The Owyhee County Economy

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A Regional Input/Output Model

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Regional models can be categorized as nonstructural or structural (Treyz, 1993). Nonstructural models lack economic behavioral structure and thus base regional changes upon trends, such as historical shift-share, employment, tax revenues and expenditures which are used to predict future changes. Naïve time series forecasts versus multiple simultaneous equations bracket the spectrum of nonstructural models. The second type of regional model, structural models, are behavioral. The structural model predicts agent behavior as the effect or impact response from a specific stimulus. Advantages of structural models for policy analysis is that the policy change is first specified and the structural model then estimates the impacts on the various agents in the economy. To address impacts on all agents in the economy, structural models require economic structure and behavioral mechanism for each agent. The model of choice for regional impact analysis is regional Input/Output (I/O).

The precursor to regional I/O models were simplified Keynesian framework accounts that developed a single multiplier from an economic base. The more complex the intersector linkages, complex interactions between agents and need for sectoral multipliers, the greater the advantages I/O has for impact analysis (Davis). As the applicability of Leontief's national I/O structure to a regional scale was recognized, survey based regional I/O models were constructed. The availability of non-survey based I/O models, in particular IMPLAN (Taylor et al) that have proliferated use of regional I/O modeling.

In addition to the general limitations of I/O in impact analysis, non-survey based I/O models have the inherent drawbacks stemming from the use of secondary or national data combined with an identical algorithm to estimate an I/O model for every county in the US. The I/O model developed for Owyhee County starts with the IMPLAN data base. The county model generated by IMPLAN is then modified extensively with a combination of survey, Idaho ES-202, and Idaho Extension data sources. The analysis portion of the IMPLAN program was not used. The multipliers and transactions table were accomplished with a spreadsheet, included in this bulletin.

This report first details the account system and multiplier calculations used for the Owyhee County regional economy. Following the theory portion of the bulletin the specifics in the modifcations of the IMPLAN data with other data sources is outline. The combined theory and data description provides the user of the Owyhee County I/O model the necessary tools to use the model for impact analysis.

Input-Output: An Accounting System for an Economy

Input-Output (I-O) comprises both a system of economic accounts for a region as well as a tool for economic analysis and forecasting. Input-Output is first a method of social accounting. The accounts of an I/O are displayed in matrix form as the transactions-among-sectors table (Appendix 1) which depicts the economic structure and interdependencies among industries and agencies of the Owyhee County economy. The table shows customers for each industry and the input needs are for each industry. The focus of input-output analysis is the cumulative interdependent nature of expansion or

contraction of an economy. By accounting for each industry's direct purchases or sales we can then ascertain the indirect impact of each industry. A social account is an empirical framework resulting from a theoretical structure which sets forth relationships between various aspects of a social entity. An account refers to the framework itself and/or the values within that framework.

Users of the Input-Output (I-O) technique require a knowledge of the definitions of the I-O accounts and then an understanding of how the accounts are used to model the economic interdependencies in an economy. This section provides a summary of the I-O accounts and compares and relates them to regional income and product accounts.

Rules of I-O Accounting Systems

As with any accounting system, I-O accounts are governed by a set of rules that allows a uniform interpretation of the accounting system. Production, distribution, and consumption are described in an I-O table by the volume of transactions that take place over a period of time. Thus, the units accounted for by I-O tables are gross dollar flows from one sector or account to another over a defined time period. The rules for I-O accounts are the focus of the sections.

Stock Versus Flow –A flow is an economic goods moving among markets over a set period of time. Stock amounts (capital, land, inventory etc.) are not reflected in the usual I-O model. However, if during the accounting period expenditures are made for stock purchases (e.g., purchases of inventory) or stocks are used up (e.g., depreciation), the purchases or expenditures of stocks are considered flows to or from respective stock accounts during that time period. This concept is analogous to an accountants financial statements, i.e., an income statement as opposed to a net worth statement or balance sheet. The I-O model is similar to the income statement in that it shows incomes and outlays over a given period (i.e., fiscal year). Whereas, the balance sheet shows liabilities and assets which are stocks at one given point in time.

I-O Margins -- The purpose of the I-O accounting stance is to represent real production, distribution and consumption activity and to exclude transactions which represent only asset transfers. Asset transfers such as sales of real estate, stocks or bonds or insurance and debits to demand deposits at banks are excluded. Thus, the finance, insurance, and real estate sector (FIRE) of the I-O model consists only of the commissions and other costs related to the sales, storage, or other services provided by those industries. The trade sector does not usually add further processing to the goods as do the other industries in the processing quadrant of the I-O table. For this reason, it is often argued that trade can be treated like transport costs. Thus, if such costs are "assumed" to be paid by the buyer rather than the seller, a certain portion of any purchase from the trade industries (anywhere from 15 to 25 percent) is shown as a payment to trade and the remainder is shown as flowing directly to the sector which would have supplied the goods to the trade sector. Because the Owyhee County model uses trade margins, the user is warned that the total sales shown for the wholesale and retail trade sectors are not total sales but rather margined sales.

Model Time Period -- Because a flow can only occur over a time period, the unit of time

accounted for in an I-O model must be explicitly defined. For the Owyhee County economy the this base year is the calendar year, 1995. Besides defining the accounting period in which flows are measured, the time period is a reference or base period for measuring real dollar economic activity. All subsequent projections and technologies must be measured using the I-O model compilation date as the base year. For example, if crop revenues were projected to increase over a ten year period, but this was simply inflation or loss of purchasing power of the dollar from the base year of 1993, then no real demand increase should be made for the I-O model. All final demand changes introduced to create I-O forecasts should be expressed in base year dollars through the use of appropriate price indices. Inflation in the total value of final demand does not represent real changes in physical output and should not be measured as impacts.

Double Entry Accounting -- Double entry accounting in the I-O framework means that for every purchase there is also the exact amount of corresponding sales, the outputs of one industry are the inputs to all the others including exports. Because profit and saving are included with other purchases, total spending is defined to equal total receipts for each industry in the processing quadrant.

Sector and Industry Delineation -- The formats of I-O accounts vary according to the application and limitations of the research. Industries are delineated to balance concerns and constraints over: 1) data availability and confidentially for a regional economy with the sector often being a single firm, 2) useful number and definition of sectors, 3) desire to estimate the impacts for those directly impacted industries, 4) reduction in aggregation error, and 5) level of aggregation used on accounts to display the impacts. Industry aggregations, as defined for the Owyhee economy, are the self explanatory headings in the appendix tables.

