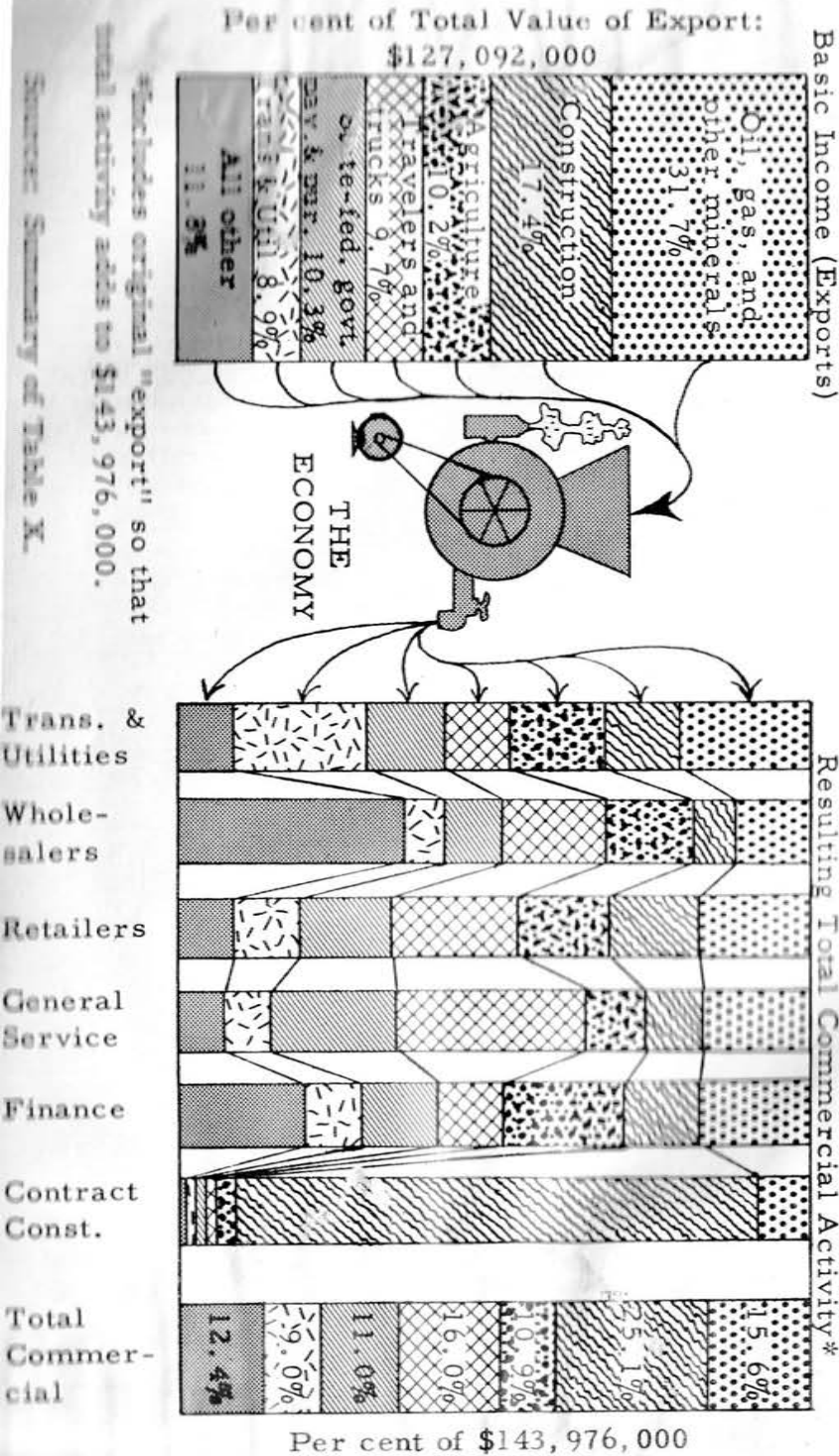
to another. The input-output model formulates a mechanical procedure by which all of these components can be manipulated simultaneously.

Substantiation of the measurability of the relationship between basic income and resulting economic activity, and consequently, the substantiation of the input-output model for measuring this relationship, was performed largely, first by constructing a model upon the relationship determined to exist in 1953, second, by inserting the export picture of 1959 into that model, and third, by comparing the results of the estimated pattern of total economic activity to the pattern of actual acivity in 1959 (Table VI.) Upon making the comparison of estimated to actual activity, it was determined that a great deal of the change within this particular local economy could be traced to the alterations occurring in the export picture between the two concerned years.

Of course, a significant amount of error did exist between the estimated and actual activity for 1959. Nevertheless, a rather substantial part of this error could be traced to some altered relationship between the household sector and the remainder of the economy. Of considerable importance was a general lowering of household input requirements per dollar of output for nearly all local industries. Another change occurred in these basic relationships through the trend of householders purchasing more services relative to commodities.

It is noteworthy that both of these changes concerning the household sector followed a similar trend in the national economy. While household input requirements per dollar of output in the local economy decreased by 15.2 per cent between 1953 and 1959, on the national level, man-hour input requirements per volume of real output decreased by 18.1 per cent.[1] Similarly, the local householder followed a national pattern in increasing his purchase of services relative to commodities. However, since the resident of Southwestern Wyoming had previously purchased services at a much lower rate than was occurring nationally, the gain recorded during the period under study was considerably higher.

Another internal change of note was the growth of local interindustry purchasing leading to a more integrated economy. While it cannot be substantiated by this examination of only one economy, this change indicates that it is certainly possible for alterations in export patterns to lead to the developing of considerably more local interindustry transactions. This change could possibly be traced to the tendency for supporting industries associated with declining export industries to remain active in the changed economy, while in addition, the new export activity would tend to bring into the economy its own specialized supporting industries. For example, the closing of the coal mines practically curtailed the operations of some local timber producers. Only by making changes in their product and good salesmanship, could they market their product with the new oil and trona industry. If these timber producers had not already been operating in the local economy, it is quite probably that these new export developments would not have invited the development of this particular timber producing industry.

[1]"Indexes of Real Product per Man-Hour for the Private Economy", Bureau of Labor Statistics, Department of Labor, as published in the *Statistical Abstract*, 1961.

The over-all implication here is that it has been shown that the *relationships existing between basic income producing activities and resulting local economic activity can be determined*, and that *these relationships change very little over time even though the export picture may change drastically*. Many of the internal changes in relationships which do occur over time are associated with the household sector and consequently can easily be determined or forecasted by noting changes in the national economy and relating them to the local economy.