Transactions Table

Spending flows among sectors in the Input-Output (I-O) framework are displayed as a table or matrix (Appendix I). The matrix format of the accounts is a convention to allow the second function of I-O, that of an analytical model, to be accomplished. An I-O table of gross flows (transactions among sectors) can be broken down into the four quadrants shown in table 1: quadrant (1) the intermediate processing transactions matrix, (2) the columns of final demands, (3) the rows of primary inputs to processing, and (4) the rows of primary inputs to final demands. Quadrants (3) and (4) together are referred to as final payments.

	Purchasing Industries & Agencies	
Selling Industries and Agencies	**QUADRANT 1** Intermediate Processing *(Interdependent variables)*	**QUADRANT 2** Final Demands *(Independent variables)*
	QUADRANT 3 Final Payments *(Dependent variables)*	**QUADRANT 4**

Schematic of an I-O transactions table, showing the four quadrants of accounts

Quadrant 1 - Intermediate Processing Transactions -- This quadrant constitutes the bulk of the I-O table. To maintain a double entry accounting framework, the n number of purchasing (column headings) sectors are the same n number of producing (row headings) sectors. Thus, quadrant 1 is a square n by n matrix, where n is the number of intermediate processing industries in the local economy. The intermediate processing quadrant only contains industries that purchase inputs to combine, transform, or use in production. End users of inputs, such as governments or exports are excluded from the first quadrant. By convention, columns of an I-O transactions table are the purchasing sectors and rows are the producing or supply sectors. As with standard matrix notation, an entry in the transactions among sectors table is denoted as the i^{th} row and the j^{th} column. To maintain equality of row sums and column sums, rows exist for profit and saving as well as spending.
Quadrant 2 - Final Demands--This quadrant accounts for the exogenous demand for goods and services made upon local production capabilities. The final demand spending represents sales which are not inputs to local processors but include all other sales. For example, exports could be for final use outside the local economy, final use inside the study area by tourists, or intermediate inputs to processors located outside the study area. Because final demand is exogenously determined, it is in effect the driving force for the economy. According to the I-O model framework, if the spending in quadrant 2 were to disappear, i.e., go to zero, the local economy would also disappear. By "exogenous," we mean that purchases of these goods and services are either made by sectors located outside the study area or factors which influence changes in these demands are outside the control of local business or personal spending decisions.
Quadrant 3 - Primary Inputs (final payments sector)--This quadrant accounts for the purchases of inputs from industries outside the local economy and for other money flows which do not re-circulate in the Owyhee County economy. Primary inputs are termed leakages because they are the flow of money out of the local economy to taxes, savings, or imports if local industries are unable to produce needed inputs. The more self-sufficient a local economy is, the smaller these purchases of primary inputs will be and the more an economy will depend upon its own industry.
Quadrant 4 - Primary Inputs to Final Demands (final payments sector)-- The fourth quadrant records the primary inputs purchased directly by the sectors of final demand.

Entries in this quadrant are not necessary to construct multipliers for impact analysis and are thus omitted from the regional accounts.

The I-O Accounting Identity

The double entry accounting identity can now be demonstrated with the definitions provided by the four quadrants of the I-O matrix. To do this, we can use Figure 1 which shows the four quadrants with notation for the highly aggregated accounts within each

$$\left[\begin{array}{cc|ccc|c} z_{11} & z_{12} & c_1 & g_1 & e_1 & X_1 \\ z_{21} & z_{22} & c_2 & g_2 & e_2 & X_2 \\ \hline l_1 & l_2 & l_c & l_g & l_e & L \\ t_1 & t_2 & t_c & t_g & t_e & T \\ v_1 & v_2 & v_c & v_g & v_e & V \\ m_1 & m_2 & m_c & m_g & m_e & M \\ \hline X_1 & X_2 & C & G & E & X \end{array}\right]$$

quadrant. The accounting identity is obtained by summing down all the columns and across all the rows.

Gross outlay by the i^{th} industry, X_i, is obtained by summing down the i^{th} column. Correspondingly, total gross outlay by all sectors in the economy is obtained from summing the column totals:

$$X = (X_1 + X_2 + X_3 + \ldots + X_n) + C + G + E,$$

where, C is consumption, G is government, and E is exports. Thus, total outlay is the sum of all column totals of interindustry spending plus the sum of household consumption, state and federal government, exports.

Gross output by the i^{th} industry, X_i, is obtained by summing across the i^{th} row. Correspondingly, total gross output by all sectors in the study area is obtained by summing row totals:

$$X = (X_1 + X_2 + X_3 + \ldots + X_n) + H + T + D + R + M,$$

where; H is household wages, T is taxes, D is depreciation, R is rents, and M is imports. Thus, total output is the sum of the row totals of interindustry spending plus the sum of wages paid to households, taxes, depreciation, rents, and imports.

We can equate the two parts of the identity using the definition inherent in our I-O double entry accounting principle, total outlay is defined to equal total output and therefore:

$$(X_1 + X_2 + X_3 + \ldots + X_n) + C + G + E = X = (X_1 + X_2 + X_3 + \ldots + X_n) + H + T + D + R + M.$$

This gives the desired result of final product measured in terms of final payments to factors equaling final product measured by final demand:

$$H+T+D+R+M \equiv C+G+E.$$

The identity holds only for the total of all final payment and final demand sectors not for each sector individually.

For the i^{th} industry, output equilibrium can be expressed as:

$$X_i = (z_{i1}+...+z_{ij}+...+z_{\in}) + (C_i+G_i+I_i+E_i+L_i).$$

Each sector of the economy is in equilibrium when the sum of the processing sectors demands plus the sum of the final demands for that same sector equal its total gross output. With a single industry (row of the intermediate processing section of the transactions table) the sum of the interindustry flows for the i^{th} industry ($z_{i1} + ... + z_{ij} + ... + z_{in}$) instead of the aggregate for all industries ($X_1 + X_2 + X_3 + ... + X_n$) and also the final demands for the i^{th} industry instead of the aggregate final demands.

To put all n industries into one equation we use matrix algebra. To simplify notation, let Z stand for the intermediate processing matrix (quadrant 1) and Y stand for the final demands matrix (Quadrant 2). The accounting equation for output can now be written as,

$$X = (Z)(U) + (Y)(U),$$

where U is a column vector of ones whose function is to provide conformation of matrices for addition and which results in the summation to column vectors of the matrices which it follows. Again, this is the statement in matrix form, that total output of the local economy is composed of intermediate processing transactions and final demands which includes all sectors of the economy.