While every local economy is different, a starting point for persons in other local economies faced with changes in basic income producing activities would be a careful examination of how similar changes would cause the economy of Southwestern Wyoming to react. For example, an economy may be faced with a substantial loss of traveler basic income. The model of Southwestern Wyoming in 1953 shows that $1.00 of export sales to travelers produced about $.42 directly and indirectly in local personal income. A careful analyst could very well apply this information to another local economy, and after taking into account the differences between the economy under consideration and that of Southwestern Wyoming, could come up with a reasonable answer as to the many effects of the loss in traveler basic income.[2]

Some Implications for Communities within Local Economies

The discussion up to now concerned largely the effects of basic income change upon local economies. Nevertheless, the conclusions reached are equally applicable to the many communities within a local economy. In fact, any delineation between a community and a local economy is completely arbitrary.

While special analyses were not made of the several local communities in Southwestern Wyoming, it was very apparent from casual information obtained, that each community's economic activity was being directly affected by changes in the particular sources of basic income upon which it was dependent. For the few communities entirely dependent upon coal exports, the loss of the coal market was a catastrophe. For example, the town of Superior, a coal mining town, dropped in population from 1,530 persons in 1950 to only 241 persons in 1960. In contrast, a few very small towns, previously dependent upon agriculture and the out-of-area-traveler market, made very substantial gains with booming gas exploration and production. For example, the town of Big Piney contained only 206 persons in 1950, but it grew to 663 by 1960.

Nevertheless, it is interesting to note that both expandable and deflationary basic income changes occurred in most of the larger communities of Southwestern Wyoming. Coal mining was carried out in extensive volume

[2]It is noteworthy that once the 1959 model for Southwestern Wyoming was completed, it was possible to use the relationships established in making analyses of several other local economies and for analyzing the contribution a certain industry made to the state of Wyoming economy. Of course, substantial errors do exist in making these adaptations, but nevertheless, they can be minimized by taking into account the major differences between the two economies. The usual procedure is to construct a new model for the economy under consideration through use of both available secondary data about that economy and the applicable relationships (input coefficients) found in Southwestern Wyoming.

near both Kemmerer and Rock Springs in the past. Consequently, the decline of coal hurt both of these communities, but especially hurt the few small surrounding coal mining towns (or camps). The railroad employment decline affected four of the five major towns in the area. Highway construction underway in 1959 was quite widespread and served to boost the economies of most communities as did also the growth in traveler business. Oil and gas exploration and production covered a wide area.

Consequently, nearly all towns of above 1,000 persons in size increased their economic activity during this period. Fluctuations in activity, of course, occurred since declines in basic income producing activity were not immediately offset by other sources of basic income. From a population standpoint, all towns over 1,000 in population made some increase in number of residents with the exception of the city of Rock Springs which declined by four per cent. The very small towns and rural areas declined sufficiently as to cause a downward drop in population of about 6.5 per cent from 1950 to 1960.

Implications for Small Businessmen

Most economic activity in Southwestern Wyoming is actually small business activity since nearly all businesses in the area would be of the size range usually classified as small business. Of course the economy does contain the usual large utility and transportation businesses and some large mineral producers. As a result, any implications for a local economy derived from this analysis, likewise are implications for small businessmen.

It is in this local economy that they must operate. Consequently, they must be concerned with the economic health of this local economy. Yet, from questioning these small businessmen while collecting data for this analysis, it appears that few businessmen are able to relate the over-all picture of changes taking place in the local economy to their own business situation. As may be expected, these businessmen were usually so concerned with their own situation that they lacked a comprehensive understanding of the over-all changes occurring in the remainder of the entire Southwestern Wyoming economy which would concern them indirectly.

For example, a significant amount of retail trade in Rock Springs results from purchases by residents of more outlying communities which often receive their livlihood from sources of basic income not directly affecting Rock Springs. In the opposite direction, the decrease in coal mining near Rock Springs resulted in a decline for timber operators in outlying communities serving the coal mines. In turn, this caused some decrease in activity for all small businesses in these outlying communities. Even while Star Valley, in northern Lincoln County, is quite isolated economically from the remainder of Southwestern Wyoming, it is linked through its local tax structure with Kemmerer in southern Lincoln County, which in turn is linked to all the recent gas, coal and railroad developments. Thus, in the long run, success of the individual business is determined to some extent by the general economic health of the entire local economy. The closeness of this association is highly variable, however.

Of course each community in Southwestern Wyoming was also changed in some manner by these alterations in basic income producing activity. Most small businessmen were much more aware of the changes occurring

here, and took many steps to adjust their activities to them. Sometimes these adjustments were as drastic as simply "closing doors" and leaving town for the few communities in which nearly all basic income was withdrawn. In other communities, operations were greatly expanded as new workers moved in with increasing sources of basic income.

However, nearly all adjustments in operations were associated with changes in market. A great many businesses that were previously dependent entirely upon railroad workers or coal miner trade suddenly found their market contained oil workers and construction people instead. A significant increase occurred in the proportion of professional, managerial, technical, and clerical people during the period under study while the proportion of operatives made a substantial decline.

This new market meant considerably different purchasing patterns. As noted previously, a considerable increase occurred in purchase of services while commodity purchases decreased from a proportion standpoint. Purchases from outside the economy increased. Purchases from bars decreased considerably.

The effectiveness with which each business could adjust to its new market situation determined its success. Those who merely attempted to retain only their past market nearly always suffered a decline, while those who took effective steps toward developing new markets made substantial gains. For a few businesses, this meant moving their location and for others it meant stocking new items or changing product quality. But for all who made gains, it meant taking advantage of the opportunities offered. Of course, it still must be recognized that the only solution for operators in some communities was to close their doors or accept a considerable decline in business.

It is interesting to note that nearly all industry classifications, in which small business would make up the vast majority of operations, made some increase in receipts (total output) between 1953 and 1959. Some categories, in particular service, wholesaling, and contracting, made considerable increases. Only one classification, eating and drinking (bars), made a substantial decline. (See Table VI.)

From the standpoint of number of enterprises, surprisingly little difference existed between 1953 and 1959. As may be seen in Table XIV the total number of commercial firms operating in each year was nearly identical. The number of utilities and transportation firms declined while the number of contractors increased. Although not shown in Table XIV, the growth in active contractors occurred in the non-building trades area. The total number of retailers remained constant; however, a serious decline was recorded in the number of bars and the number of gasoline retailers increased as highway traveler business increased.

In summary, small business operations in a local economy such as in Southwestern Wyoming are dependent upon basic income finding its way

to that economy. Consequently they are always affected by any changes occurring in that basic income. Even though the individual small businessman is often affected more directly by changes occurring in his own community, he must be aware of over-all changes in the local economy for he is also affected indirectly by such changes. His success in the changed economy largely is based on his recognition of how it has changed, and the effectiveness with which he adjusts to the new market.

Table XIV

NUMBER OF COMMERCIAL FIRMS OPERATING

Southwestern Wyoming

1953 - 1959

Industry	1953	1959	
Transportation and Utilities	96	75	
Wholesalers	61	64	
Retailers	685	685	
Service Firms	419	433	
Finance	73	60	
Construction Contractors	136	146	
Total Firms	1,470	1,463	

Source: Survey, 1954 and 1960.

CHAPTER VI

ECONOMIC DEVELOPMENT

As noted in the first chapter of this analysis further changes were anticipated to occur in Southwestern Wyoming following 1959—the year of critical analysis. In some cases facilities which would provide new income sources were actually under construction in 1959 and did affect the economy through the construction industry. Construction has been initiated on other facilities in the interim between 1959 and the completion of this report.

The input-output techniques as described in detail earlier is especially useful in forecasting the effects of various basic income changes on an economy. However, one problem arises in that this technique requires an assumption that interrelationships (input coefficients) do not change over the period being examined. It was noted in Chapter IV that some changes do occur.

Nevertheless, as was pointed out in Chapter IV, these internal changes were quite small, outside of those affecting household income, compared to the magnitude of changes affecting basic income. Often the internal changes could be traced directly to some specific occurrence such as the expansion of gas utility service. Thus, the limitations of the input-output can be overcome in actual application, and considerable insight into the effects of changes in basic income upon an economy can be forecasted through its use.

In the estimates to follow, changes in interrelationships concerning household income and industry output were taken into account wherever such changes were considered of importance. Nearly all other interrelationships were considered to remain constant.

The entire post war period has been marked by a slow but persistent upward movement of prices. Some commodities have been affected more than others. While such trends can be expected to affect the Southwestern Wyoming economy in the future, they are not considered here. Thus, the forecasts to follow can be considered as representing nominally 1959 dollars.

The more important changes anticipated in Southwestern Wyoming are now considered in detail. This discussion is not considered to have covered all changes, but only the major ones.

Agriculture

The agriculture industry has remained at a rather constant level of output for the past several years. Only price changes and drouth have caused deviations from the average. This same picture can be expected to continue in the near future for the present operating units; however, one large new irrigation project will add significantly to agriculture output in the coming years.

Construction of the Seedskadee project on the Green River, beginning about 14 miles north of the town of Green River, was started during

1961. Upon completion it will contain 58,775 acres divided into approximately 205 farm units.[1] The first few units are expected to be ready for settlement in the fall of 1963 so as to bring them into operation when water is available from Fontenelle Dam in 1964.[2] Other blocks of units will be opened for development in the following years. Currently, indications are that development of the final 20,000 acres may be delayed to forestall interference with possible trona mining operations under parts of the project area.

According to the feasibility study,[3] this project is expected to produce $1,600,000 annually in agriculture receipts to the area upon its completion. The price index used here is slightly higher than that actually occurring in 1959. The Bureau of Reclamation expects the income going to the household sector to be a slightly smaller proportion of total receipts than the author found to be true in 1959. After considering this one change in interrelationships and manipulating these data in the 1959 input-output model, it was found that this irrigation project would produce a total of $3,917,000 in commercial activity and $2,631,000 in realized personal income per year in 1959 prices. Additional detail is shown in Table XV. A major amount of this new commercial activity will find its way to the doors of retailers; however, wholesalers, transportation, and service firms will receive a significant amount.

Oil and Gas Production Increase

Oil and gas exports can be expected to increase considerably in future years in Southwestern Wyoming. In a recent forecast for 1964 the author has estimated value of such production to double over that of 1959; however, trends in very recent years point toward a tripling of production during this five year period.

Despite recent trends, however, oil and gas production rates are determined to a large extent by available market. Thus, production in future years will depend significantly upon the completion of a proposed gas pipeline to the Los Angeles area.

The doubling of oil and gas production, as suggested above to occur by 1964, is a rather convenient amount to illustrate use of the input-output forecasting technique in this instance. Of course, it is realized that this is a rather short step forward.

Even though oil and gas production increases considerably, employment need not increase in direct proportion. Upon comparing the current situation in Southwestern Wyoming to other parts of Wyoming at earlier times it appears employment will remain at about a constant level during this period. Considerable employment associated with exploration is expected in 1964, but 1959 was also a high year in exploration. Even while employment does remain steady, it may be expected that houshold income will increase a small amount due to wage increases.

After taking into account the above changes in interrelationships and manipulating the doubling of oil and gas exports within the 1959 model,

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[1] Seedskadee Project, Wyoming, Definite Plan Report (Bureau of Reclamation, 1959).
[2] B. L. Mendenall, Project Engineer as quoted by the Rock Springs Miner (February 25, 1962).
[3] Seedskadee Project, Wyoming, op. cit.

Table XV

ESTIMATED LOCAL IMPACT OF SELECTED MAJOR ECONOMIC CHANGES
Southwestern Wyoming

($1,000's of Produced Business Annualy Direct and Indirect)

Industries	Seedskadee Project	Doubling Oil and Gas Production By 1964*	Coke Trona, and Steam-Electric	Flaming Gorge Recreation Area
Agriculture	$ 372	$ 78	69	$ 12
Minerals	64	2,032	2,430	11
Manufacturing	121	169	262	26
Trans. & Utilities	420	534	768	62
Wholesale	815	1,191	564	175
Retail	2,006	3,214	2,600	768
Service	365	985	501	244
Finance	166	160	128	18
Contractors**	145	1,590	566	14
Total Business	$4,474	$9,953	$7,888	$1,330
Local Government	$ 333	$1,044	$ 525	$ 18
State & Fed. Govts.	545	3,212	720	72
Household	2,631	4,934	4,313	300

*Data show increase over that of 1959.
**Does not include initial construction.
Source: Estimates prepared by author from 1959 input-output model

It was found that this increase in basic income from oil and gas in 1964 would produce an increase of $7,674,000 in commercial activity in 1964 and $4,934,000 in realized personal income. As pointed out in Table XV, the increase for retailers is not too much greater than that expected from the Seedskadee project, but contractors will make a very significant gain. A considerable amount of personal income gain results from an expected increase in royalty payments.

Increased Local Coal Utilization

Even though coal production was at a very low level in 1959, current indications are that this small outside market will decline in the future. Nevertheless, two large scale local industries will soon be using coal at a higher rate than total tonnage output in 1959.