I-O as an Analytical Tool

The underlying theory that transforms the I-O accounting framework into an economic model for a local economy is the interpretation of the spending flow accounts vis a vis local industry production functions. The I/O accounts are recast into a model of regional economic behavior, a general equilibrium model of regional production and consumption, by substituting linear production and expenditure functions into the accounting identity. To view the I-O accounts on the basis of production functions let us first define a production function and then set forth the assumptions that make the interpretation possible.

The Production Relation Assumptions of I-O Models

A production function defines the engineering/technical or physical relationship between inputs and outputs for a firm or for an industry. I-O accounts are assumed to

contain information reflecting production functions of industries in the study area. No one argues that outputs are not a direct result or function of inputs i.e., the existence of a production function. The exact nature of the form of this relationship is a matter for empirical testing. In the I-O model, however, the implied production relationship is a consequence of the simplified accounting system that is necessary to capture complex economic activity in a linear model. Transformation from accounts to general equilibrium requires the assumption of linear production process which in turn exacts a rigid interpretation of the impact analysis with multipliers, specifically the most important limitations are:1) Constant production coefficients; which bars scale economies, externalities, technological change, relative price changes, and changes in trading patterns or the production recipe; (2) Output is homogeneous, no joint or substitute products; (3) Supply and demand functions are fixed price; whereby producers in one sector react to changes in demands from other sectors by changing output rather than changing prices and resource or inputs supplies and thus supplies are unconstrained with fixed prices with efficient resource that bars resource unemployment.

The production function in I-O is of a type where input budget shares remain in a fixed proportion to each other. Changes in relative prices of inputs results in offsetting substitution among inputs so that spending shares remain constant among inputs (unitary elasticity of substitution). Thus, the spending by a given industry is defined as fixed percentages down a column of the transactions matrix,

$$a_{ij} = \frac{z_{ij}}{X_j} \;;$$

where each a_{ij} is the direct input coefficient showing direct input requirements for each dollar of output found by dividing the payment flow to each input supply sector (z_{ij}) by the purchasing industry's column total (X_j). With each sector's direct input coefficient defined as $a_{ij} = z_{ij}/X_j$., the n by n matrix of direct input coefficients is;

$$A = Z\hat{X}^{-1}. \qquad (7)$$

where Z are the intermediate processing flows and $\hat{X}$ is a matrix with the total output vector on the main diagonal and zero's elsewhere. The direct input coefficients, also called the technical coefficients, are the fixed relationship between any sector's flow of output measured in dollars and inputs measured in dollars. A direct input coefficient tells us the direct requirements as a fraction or percent of total spending by an industry. A direct input coefficient is the cents worth of inputs each industry needs to produce a dollar's worth of output. The direct input coefficients, which include an allocation to retained earnings and imports, must sum to unity. Since I-O models measure spending, not with physical input data, and the fixed direct input coefficients refer not to physical input quantities but rather to the dollar spending on inputs by the industries in the model.

The direct input coefficients are the share of the spending or income allotted to each

input. The I-O model assumes that if spending on all locally supplied inputs and saving or profit, and depreciation, and taxes and imports increase proportionately then total sales of output will increase by that same proportion. This is a long run adjustment which satisfies the definition of a change of scale but it refers to spending on inputs and sales revenue from outputs not to physical units as in a production function. The I-O spending relationships are consistent with constant returns to scale but are not strictly limited to that assumption if the I-O flows are measured as spending rather than physical output. The constancy of the spending distributions down each industry column is thus a critical requirement for the I-O technique to provide accurate impact forecasts.

I-O Output Equilibrium

The accounting and the production facets of I/O can now be combined into a model of regional economic behavior. The I/O accounts are recast into a model of regional economic behavior, a general equilibrium model of regional production and consumption, by substituting linear production and expenditure functions into the accounting identity. Rearranging the terms for each sector's direct input coefficient ($a_{ij} = z_{ij}/X_j$) shows the i^{th} sector's purchases from sector j in terms of the production relationship; i.e. $z_{ij} = (a_{ij})(X_j)$. For the i^{th} industry, the sum of sales to intermediate processing industry demands plus the sales to final demands (total gross output) equals total gross spending and saving (total gross input):

$$X_i = z_{ij} + \dots z_{i,n} + c_{in} + y_i = z_{ij} + \dots z_{i,n} + l_{in} + p_i = X_i \quad (8)$$

where X_i are industry spending and saving which equal industry sales, the z_{ij}'s and households the c_{ij} column *lij* row are simultaneously endogenous intermediate processing flows from sector i to other domestic sectors, y_i are the exogenous final demands (government *g*, and exports *e*) while p_i are the endogenous (recursive) final payments or the primary inputs of the economy (taxes *t*, value added *v*, and imports *m*). In matrix form, the Z matrix is substituted into the accounting balance equation;

$$X \equiv ZU + YU. \quad (9)$$

Substituting the direct input requirement coefficients into the accounting equations reduces the n^2 simultaneously determined unknowns *(Z)* to the n accounting balance equations to express an output equilibrium for a regional economy. Final payments, such as imports, are endogenous since they supply inputs in proportion to sector output, but not simultaneous since they do not respond by demanding more inputs from the region's economy. Thus, the substitution of direct input coefficients into the accounting identity reduces the number of unknowns to be equal with the number of balance equations. When solved for output, the equilibrium condition states that exogenous non-negative final demands are fulfilled by regional production:

$$X = AX + YU \quad (10)$$

We can further solve the equation for final demands by isolating the final demand vector:

$$(Y)X-(A)(X) = (Y)(U), \\ (I-A)(X) = (Y)(U). \tag{11}$$

where I is the identity matrix with ones on the diagonal and zero's elsewhere and U is a column vector of ones.

Solving equation (11) uniquely for regional output X as determined by final demands yields an equilibrium statement for regional production and consumption:

$$X = (I-A)^{-1}(Y)(U): \tag{12}$$

where I is the diagonal identity matrix. This output equilibrium, the *Leontief Inverse*, shows the amount of output from each of the sectors necessary to supply the exogenously determined final demands. Final demands can exist at any given positive level and local production is assumed to be able to fulfill those demands -- thus the output of the economy is backward linked to exports in the backward linked demand driven I/O model. Further, input supply (imports and other inputs) to the regional production are thus assumed to be unrestricted and at the prices fixed at current levels. This output equilibrium shows the amount of output from each of the sectors necessary to supply the exogenously determined final demands. Final demands can exist at any given positive level and local production is assumed to be able to fulfill those demands.