As mentioned earlier, a 250 ton per day output pilot scale coke plant began operations near Kemmerer in 1961 and a 150,000 K.W. steam-electric plant, also near Kemmerer, is due to begin operations in 1963. Both of these plants will use a large volume of low grade, stripped-mined bituminous coal located nearby.

In making estimates of the effect these coal users would have on the economy, their major local expenditures such as payroll and taxes were considered as well as their purchase of local coal. The result is that an estimated $2,888,000 in commercial activity and $2,672,000 in realized personal income will be produced per year. (See Table XV.)

Increased Trona Production

While the future is bright for increased utilization of the natural Soda ash (trona) desposits in Southwestern Wyoming, the author believes that total expansion in the very near future will consist of the placing into operation of the facilities being constructed by the Stauffer Chemical Company. Past increases in natural soda ash production have largely been made through a displacement of production by the older process. Such a displacement can only take place where purity is at a premium and when transportation costs do not become excessive.

To provide the reader with an insight into the impact on the local economy of the plant presently under construction, and any future plants which may be constructed, the following estimates are offered. Key data in making these estimates are the reported 175,000 tons per year capacity and employment estimate of 150 workers for the new Stauffer plant.

Upon converting this information to export dollars, an estimated impact of $1,351,000 per year was determined for commercial firms. Since a major part of this impact results from householders spending their $1,341,000 expected realized personal income, the firms affected the greatest amount will be those serving this household market. Of course, the utility and transportation companies serving this new plant will reap a substantial gain.

Travelers Contribution

As was noted earlier, basic income contributed to the local economy by out-of-area travelers amounted to a very sizeable amount in recent years. Yet this valuable source can be expected to become even more important in future years. Not only are people everywhere being offered increased means and time in which to travel, but several developments are taking place in Southwestern Wyoming which will increase both the number of travelers and the time they stay.

Possibly the most important development from the viewpoint of number of visitors is the current construction of an interstate route through the area. Traffic increased by about 15 per cent past the town of Green River in the five years prior to 1959 and the latest traffic data[4] indicate that possibly a 20 per cent increase can be expected for the five years following 1959. Thus, on the basis of number of persons involved, the contribution to the local economy can be expected to increase at least 15 per cent and very possibly 20 per cent every five years in the future. Of course, the impact on the local economy, of total business produced, will also make similar increases.

However, not only are people expected to travel more extensively in the future, but they are also expected to spend more days vacationing. As part of a broad program by the U. S. Forest Service and the National Park Service in providing facilities for this increase in vacationing, several recreation areas are programmed for development or expansion.

The largest development currently foreseen in Southwestern Wyoming is the area surrounding the 42,000 acre reservoir created by Flaming Gorge Dam near the Utah-Wyoming border. Considerable effort will now be put forth to estimate this area's impact on the local economy. By considering the detail included it is hoped that the concerned reader can make some estimates of his own of the several other smaller developments which may affect him more closely. An over-all estimate of the expected impact of these possible recreation developments is considered much beyond the scope of this particular study.

The creation of the Flaming Gorge Reservoir in a semi-arid region, enhanced by diversely outstanding scenic surroundings, is expected to have considerable visitor drawing power. As a result, the U. S. Forest Service is constructing facilities to handle 100,000 visitors[5] annually as soon as the reservoir is filled and the National Park Service has initiated construction to handle 300,000 visits annually.[6] The U. S. Forest Service expects to continue development of campgrounds in the future so as to accommodate a maximum of 9,000 overnight visitors (66 campgrounds) at peak demand if the area proves sufficiently popular. Most of the facilities for staying overnight will be constructed by the U. S. Forest Service.

Total visits to the Flaming Gorge recreation area has been estimated between 300,000 to 600,000 annually after completion of all facilities. Upon

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[4]Wyoming Highway Department traffic count data.

[5]Letter from A. R. McConkie, Forest Supervisor, Ashley National Forest.

[6]*Recreation Planning Status Report, Flaming Gorge Unit* (National Park Service, 1959).

reviewing the extent of facilities programmed for construction by both the U. S. Forest Service and the National Park Service, it appears that for this report a 350,000 visit estimate would be very reasonable. About 50,000 of these visits could be expected to be made by people from nearby communities in Wyoming and Utah according to the local visit pattern determined to exist at three reservoirs recently constructed in Nebraska.[7]

After considering data collected in a recent survey of travel in Wyoming[8] conducted by the author and reviewing facilities available, it appears that approximately 130,000 of the non-local visitors or 43 per cent of the total 300,000 would stay one or more nights in the area. By applying expenditure rates determined in the above survey for those staying overnight and those only visiting during the day, an estimated annual expenditure of $1,505,000 within the local area surrounding the reservoir was derived. Since most of the recreational facilities will be constructed about midway between trading centers in Wyoming and Utah, it would be reasonable to deduce that about one-half or $752,000 of this would be spent in Southwestern Wyoming.

While the above amount is small in comparison to the current amount already being contributed by out-of-area travelers, it is, nevertheless, a significant addition. Upon applying this amount to the 1959 model through use of an expenditure pattern determined by the prior mentioned Wyoming travelers stury, it is estimated that the Flaming Gorge Reservoir will produce a total of $1,281,000 in commercial activity and $300,000 in realized personal income annually in Southwestern Wyoming in the future. Table XV shows additional details on the expected economic impact. The pattern of impact on various classes of commercial firms will be quite similar to that of other out-of-area visitors except that grocery stores will receive a much higher amount and lodging services a lower amount as a result of changes in the direct purchases by campers.

Summary

These estimates on the effect of pending economic changes are included both as a guide about what to expect in the future, and as an illustration of an application of the input-output model in forecasting. It is admitted that not all expected changes were discussed, but it is thought that most changes other than those representing a slow increase or decrease were covered. To cover these gradual changes, only a forecast for a definite future year would be meaningful. Such a comprehensive forecast[9] has been constructed and already disseminated for the year 1964 by the author. It was not included in this report for the objective here was to estimate the total effect of a specific change.

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[7]Edgar Z. Palmer, *Recreational Aspects of Three Nebraska Lakes* (University of Nebraska, 1960).

[8]Richard E. Lund, *A Study of Wyoming's Out-of-State Highway Travelers* (University of Wyoming, 1961).

[9]Richard E. Lund, *A Study of the Resources, People, and Economy of Southwestern Wyoming* (Wyoming Natural Resource Board, 1962).

These effects are all summarized into aggregates to simplify discussion. Yet, it is hoped that these forecasts will serve as an illustration of what can be learned about the future by input-output techniques. By this method the individual businessman can considerably improve his judgment as to how specific changes will affect his operations in particular.

APPENDIX A

THE INPUT-OUTPUT MODEL

Total output (sales) by an industry over a particular time period equals the sum of its output going to each local industry plus the output going to industries outside the local economy. If there are n local industries, this statement may be written symbolically as:

(1) $X_i = \Sigma_j x_{ij} + y_i$ (i, j = 1, 2, ... , n)

Where: X_i = total output (sales) by industry i

x_{ij} = output (sales) from industry i to industry j within local economy

y_i = output going outside the local economy

Table I in Chapter III, showing the flows of output (sales) between the local industries and to the "outside world," is simply the quantification of equation (1) for Southwestern Wyoming. The processing sector represents the x_{ij}'s, the export sector the y_i's, and the total at the right the X_i's.

By assuming that purchases by each industry has a constant relationship to output by that industry, equation (1) can be converted to a very useful model. Table II in Chapter III shows these relationships for Southwestern Wyoming. That is, assume:

(2) $x_{ij} = a_{ij}X_j$ (i, j = 1, 2, ... , n)

Total output as expressed in equation (1) becomes:

(3) $X_i = \Sigma_j a_{ij}X_j + y_i$

or

(4) $y_i = X_i - \Sigma_j a_{ij} X_j$ (i, j = 1, 2, ... , n)

Equation (4) in matrix notation can be written as:

(5) $Y = X - AX$

or

(6) $Y = [1 - A] X$

To make this model useful it is valuable to manipulate equation (6) so that total output for a predictive period is a function of export for that period. Thus, under the condition that $[1 - A]$ has an inverse, equation (6) becomes:

(7) $X = [I - A]^{-1} Y$

The $[I - A]$ matrix for Southwestern Wyoming is included as Table III. Each element of the inverse matrix may be regarded as representing the amount of output from industry i used both directly and indirectly per dollar of export by industry j.

For making the forecast concerning the expected effect from pending economic changes a new Y was developed from outside data. It was then multiplied by the $[I - A]^{-1}$ matrix for 1959 to obtain total expected output for each industry.

The restriction that $[1 - A]$ have an inverse can be met in all practical situations if the Y vector contains at least one nonzero element in the year used in constructing the $[1 - A]$ matrix.

APPENDIX B

A DISCUSSION ON ERRORS AFFECTING THE MODEL

In discussing the use of input-output models, in particular the models used herein, the author is frequently confronted with the comment: "I agree completely with the conclusions drawn from your model, but I'm suspicious as to the soundness of the data contained in it. I doubt that your sampling procedure would give you figures of required accuracy." Or in some cases: "I would like to construct a similar model, but neither our survey experience nor project budget will enable us to collect the immense amount of data required."

In answer to these comments the author submits that if proper attention is given to certain important classes of data required in constructing the model, and if sound sampling techniques are used for collecting data required to supplement the vast amount of secondary data available, the task of constructing such a model of sufficient accuracy to meet most research needs becomes feasible and can even be fitted into fairly small research budgets. In support of this statement and the models used in this study, the author contributes the following discussion concerning where accuracy should be strived for in input-output models and the methods used in obtaining data of the required accuracy for Southwestern Wyoming (Appendix C).

For this short examination of the effects of certain kinds of errors, assume that an input-output model is to be constructed for an economy of quite similar size and structure to that of Southwestern Wyoming. Further, assume that economic activity in this economy can be summarized into only four industries: mining, utilities, trade, and houshold. While in reality an economy can never be quantified with 100 per cent accuracy, there is nothing wrong with imagining such a situation to be possible. Thus, suppose that Table XVI represents this economy's interindustry table and that no errors exist in its construction.

As was carried out for Southwestern Wyoming, a table showing direct and indirect activity per dollar of export (inverse matrix) can be constructed from this interindustry table. All of the analysis could then be carried out and forecasts of future activity could be made upon expected changes in export activity.

For example, it may be determined from outside sources that this imaginary economy could be expected to increase its exports of utilities by five million dollars at some future time. What will the effect be of this increase on different local industries?

INTERINDUSTRY TABLE XVI

($1,000,000's)

— SALES —

Industry	No. 1	No. 2	No. 3	No. 4	Export	Total
Mining (No. 1)	2	4	2	2	60	70
Utilities (No. 2)	4	1	5	5	5	20
Trade (No. 3)	3	2	10	25	30	70
Household (No. 4)	17	8	10	0	5	40
Import	44	5	43	8	0	100
Total	70	20	70	40	100	300

(left margin, vertical: PURCHASES)

As noted in Appendix A, and as carried out for Southwestern Wyoming, an answer can be obtained by multiplying the inverse matrix by the column vector (0, 5, 0, 0). While the inverse matrix is not shown here, the results of such multiplication are shown in the third column of Table XVII.

This identical use of the input-output model for this imaginary economy will now be repeated; however, an error will be inserted into the original 100 per cent accurate table at various locations. After carrying out the required manipulations, the forecasting effect of these errors can be determined by comparing their forecasted total output to the total output derived by use of the error free model.

Assume now that an error of two million dollars was made in the purchasing column for utilities in the interindustry table so that two million dollars less was shown to be purchased from mining, and two million dollars more was shown to come from trade(Case A). This error amounting to 10 per cent of total output for utilities of course would cause an error in the estimate of the effect on the economy from the additional five million dollars in export by utilities. By constructing a new input-output model including such an error in purchases, it was determined that the five million dollars in exports would produce $13.5 million in business and personal income or only 2.5 per cent less than was estimated by using the 100 per cent accurate model. These data are shown in Table XVII.

It is interesting to assume a similar sized error in purchasing from minerals by utilities, but in contrast assume that this amount was then spent outside the economy instead of with the local trade industry(Case B). By building a model with this error incorporated, it was determined as shown in Table XVII, that an error of 9.4 per cent occurred in estimating the effect of a five million dollar additional export by utilities.

An error of two million dollars in the payroll sector of the utility industry resulted in an over-all error amounting to 12.3 per cent for this same increase in utility exports(Case C). Data showing the individ-

Table XVII

ERROR IN DETERMINING PRODUCED BUSINESS
RESULTING FROM AN ERROR IN UTILITY PURCHASES

($1,000,000's)

Industry	Export Vector Applied	Correct Produced Output	CASE A Purchases $	CASE A Output $	CASE A Error %	CASE B Purchases $	CASE B Output $	CASE B Error %	CASE C Purchases $	CASE C Output $	CASE C Error %
No. 1	0	1.49	4—2	.88	—40.9	4—2	.84	—43.6	4	1.40	— 6.0
No. 2	5	6.01	1	5.99	— 0.3	1	5.92	— 1.5	1	5.85	— 2.7
No. 3	0	3.12	2+2	3.51	+12.5	2	2.80	—10.2	2	2.43	—22.1
No. 4	0	3.21	8	3.11	— 3.1	8	2.97	— 7.5	8—2	2.44	—24.0
Totals		13.83		13.48	— 2.5		12.53	— 9.4		12.13	—12.3

ual errors occurring in the estimated effects of this five million dollar increase in exports are also shown in Table XVII.