The *Leontief Inverse* matrix shows the "total requirements" per dollar of exports by the industry named at the head of the column. Total requirements are composed of the direct and indirect requirements. And when households (row *l* and column *c*) are included as a dependent sector, then the total requirements are said to also include "induced" requirements. Each entry in the inverse matrix is an interdependency coefficient. Each coefficient in the *Leontief Inverse* or final-demand-to-output multiplier matrix, b_{ij} represents the direct and indirect requirements of sector i per unit of final demand sold by sector j;

$$\beta_{ij} = \Delta x_i \, / \, \Delta y_j \tag{13}$$

and is composed of the direct plus indirect change in total output in sector i resulting from a unit change in final demand j. Column sums of the Leontief inverse are similarly interpreted as the effects of change in sales to final demand upon the entire economy. By setting the level of final demands at any level (including the current level) we can now obtain the gross local economic activity (direct, indirect, and induced) in each sector that goes to supplying that level of demand. The immediate impacts computed in the direct input coefficients table are followed by even longer term effects which can be found by calculating "total requirements". Successive rounds of production and demand arise because suppliers need local inputs to make and sell their outputs. Total requirements are

much larger than the direct requirements, shown by the direct input coefficients, because the total requirements incorporate all of the cumulative effects of each industry supplying each other industry to reach a new equilibrium of the economy while the direct input coefficients only show the initial round of water use.

Conceptually, the processing sectors of the regional economy move toward a stable equilibrium where sales equal receipts in each industry. Receipts are perturbed when final demands such as exports or government purchases from industry change. Changes in final demand set off a series of transactions as each industry responds to either direct or indirect changes in their demands. An example of direct change in demand would occur if agricultural exports increased, while an example of an indirect demand change could be the response of farms to increase output and in so doing they purchase more fuel, fertilizer, machinery, labor and similar inputs thereby creating an indirect demand for the output of other sectors in the economy. When the other sectors find their demand rising they too will buy more inputs and thus the original export change ripples throughout the economy. These reverberations gradually wane as a portion of each round of spending leaks out to saving, taxes, and imports. The greater the leakage the faster the effects die out and the smaller the multiplier.

Final Demand Multipliers

The final demand multiplier (sometimes called the business multiplier), for any sector i, is the sum of the direct and indirect (and induced if the model is closed with respect to households) requirements from all sectors of the local economy needed to sustain one additional dollar of output to final demand by sector i. Because each element of $(I-A)^{-1}$, b_{ij} measures the total stimulus, direct and indirect (and induced), to the ith gross output when the jth final demand changes by one unit, the output multiplier $(\Sigma_i b_{ij})$ measures the total effect on gross output of all sectors when final demand for the jth sector changes by unity and all other final demands are zero. The magnitude of the multiplier indicates the amount of demand stimulus that sector of the economy will create when it makes added sales to final demand. Each entry in a column of the Leontief inverse shows the total production requirements from the sector at the left when the sector at the column head increases sales to final demand by one dollar. Sectors with large output multipliers have relatively small leakages in their direct and/or indirect purchases. In other words, a large multiplier means that the sector directly and indirectly purchases a larger proportion of its inputs from within the local economy instead of importing. Comparing multipliers for similar sectors across different area's I-O models provides a measure of the self sufficiency of a local economy. The regions with larger multipliers often have greater development in the stages of intermediate production.

Table 1. Final demand (Type I and Type II) multipliers for the Owyhee County economy.

Industry	Type I Multiplier	Type II Multiplier
	$ Total Regional Output per $ Final Demand	
Dairy	1.29	1.75
Cattle Ranch	1.34	1.42
Cattle Feedlots	1.54	1.62
Misc. Livestock	1.45	1.74
Grains	1.29	1.43
Forage Crops	1.39	1.56
Alfalfa Seed	1.50	1.64
Misc. Crops	1.14	1.57
Sugar Beets	1.15	1.34
Agricultural Services	1.03	1.31
Mining	1.06	1.36
Construction & Maint.	1.12	1.34
All Manufacturing	1.14	1.15
Trans. & Communication	1.16	1.32
Electric Services	1.05	1.20
Irrigation, Sanitary Serv	1.13	1.50
Wholesale Trade	1.10	1.24
Misc. Retail	1.02	1.14
Food Stores	1.05	1.36
Auto & Service Stations	1.07	1.28
Eating & Drinking	1.11	1.39
F.I.R.E	1.10	1.26
Hotels and Lodging	1.18	1.40
Services	1.13	1.45
Health Care	1.14	1.27

Output Multipliers

Whereas the conventional I/O model equilibrium is demand driven i.e. the multiplier measures a change in output as determined by change in exports. Output of the industry becomes the driving force or the determinant of regional output of the economy. Formally, the output to output equilibrium for the economy is expressed as:

$$X = (I-\tilde{A})^{-1}X$$
$$where:\ (I-\tilde{A})^{-1} = (I-A)^{-1}(\hat{\alpha})^{-1} \qquad \textbf{(14)}$$

Computationally the output equilibrium is obtained by dividing the Leontief inverse by the on diagonal elements of the Leontief inverse. To make output the driving force for the economy, the conventional Leontief inverse is normalized or standardized by the direct and

indirect output of that respective sector (i.e. the on diagonal elements of the Leontief Inverse). Or computationally, in terms of the final demand multiplier of the conventional Leontief inverse, the output-to-output multiplier, is:

$$\hat{\beta}_{ij} = \beta_{ij}/\beta_{jj} = \frac{[\Delta X_i/\Delta Y_j]}{[\Delta X_j/\Delta Y_j]} = \Delta X_i/\Delta X_j \qquad (15)$$

Alternatively the multiplier can be expressed as:

$$\Delta X_i = \hat{\beta}_{ij}\, \Delta X_j \qquad (16)$$

Whereas the final demand multiplier is driven by change in exports, the output multiplier is useful in estimating impacts when the exogenous shock can only be expressed in terms of changes in industry output. The output multiplier is particularly useful when estimating the impact of the presence or absence of an industry in an economy. Setting the final demands to zero and applying the final demand multiplier to the change to estimate the impact of an industry leaves a portion of the industrial output that is sold to other industries within the economy. In effect, the total impact of the presence of the industry in the economy is not accurately assessed because impact is understated by the impact of internal regional consumption.