From these examples it may be deduced that an error of a given magnitude will have quite varying effects upon an input-output model according to its location. *An error which changes the leakage picture is of considerable more concern than one resulting from assigning a local purchase to the wrong industry. Similarly, an error affecting household or any other industry having a high multiplier is of more concern than one with a low multiplier.*

The above examples tend to over-emphasize the effects of an error for it is not often that only one type of export from an economy expands. To move to the opposite extreme, it may be assumed that the forecasted increase in exports is that all will increase by 50 per cent. The new export column vector becomes $1.5(60, 5, 30, 5)$ where 1.5 is a scaler. Now if errors occur in constructing the processing sector of the model, but both total output and exports are 100 per cent correct, the forecast will be 100 per cent correct under the conditions[1] assumed earlier despite that error.

That is:

Assume the model: $X = Y \left[I - A \right]^{-1}$ Where: X = correct output

Y = correct export

$\left[I - A \right]^{-1}$ = matrix with or without an error

Then: $(1.5) X = (1.5) Y \left[I - A \right]^{-1}$ Where: 1.5 is a scaler.

It may also be shown that the condition of 100 per cent accuracy in the original export and output picture can be relaxed somewhat without application errors becoming significant, providing the elements of the new export vector tend to be a constant proportion of the original elements (that is, if each original export can be assumed to increase by say, about 50 per cent).

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[1]Of course this argument, as does all of Appendix B, assumes the theoretical requirement of constant input coefficients having been met or overcome in the applied situation.

APPENDIX C

DATA SOURCES

The discussion to follow is included to assist the critical reader in evaluating the preceding analysis. Persons interested in the more technical aspects of survey work are referred to the many excellent technical publications now available.

The enormous amount of data required for this analysis were collected in a multitude of ways. Of course, secondary sources were used whenever available, but it was necessary to collect a large proportion of the required data from actual field survey work. Table XVIII summarizes the most important secondary sources used and the survey work required to supplement these secondary sources. A selected list of publications contributing to the project are included later.

The description to follow pertains largely to the field survey work conducted during the summer of 1960 for obtaining data on activity during 1959. As will be noted later, the 1953 tables were constructed from data collected in an earlier survey as well as secondary sources and through using some of the relationships determined to exist for 1959. The 1959 interindustry table was actually completed before the table for 1953.

Universe Construction

Since this analysis was intended to include *all* local economic activity, it was necessary to give considerable attention to universe development. Any omissions, of course, would result in error that would not be correctable by any degree of sophistication in survey techniques.

For what may be called the business type of industries, the initial step here was to stratify a listing obtained from the Wyoming Employment Security Commission of all firms employing at least one person. Stratification was based on county of location and industry classification. Fifty different classifications or sampling strata were used. To these initial records were added firm names obtained from sales tax license records and in some cases telephone book listings.

While both the records obtained from the Employment Security Commission and sales tax licences contained "kind of business" codes, it was necessary to make some revisions in classification while in the field. In addition, it was necessary to remove the listings of firms doing no business in 1959 and duplications due to changes in firm names. The services of local Chambers of Commerce were widely used here.

It was not necessary to construct a detailed universe for either households or agriculture since Bureau of Census publications provided the needed universe measures here. A listing of all persons selling either wool or livestock as determined by records for government wool support payments and brand certificates was used in conducting the mail in survey of farmers and ranchers. The telephone book was relied on in surveying non-farm households.

Necessary listings and universe counts for real property rental were obtained from tax acessment records. While much of the needed data on government units were obtained from secondary sources, it was necessary to carry out field survey work by referring to telephone listings and other miscellaneous sources. A listing of nonprofit organizations was constructed with the help of local Chambers of Commerce.

Data Needed

While some data were needed for general economic analysis, the primary goal was to obtain data necessary for constructing an interindustry table. That is, all data requirements could be summarized down to the need of making an estimate of each element showing sales (or purchases) from one industry to another.

Since each element of an interindustry table represents both a sale and a purchase, data for estimating that element could be obtained from two different sources. However, a decision was made to concentrate on obtaining data denoting purchases since past experience of the author's research organization showed businessmen to be more cognizant of their sources of supply than the many strata making up their market. Nevertheless, some elements of the table were constructed from data concerning sales and such data were used in many instances as checks on purchase data. In addition, it was necessary to collect data concerning total output (gross receipts in most strata) and data necessary to the sample expansion methods.

The questionnaire used for retailers is included as Appendix D since it is typical of the many different questionnaires used in the field survey work. It should be noted, however, that some information was received in the form of side notes explaining situations not accounted for in the questionnaire.

As may be expected, businessmen seldom keep their records in a form conducive to easy construction of an interindustry table. In other words, they are often very casually concerned as to whether a certain supplier is located in Rock Springs or Salt Lake City. Thus, it was often necessary to rely on the respondents' estimates of where his purchases were made rather than on his financial records.

Information of a similar nature to that shown on typical income statements was requested in many instances even though such data did not meet the requirements of the interindustry table without considerable adjustment. These types of data were collected to both reduce interview time and to prevent the interview from degenerating into a mere guessing game. It was thought that the analyst would be in a better position to make guesses (apportionments and adjustments of various classes of income statement expenditures) than the typical respondent or interviewer. Of course, another reason behind using certain items of income statement information, even though not specifically defined in the manner needed, was the low value some such items had in terms of the aggregate situation.

Table XVIII

1959 DATA SOURCES AND DEFINITION

INDUSTRY	STANDARD CODE*	DEFINITION OF TOTAL OUTPUT	SOURCE OF TOTAL OUTPUT	SOURCE OF ESTIMATES OF INPUT
AGRICULTURE		Gross receipts from marketings, government payments, equipment sold, and cash rent received. Farm to farm sales are included.	Data from Census of Agriculture, Annual Report of the Wyoming Agriculture Stabilization and Conservation Committee, and mail-in survey of farmers and ranchers (198 returns).	Estimates were largely prepared from Census of Agriculture data, Farmer's Expenditures in 1955 by Region (U.S.D.A. Stat. Bulletin 224), Farm Income (F.I.S. 183 Supplement, U.S.D.A, August 1961), and mail-in survey of farmers and ranchers (198 returns).
MINERALS				
OIL AND GAS PRODUCTION	131	Value of "mine output" including value of auxiliary processing at the mine and receipts from services rendered.	Value reported in the Minerals Yearbook (U.S.D.I.) supplemented with data from the Wyoming State Board of Equalization Biennial Report and other records made available.	Personal contact survey of 10 operators. Survey data were expanded upon Wyoming Employment Security Commission data on payroll.
OTHER MINERAL PRODUCTION	121 & 140's			
OIL AND GAS FIELD SERVICES	138	Receipts from sale of services and commodities.	Estimates based on personal contact survey of 5 operators. Arithmetic expansion was used.	Estimates based on personal contact survey of 5 operators. Arithmetic expansion was used.
MANUFACTURING		Receipts from all sales of services and commodities. Actual selling price was recorded regardless of whether sales were at retail or wholesale.	Estimates based on personal contact survey of 32 operators. Data were expanded on Wyoming Employment Security Commission data on payroll.	Estimates based on personal contact survey of 32 operators. Data were expanded on Wyoming Employment Security Commission data on payroll.
LUMBER	241 & 242			
OTHER	Remaining 200's & 300's			
TRANSPORTATION	400's to 470's	Receipts from all sales of services and commodities for all except railroad. Non-local sales were included only for firms having their base of operations in the local area. Since railroad local expenditures and payroll amounted to much more than local receipts. Total output for this industry was taken as the sum of these local expenditures.	Estimates based on personal contact survey of 25 operators. All non-railroad data were expanded on Wyoming Employment Security Commission data on payroll.	Estimates based on personal contact survey of 25 operators. All non-railroad data were expanded on Wyoming Employment Security Commission data on payroll.
UTILITIES	480's & 490's	Receipts from all sales of services and commodities in the local area. Export sales by strictly local firms were included. An adjustment was made to conform the value of this export to the value of local input associated with that export.	Estimates based on personal contact survey of 22 operators. Expension was based on Wyoming Empoyment Security Commission data on payroll.	Estimates based on personal contact survey of 22 operators. Expansion was based on Wyoming Employment Security Commission data on payroll.

Table XVIII (continued)

INDUSTRY	STANDARD CODE*	DEFINITION OF TOTAL OUTPUT	SOURCE OF TOTAL OUTPUT	SOURCE OF ESTIMATES OF INPUT
WHOLESALE				
GENERAL	500's (except 505)	Receipts from all sales of services and commodities in local area plus export sales handled by local firms. Sales by agents and brokers were included if they had resident employees.	Estimates were based on personal contact survey of 38 operators. Farm product handlers sample data were expanded arithmetically, while all others were expanded on Wyoming Employment Security Commission payroll data.	Estimates were based on personal contact survey of 38 operators. Farm product handlers sample data were expanded arithmetically, while all others were expanded on Wyoming Employment Security Commission payroll data.
FARM PRODUCT HANDLERS	505			
RETAIL				
BUILDING MATERIAL AND FARM IMPLEMENT DEALERS	520's	Receipts from all sales of services and commodities.	Estimates were based on personal contact survey of 262 operators. Expansion was based on sales tax data for all strata except building material dealers, implement dealers, bars, and liquor stores.	Estimates were based on personal contact survey of 262 operators. Expansion was based on sales tax data for all strata except building material dealers, implement dealers, bars, and liquor stores.
GASOLINE AND AUTO DEALERS	550's			
EAT AND DRINK	580's & 592			
ALL OTHER RETAIL	530's to 590's (except those above)			
SERVICE				
LODGING	700's	Receipts from all sales of services and commodities. In the case of county hospitals and the state mental hospital, support received from the governmental units as well as receipts from patients were included. Dues and contributions received by churches and non-profit organizations were included.	Estimates based on survey data from 236 operators. Most contacts were by personal interview; however, mail-in methods were used for most professional, church, and non-profit strata. All expansions were made arithmetically.	Estimates based on survey data from 236 operators. Most contacts were by personal interview; however, mail-in methods were used for most professional, church, and non-profit strata. All expansions were made arithmetically.
BUSINESS AND PROFESSIONAL	730's, 810's, & 890's			
REPAIR	750's & 760's			
ALL OTHER SERVICE	720's, 730's, 790's, 800's, 820's, & 860's			
REAL ESTATE RENTAL		Receipts received from rental of non-farm real property.	Estimates based on a survey covering 109 rental units. About one-half of these contracts were made by mail while the other half were personal interviews. Expansions were made arithmetically upon universe data obtained from county tax assessment records.	Estimates based on a survey covering 109 rental units. About one-half of these contacts were made by mail while the other half were personal interviews. Expansions were made arithmetically upon universe data obtained from county tax assessment records.
FINANCE	600's to 670's	Receipts received from fees, commissions, services charges, interest, and any commodities sold.	Estimates were based on personal contact survey of 26 operators. Arithmetic expansions were used.	Estimates were based on personal contact survey of 26 operators. Arithmetic expansions were used.

Table XVIII (continued)

INDUSTRY	STANDARD CODE*	DEFINITION OF TOTAL OUTPUT	SOURCE OF TOTAL OUTPUT	SOURCE OF ESTIMATES OF INPUT
CONTRACTORS				
BUILDING OTHER	150's & 170's 160's	Receipts received from all local area construction project. Exports in this case constituted investment in local construction projects regardless of whether the investment was made by local people or outsiders. Local sales were regarded as local repair and service undertaken by contractors. Such items as stripping mineral seams were included as local sales rather than export.	Estimates were based on personal contact survey of 30 operators. Payroll data obtained from the Wyoming Employment Security Commission was used in expanding survey data.	Estimates were based on personal contact survey of 30 operators. Payroll data obtained from the Wyoming Employment Security Commission was used in expanding survey data.
GOVERNMENT				
LOCAL STATE AND FEDERAL		Total taxes and other receipts received from the local economy. In addition, transfers from the state and federal governments, such as school foundation equalization payments, are included as a receipt to local government.	Estimates were based on secondary data contained in numerous government publications and data contained in the **Census of Governments, Compendum of State Government Finances,** and **Compendium of City Government Finances** published by the Bureau of Census, U. S. Department of Commerce.	Estimates were based on contacting 36 government units and agencies by mail questionnaire. Expansion of these results were based on payroll data collected in survey conducted by the Wyoming Employment Security Commission. In addition, some components of input were determined from published government reports.
HOUSEHOLD		Total personal receipts to residents of the local area. Conforms largely to the definition of "personal income" used in the U. S. Department of Commerce series; however, all imputed or unrealized income is excluded. Receipts from trade of autos are included.	Total constituted a summation of the payroll established for each of the above industries (largely from Wyoming Employment Security Commission records), estimates of profit prepared from surveys mentioned above, and other income sources estimated from a sample survey of 316 households and from data on personal income in the August 1960, **Survey of Current Business.**	Estimates initially based on the **Life Study of Consumer Expenditures** (Time Inc., 1957) **Farmer's Expenditures in 1955** (U.S.D.A. Stat. Bulletin, 224), and a survey of 316 household (167 personal contact and 149 mail-in). These initial estimates were then adjusted to fit data collected in the business firm surveys.