Table 2. Output multipliers (Type I and Type II) for the Owyhee County economy.

Industry	Type I Multiplier	Type II Multiplier
	$ Δ Total Regional Output per $ Δ Total Industry Output	
Dairy	1.22	1.65
Cattle Ranch	1.27	1.35
Cattle Feedlots	1.47	1.54
Misc. Livestock	1.43	1.73
Grains	1.29	1.43
Forage Crops	1.39	1.56
Alfalfa Seed	1.50	1.64
Misc. Crops	1.14	1.57
Sugar Beets	1.15	1.34
Agricultural Services	1.03	1.31
Mining	1.06	1.36
Construction & Maintenance	1.12	1.33
All Manufacturing	1.11	1.13
Transportation & Communication	1.06	1.20
Electric Services	1.04	1.20
Irrigation, Sanitary, Water Serv	1.07	1.41
Wholesale Trade	1.09	1.24
Misc. Retail	1.02	1.14
Food Stores	1.05	1.36
Auto Dealers & Service Stations	1.07	1.28
Eating & Drinking	1.10	1.37
F.I.R.E	1.07	1.21
Hotels and Lodging	1.18	1.40
Services	1.07	1.36
Health Care	1.12	1.24

Primary Input Multipliers

Multipliers are not limited to measuring output impacts but can also be expressed for inputs or production factors; final payments or primary input and resources (water and employment). Primary input and resource multipliers are calculated and interpreted in an identical fashion. Primary input and resource multipliers assess direct and indirect (and induced) payments to the primary inputs or resource use resulting from a change in final demands of the economy. The difference is that resource multipliers are denominated in physical quantities (e.g., gallons of water, jobs) instead of economic units (dollars). Being in physical units, resource multiplier data must thus be obtained outside the I/O accounting framework. Two primary input multipliers (Earnings, Table 3 and Value Added Table 4) and the employment multiplier were calculated for the Owyhee County Economy (Table 5).

Primary input multipliers are used to examine the direct and indirect (also induced if the model is closed with respect to households) payments to any of the Primary Input sectors when final demands for the economy change. Again, the assumption is that primary inputs are used in constant proportion to output. Begin with the equilibrium condition derived earlier: $X = (I - A)^{-1}Y$. Define a matrix of primary input coefficients, V, exactly as the direct input coefficients were calculated:

$$V = P\hat{X}^{-1} \tag{17}$$

The primary input multiplier can be interpreted as a linear transform of the direct and indirect impact i.e., the I-A inverse using the primary input coefficient matrix where V is a m by n matrix of primary input coefficients, P is the vector of gross primary inputs or final payments (quadrant 3), m is the number of rows of primary inputs, n is the number of rows or columns in the transactions matrix (quadrant 1). Premultiply both sides of the original equilibrium condition for X by the definition of the primary input coefficients:

$$P\hat{X}^{-1}X = V(I-A)^{-1}Y, \quad or \quad P = V(I-A)^{-1}Y \quad \because \quad \hat{X}^{-1}X = I \tag{18}$$

Each element of the matrix $V(I - A)^{-1}$ is the direct and indirect increase in payments to the ith primary input when final demand for the jth sector increases by one dollar. The multiplier for all sectors is the column sum of the elements of the matrix $V(I - A)^{-1}$. Primary input multipliers are always less than or equal to one as opposed to output multipliers which are always greater than or equal to one (not recognized in the conversion to millions).

Two primary input multipliers, earnings and value added, were calculated for the Owyhee County economy. Earnings are defined as payments to household (salaries and wages) plus proprietors income. The inclusion of proprietors income into earnings was necessary because farming income is paid to the farm owner in lieu of a wage. Likewise with many small business that dominate Owyhee County's economy. To the extent that

proprietors income is paid to proprietors residing outside the region the earnings multiplier is inflated. Value added is the amount remaining after payments to intermediate suppliers. Value added is the sum of earnings, taxes plus, other income (dividends profits and rents). Since value added includes earnings the direct value added and the multiplier will exceed the earnings values. Both the earnings and value added are expressed in millions for ease of interpretation.

Table 3. Earnings multipliers for the Owyhee County economy.

Industry	Direct Earnings	Type I Multiplier	Type II Multiplier
	$ earnings per $ output	$ earnings per $ FD	$ earnings per $ FD
Dairy	0.3084	0.3604	0.3722
Cattle Ranch	0.0365	0.0671	0.0693
Cattle Feedlots	0.0283	0.0628	0.0648
Misc. Livestock	0.1889	0.2353	0.2430
Grains	0.0647	0.1144	0.1181
Forage Crops	0.0680	0.1382	0.1427
Alfalfa Seed	0.0150	0.1053	0.1088
Misc. Crops	0.3168	0.3375	0.3485
Sugar Beets	0.1318	0.1546	0.1597
Agricultural Services	0.2196	0.2224	0.2297
Mining	0.2288	0.2365	0.2442
Construction & Maintenance	0.1492	0.1687	0.1742
All Manufacturing	0.0000	0.0116	0.0120
Transportation & Communication	0.1077	0.1284	0.1326
Electric Services	0.1142	0.1211	0.1250
Irrigation, Sanitary, Water Serv	0.2605	0.2859	0.2953
Wholesale Trade	0.1044	0.1173	0.1212
Misc. Retail	0.0901	0.0924	0.0955
Food Stores	0.2414	0.2473	0.2554
Auto & Service Stations	0.1570	0.1654	0.1708
Eating & Drinking	0.2060	0.2202	0.2274
F.I.R.E	0.1051	0.1198	0.1237
Hotels and Lodging	0.1460	0.1730	0.1786
Services	0.2262	0.2472	0.2553
Health Care	0.0833	0.1023	0.1057

Often times the economic impact to an economy is not expressed as a change in exports but rather as a change in the payment to the primary input. A common example would be the direct impact of a firm being expressed as an increase in payroll, as opposed to an increase in exports. To aid in the use of impact analysis with multipliers we can express the impact as being driven by the primary input, either earnings or value added. But it is important to remember that the underlying driving force in the economy remains exports. There are two component parts to the income multiplier: the primary input multiplier for household income, $h(I-A)^{-1}$ and the average (marginal) propensity to consume for households (ie the direct input coefficients for the household row):

$$h = H\hat{X}^{-1} \tag{19}$$

where H is the gross income paid to households. To calculate the income multiplier the primary input multiplier is divided by the marginal propensity to consume:

$$earnings\ multiplier = h(I-A)^{-1}\hat{h}^{-1} \tag{20}$$

Simplistically, this multiplier shows how an initial change in household sales is multiplied or increased in the economy (directly and indirectly) to create the total change in household income in the economy. More precisely the household earnings multiplier shows how much the economy must expand in order that income to households could expand by one dollar. The type II earnings multiplier is the direct, indirect, and induced change in household income i.e., $(I-A)^{-1}$ is calculated for a closed economy with households included in the transactions matrix. Type II income multipliers are used to examine total (direct, indirect and induced) household income changes when an initial impact in household income is expected to occur. For example if a new plant locates in the local economy and the payroll for this new plant is known, then the total (direct, indirect, and induced) income increase for all households can be estimated with an earnings multiplier.