*Standard Industrial Classification Manual, Executive office of the President, Bureau of the Budget (U. S. Government Printing Office, 1957).

Method of Collection

Nearly all field survey data were collected by personal interviews carried out by three persons. In addition, the author and one other person worked part-time at this task. While these interviewers were inexperienced in this work, they all had an extensive academic background in business administration, economics, and humanities. Only persons having completed a bachelor's degree were employed. Considerable effort was spent in educating the interviewers on the requirements of the input-output model and interviewing techniques. The author feels they turned out a fine job.

Normally accepted random sampling methods were used in selecting most firms to be interviewed. Sampling rates for each strata were determined from a prior survey conducted in Southwestern Wyoming. These rates varied from a requirement of interviewing about 10 per cent of some retail store strata to contacting all firms in other strata. For most strata a coefficient of variation of about 10 per cent was aimed at for total output.

Most strata expansions were based on ratio estimating techniques with the indepent variable being either payroll compiled by the Wyoming Employment Security Commission or Wyoming state sales tax collected. However, most estimates for service type industries were made arithmetically. The choice of expansion procedure was predetermined from data obtained in an earlier survey.

Sampling and expansion procedures for household, rental, and agriculture were somewhat more complicated since considerable data were taken from secondary sources. In essence, these amounted to expanding collected data on a basis which would provide results compatible to these secondary sources.

Interindustry Table Construction

Upon expanding all field results and assembling needed secondary data, construction of the interindustry table for 1959 was initiated. As may be expected, estimates obtained from the many different sources did not always fit neatly together. Quite surprisingly, however, resulting ambiguities could nearly always be traced to some error of ommission or definition. Required corrections were made and many small adjustments carried out with the result being Table VII presented in Chapter IV.

The interindustry table for 1953 was constructed after the table for 1959 was completed through use of similar secondary data, results from a field survey of Southwestern Wyoming completed in 1954,[1] and some of the relationships determined by the 1959 table.

Evaluation

In the author's judgement, the data presented throughout this analysis are highly representative of the true situation occurring in Southwestern

Wyoming. Of course, considerable error is admitted for individual entries, but this error is considered to have been minimized in the over-all situation by the multitude of cross checks completed, the reliance on sound and comprehensive secondary data where ever possible, and the attention given to the use of normally accepted sampling procedures when collecting data by field survey.

Greater effort was spent in getting the items of information which were more determinative of the actual situation than was spent on obtaining incidental details. Thus, millions of dollars were treated carefully while hundreds of dollars were given much less emphasis. In this regard, data on imports, exports, payroll, raw material or merchandise purchases, and total receipts were given much more emphasis than telephone bills.

Nevertheless, the author is aware of a great many improvements which can be made in the techniques employed here. Of special note, is that even though increased emphasis was given to obtaining better answers to large dollar figures, giving more concentration to the few large firms in the area with less emphasis on the small ones would have provided better accuracy for an equivalent survey cost.

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[1]Floyd K. Harmston, Robert W. Birch, and H. Allen Fulton, *A Study of the Resources, People, Economy of Southwestern Wyoming* (Laramie: University of Wyoming, Division of Economics Analysis, 1955).

APPENDIX D
A TYPICAL QUESTIONNAIRE

1. Kind of store?...

2. How many persons were employed here during the month of June last year (1959)? (If not in operation during June of that year, select a typical month and specify which one).

   a. Full-time (persons normally work 40 hours per week or more)..............

   b. Part-time (persons normally working less than 40 hours per week).......

   c. Owners..

3. What was the total payroll for June, 1959?.......................$................

4. What was the value of merchandise and supplies and equipment purchased during the year, 1959?...............................$................

5. How much of this was bought *outside* of the four county area (Sweetwater, Uinta, Sublette, and Lincoln)..................$................

6. How much was bought *inside* the four county area from the following types of firms?

   a. Lumber mills ....$................

   b. Other manufacturers ....$................

   c. Local wholesalers ....$................

   d. Farms and ranches ....$................

   e. Building material dealers ....$................

   f. Service stations, garages, etc ....$................

   g. Other retailers ....$................

7. How much did you pay during 1959 for the following?

   a. Business and professional services ....$................
      (Legal, accounting, bookkeeping services, collection, etc.)

   b. Repair services (except to buildings) ....$................

   c. Advertising ....$................

   d. Delivery expense (to someone else) ....$................

   e. Laundry expense ....$................

   f. Building repairs and maintenance ....$................

   g. Donations ....$................
      (7. continued on next page).

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   h. Insurance ....$................

   i. Interest expense and bank charges ....$................

   j. New construction ....$................

   k. Sales tax ....$................

8. How much was your gross business in 1959?....................$................

9. Do you perform services for which you charge? Yes........ No.......

   If yes: a. What are they? ....

           b. How much was received from these services?...$................

10. Did you wholesale anything in 1959? Yes........ No........

    If yes: How much was sold to:
    a. Other retailers ....$................

    b. Contractors ....$................

    d. Government (local, state, federal) ....$................

    e. Non-profit organizations ....$................

11. How much was lost due to bad debts in 1959? ....$................
    (or expected to be lost?)

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C. OTHER SOURCES

Data were compiled at the headquarters of the Union Pacific Railroad, Omaha, Nebraska, concerning the number of railroad employees and payroll for 1950 through 1960.

Data on employment and payrolls were obtained by duplicating International Business Machine Cards used by the Wyoming State Employment Service, Casper, Wyoming.

The State Bank Examiner has issued mimeographed reports concerning deposits of state and national banks on December 31 and June 30 of each year, 1946 through 1960.

Data concerning the value of liquor sales by state monoply to dealers and bars in various counties were compiled by the Wyoming State Liquor Commission, Cheyenne, Wyoming and made available to the author.

Oil and gas production as shown by tax returns are filed with the State Board of Equalization and show government royalty oils as well as taxable production. The data were furnished at the author's request by the State Board of Equalization, 1910-1960.