Table 4. Value Added multipliers (Type I and Type II) for the Owyhee county economy.

Industry	Direct Value Added	Type I Multiplier	Type II Multiplier
	$ VA per $ output	Δ $ VA per Δ $ FD	Δ $ VA per Δ $ FD
Dairy	0.3927	0.4952	0.5244
Cattle Ranch	0.0630	0.1510	0.1565
Cattle Feedlots	0.1743	0.2773	0.2824
Misc. Livestock	0.3269	0.4468	0.4658
Grains	0.5105	0.5987	0.6080
Forage Crops	0.2336	0.3535	0.3646
Alfalfa Seed	0.0661	0.2189	0.2275
Misc. Crops	0.7200	0.7580	0.7853
Sugar Beets	0.6855	0.7278	0.7403
Agricultural Services	0.3184	0.3256	0.3436
Mining	0.4351	0.4654	0.4846
Const & Maint	0.1845	0.2260	0.2397
All Manufacturing	0.1023	0.1383	0.1393
Trans & Comm	0.4263	0.4859	0.4963
Electric Services	0.6588	0.6708	0.6806
Irrig, Sanit, Water	0.4845	0.5361	0.5593
Wholesale Trade	0.3601	0.3906	0.4001
Misc. Retail	0.1798	0.1864	0.1939
Food Stores	0.5604	0.5773	0.5973
Auto & Serv Stations	0.4268	0.4508	0.4642
Eating & Drinking	0.3248	0.3634	0.3812
F.I.R.E	0.5711	0.6102	0.6199
Hotels and Lodging	0.2867	0.3542	0.3683
Services	0.2568	0.3002	0.3202
Health Care	0.1278	0.1738	0.1821

Employment Multipliers

The employment multiplier is computed in an analogous manner to the primary input multipliers but measures the total change in physical amount of resource use resulting from a change in final demands. A second employment multiplier is computed analogous to the income multiplier, where the total change in physical resource use results from an initial change in the physical amount of the resource itself. Both multipliers measure changes in physical units (e.g., gallons of water, jobs) instead of economic units (dollars). The first step is the computation of direct resource input coefficients in terms of physical units of resource use per dollar of gross output for each sector of the economy. As an example let us look at employment in the economy. A technical resource input coefficient for employment is:

$$\Omega_w = W\hat{X}^{-1}, \tag{21}$$

where W is the average annual monthly employment in physical units for each industry of the economy or the total physical resource use (jobs) in each industry of the economy when computing resource coefficients. Linear resource coefficients imply labor use will be used in constant proportion to output, with no efficiency change. This technical resource coefficient implies that in the subsequent multipliers that physical resource use will be in constant proportions, no change in efficiency in labor is permitted.

To obtain the primary input or resource multiplier, both sides of the Leontief equilibrium condition (Eq. 6) are multiplied by the definition of the primary input or resource coefficients:

$$W\hat{X}^{-1}X = \Omega_w(I-A)^{-1}Y, \quad or \quad W = \Omega_w(I-A)^{-1}Y \quad \because \quad \hat{X}^{-1}X = I \tag{22}$$

Each element of the matrix $W(I - A)^{-1}$ is the direct, indirect, and induced increase payments to the primary input (or direct, indirect, and induced physical amount of resource use) in the i^{th} sector when final demand for the j^{th} sector increases by one dollar. Thus, a primary input or resource multiplier is a linear transform of the direct, indirect, and induced impacts measured by the *Leontief Inverse*. This multiplier says that a change in final demand will cause a total (direct and indirect) change in physical resource use throughout the economy.

The employment multiplier states that a change in final demand will result in a backward linked change (direct, direct, and induced) in the physical amount of labor use throughout the economy. The employment multiplier is a proration or linear transform of the total labor requirements (direct, indirect, and induced) impacts measured by the *Leontief Inverse* matrix. The total physical amount of labor use is thus proportional to the economic ripple effect (direct, indirect, and induced economic transactions) in the economy

and attached to every sale or purchase in the economy is the labor was used to produce those goods or services. An element in the employment adjusted *Leontief Inverse* is a total labor requirement coefficient;

$$\beta^{w}_{ij} = \Delta W_i \,/\, \Delta y_j \tag{23}$$

where each coefficient, b^{w}_{ij} is composed of the direct, indirect, plus induced change in labor use in sector i resulting from a unit change in final demand j. Column sums are thus the change in employment across the entire economy resulting from a change in final demand. Alternatively, an entry or column sum of the inverse matrix can be pictured as a measure of labor interdependency in the economy. Successive rounds of production and demand arise because suppliers need production inputs, which require labor to produce, to make and sell their outputs which are then inputs for other industries. Total requirements are much larger than the direct requirements shown by the direct input coefficients because the total requirements incorporate all of the cumulative effects of each industry supplying each other industry to reach a new equilibrium of the economy while the direct input coefficients only show the initial round or direct labor use.

The labor multiplier formulation does not change *Leontief Inverse*, backward linked mechanism whereby final demands are set at any given positive level and local production is assumed to be able to fulfill those demands. The processing sectors must always move toward a stable equilibrium where sales equal receipts in each industry. Receipts can be disturbed when final demands such as exports by an industry change. By setting the level of final demands at any level (including the current level) total labor use (direct, indirect, and induced) in each sector is needed to produce that level of demand. Direct input coefficients (eq. 8) are the immediate impacts, followed by even longer term indirect and induced effects calculated in the total labor requirements To meet those demands, labor supply, imports and other inputs to the regional production are assumed to be available without restriction at current prices.

To calculate the second employment multiplier the first employment multiplier is divided by the technical resource input coefficient. The second employment multiplier is:

$$\Omega_w (I-A)^{-1} \hat{w}^{-1} \tag{24}$$

Simplistically, this multiplier shows how an initial added labor input is multiplied or increased in the economy (directly and indirectly) to create the total change in labor usage in the economy. More precisely, the multiplier shows how much the economy must expand, expressed in terms of total labor use, in order that the given sector can use up the added labor made available to it. The contrast in the two resource multipliers is that the first multiplier is created by changes in final demands while the second type of multiplier in driven by a change in physical units of the resource itself. The second multiplier implicitly assumes that excess final demand exists for the sector receiving the added increment of

labor. A type I resource multiplier is the direct and indirect change in resource use i.e., $(I-A)^{-1}$ is calculated for an open economy without households in the transactions matrix. The type II resource multiplier is the direct, indirect, and induced change in resource i.e., $(I-A)^{-1}$ is calculated for a closed economy with households include in the transactions matrix. The second type of resource multipliers are used to examine total (direct, indirect and induced) physical resource changes when a new demand for the resource is created in an economy. For example, if a new plant locates in the local economy and labor usage for this new plant is known, then the total (direct, indirect, and induced) employment increase for entire economy can be estimated with the second type of resource multiplier. Presumably the plant is going to export its output, if not then the multiplier overstates labor requirements.

Table 5. Employment Multipliers for Owyhee County economy.

Industry	Direct Employment	Multipliers			
		Final Demand Type I	Final Demand Type II	Employment Type I	Employment Type II
	Jobs/milS	Jobs / milS FD	Jobs / milS FD	Jobs /job	Jobs / job
Dairy	5.39	10.74	12.53	1.99	2.32
Cattle Ranch	3.57	8.57	8.91	2.40	2.50
Cattle Feedlots	15.33	21.00	21.32	1.37	1.39
Misc. Livestock	33.63	42.37	43.54	1.26	1.29
Grains	15.42	22.40	22.97	1.45	1.49
Forage Crops	16.93	27.00	27.69	1.59	1.64
Alfalfa Seed	7.86	22.34	22.87	2.84	2.91
Misc. Crops	8.94	12.21	13.89	1.37	1.55
Sugar Beets	13.41	16.89	17.66	1.26	1.32
Agricultural Services	39.50	39.97	41.08	1.01	1.04
Mining	10.63	11.12	12.30	1.05	1.16
Construction & Maintenance	13.17	15.72	16.56	1.19	1.26
All Manufacturing	10.00	11.71	11.77	1.17	1.18
Trans & Communication	9.76	11.88	12.52	1.22	1.28
Electric Services	3.40	4.12	4.72	1.21	1.39
Irrigation, Sanitary Serv	10.28	12.03	13.45	1.17	1.31
Wholesale Trade	12.92	14.59	15.17	1.13	1.17
Misc. Retail	15.56	15.86	16.32	1.02	1.05
Food Stores	36.94	37.71	38.95	1.02	1.05
Autos & Service Stations	22.41	23.51	24.34	1.05	1.09
Eating & Drinking	40.91	42.63	43.73	1.04	1.07
F.I.R.E	10.44	12.02	12.61	1.15	1.21
Hotels and Lodging	32.40	35.21	36.07	1.09	1.11
Services	28.48	31.08	32.32	1.09	1.13
Health Care	23.76	26.37	26.88	1.11	1.13

Owyhee County I/O Data

The use of input-output models for impact analysis has expanded development of

numerous microcomputer input-output programs. Microcomputer programs such as IMPLAN (Minnesota IMPLAN Group Inc. 1997), ADOTMATR (Lamphear and Konecny 1983), RIMS II (U.S. Department of Commerce 1981), and the Schaffer Model (Schaffer and Davidson 1985) employ secondary procedures to formulate local input-output models. The secondary procedures have been adopted because of time and money constraints that preclude development of a primary survey-based input-output model. Schaffer and Chu (1969) and Round (1983) analyzed potential errors in regional or county level I/O models from secondary procedures instead of primary surveys. Their results imply that secondary models yield substantial errors when compared to primary survey-based models.

Given that survey-based models are too time consuming and expensive; and conversion of a national model through secondary procedures too unreliable, the hybrid-type county level input-output has provided the best solution. There are several hybrid-type approaches. Among the most promising is the "mongrel model" or the mixed survey/non-survey model suggested by Jensen (1980). Jensen suggested a two-step approach for development of a "mongrel model". First, a non-survey input-output model is developed from a microcomputer program such as IMPLAN. The second step involves the insertion of superior data obtained from surveys, other primary sources, or reliable sources. There is a substitution of superior data into the model and appropriate techniques are employed to balance the regional models. Using agricultural enterprise budgets or survey of major Owyhee County industries makes these impact assessments more accurate and allows the researcher to simply create IO accounts and insert them into IMPLAN's current framework or a "mongrel" IO model for impact estimation. With minimal effort the base IMPLAN make and use tables for a state, county, or region can be changed along with all the control totals to match local data sources and therefore result in a more accurate estimation of impacts as well as the ability to change and aggregate models to suit the needs of the impact assessment.

Owyhee County Industries

Mining Gravel and aggregate, miscellaneous minerals, and gold and silver mining are present in Owyhee County. The gold and silver mining has numerous small prospectors but is overwhelming dominated by the one single large firm -- Delamar Mine. All mining was aggregated in a single industry to avoid disclosure. The Delamar mine shut down in 1998 due to depressed gold prices, but was retained in the I/O model because the model was for the accounting year 1995.

The total production of the Delamar mine was available as public information on the company web site. And the employment at the mine was published several times in local newspapers as the mine was being shut down. The technology that we want to represent in the I/O is for a large open pit cyanide leaching gold and silver mine. The production recipe for open pit cyanide leaching mines was taken from Nevada I/O study for similar mines. Also the Nevada mines are distant from suppliers and thus import most inputs and was the case with the Delamar mine in Owyhee county. For the row entries, all gold and silver was exported from the county without further processing.

Agricultural Services The agricultural services industry becomes important in impact analysis because the industry is the only readily identifiable backward linked industry to agriculture. The industry, however, is a mixed bag. This industry is an aggregate of agricultural service firms, fertilizer mixing and blending, custom and contract farming, farm labor contractors, and also landscaping and horticultural services.

Construction and Maintenance All heavy and light construction, from earth moving, road building to dry wall contractors are included in this industry. In addition to construction all maintenance (road maintenance, janitorial services) are included.

All Manufacturing Manufacturing is minimal in Owyhee County. The few small manufacturing firms, albeit varied in inputs and outputs, were aggregated into a single industry to avoid disclosure. Virtually all output from these firms is exported outside the county. Also aggregated within the manufacturing sector (to avoid disclosure) was the small meat packing industry. The meat packing industry is important in the analysis of range livestock industry because this industry is one step removed in the forward linkages from range livestock. IMPLAN data for the Meat Packing industry was modified using survey information and ES-202 data. Approximately 2 million dollars of cattle were purchased by this sector and 80% of the purchases were from outside Owyhee county. Thus the sheep purchases in IMPLAN were set to zero, 10% of the cattle purchases were made from cattle ranches, 10% made from cattle feedlots and the remaining 80% from imports. For the industry sales 5% were direct to consumers, 5% custom work, leaving 90% of the sales to retail outside the county. IMPLAN employment matched ES-202 data, but the proportion of labor from outside Owyhee county was modified using survey data.

Transportation and Communication The Transportation and Communications sector is an aggregate of transportation, warehousing, freight, communications. One of the larger segments of this sector are small trucking firms.

Electric Services This industry is primarily the operation and maintenance of the hydro electric generation plants in the county.

Irrigation, Sewer, and Sanitary Services As the label implies this industrial category aggregates all sewer, sanitary, and water service firms in the county. That includes those irrigation or ditch companies that supply agricultural irrigation water.

Wholesale Trade The wholesale trade industry is difficult to distinguish from retail trade. Wholesale trade was disaggregated from other trade so that in the impact analysis a separate trade margin can be applied to this changes in final demands for the other trade sectors. Only the margin, or markup are recorded in the accounts for Wholesale Trade.

Miscellaneous Trade All trade that is neither wholesale, auto, nor food related is aggregated into the Miscellaneous Trade industry. Only the margin for sales are recorded for this industry. The margin for sales from this industry is different than those of the other trade sectors.

Food Stores Only the margin, markup are recorded in the accounts for food retail sales.

Autos & Service Stations Only the margin, markup are recorded in the accounts for the Autos & Service Stations sector.

Eating & Drinking There are eating and drinking establishments in every community in the county. These range from simple fast food locals to those with more extensive menus. All employ local labor and are locally owned so proprietors' incomes remain within the county. Supplies for these businesses must be imported to the county.

Hotels and Lodging There are several small locally owned hotels which provide lodging services.

FIRE (Finance, Insurance, and Real Estate) There are financial services available in the county as well as insurance and real estate agents. Only the margins on the sales by these firms are accounted for in the I/O model.

Services The service sector of the Owhyee County economy is small and diverse. Aggregated in this sector are every firm that provides some type of service; from blue-collar to professional. The range of services are Funeral Services, Computer Services, Repair Services, Engineering Services, Legal Services, Accounting etc. All these firms have a presence in the County.

Health Care Health Care services are placed within a separate industry. Health Care includes Doctors and Dentists and all other ancillary businesses, such as Nursing Care, or Other medical or health services.

Crop and Livestock Industries

IMPLAN data that use national averages do not represent the local agricultural industries and agricultural sectors are overly aggregated. Using crop and livestock cost and return estimates the I/O model can be expanded and localized to investigate impacts to specific agricultural industry. Using enterprise budgets, each production cost is allocated to the I/O industry where purchased. If more than one budget exists for a region, weight and average the costs and returns by the acreage or unit of output of each commodity were estimated for a regional account. By using margining techniques and regional purchase coefficients the I/O accounts are converted to producer prices and purged of all imports. The commodity accounts can now be expanded by multiplying value of production estimates by the technical coefficients derived from the cost and return estimates. Following these procedures, yields for the industry by commodity matrix, which includes regional, rather than national, production practices. This also gives the researcher the

opportunity to disaggregate and broaden the scope of the model.

Many crops grown in the United States are grown strictly in certain regions and are aggregated with other industries in the secondary impact models. These crops however small in importance nationally may have large impacts in their respective production area. Most secondary IO models have economic sectors that may produce aggregation errors. Morimoto (1970) investigated aggregation errors in I/O models.

The estimation errors encountered with the secondary I/O models do not necessarily arise from errant agricultural production functions or technology. The problems arise from the aggregation of those agricultural sectors. Burchell, et al. (1998) stated that even when county technology varies widely from the nation's average for one or more industries, model accuracy might not be significantly affected due to inter-county trade. These errors in technology are reduced through the use of regional purchase coefficients (RPC's) and margining techniques.

We will explain how to integrate crop or livestock cost and return estimates into a framework suitable for use in a "mongrel" type IO model using IMPLAN as a base. By studying agricultural enterprises as individual economic sectors, with expenditure patterns different from national averages and in a less aggregate format, the researcher gains the ability to more accurately estimate the impacts these agricultural sectors have on local and regional economies.

We use five basic steps to create I/O accounts from crop or livestock cost and return estimates: (1) gathering control (output) total and cost and return estimates pertinent to the study region, (2) converting from purchaser prices to producer prices using retail trade margin procedures, (3) allocating cost and return accounts to I/O sectors, (4) purging imports with IMPLAN regional purchase coefficients, and (5) updating a secondary model make matrix.

After deciding which agricultural sectors will be included in the I/O model, control totals must be estimated for the respective industry. Control totals are the total values of production, employment, and income generated from each commodity. The values of production can be found using state agricultural statistics or the Department of Commerce's Census of Agriculture. These published values are based on statewide numbers and can be broken down to a county or regional values based on acreage in the county or production of that commodity within the county. The employment and income values are available from the Bureau of Economic Analysis' Regional Economic Information System (REIS), but are aggregated so must be proportioned based on employment in the cost and return estimates, ES202 state-level employment data, relative commodity output, or other methods available to the researcher. Cost and return estimates must be constructed for each of the agricultural sectors for which control totals were estimated. The cost and return estimate is the cornerstone of an accurate and precise I/O account.

To make the model more precise the retail trade sectors need to be converted from producer prices to purchaser prices. The producer price is the price paid for a commodity at the factory door. The purchaser price is the price paid for a commodity at a retail outlet which includes transportation costs, wholesale mark-up, retail mark-up, and producer price. The cost and return estimates contain purchaser prices for most of the purchased

inputs and therefore all purchases from the retail sector need to be margined. A margin is the portion of a commodity's value going to each appropriate producer such as the transportation cost, wholesaler mark-up and retail mark-up. Once the margin source is chosen, they must be applied to each of the retail purchases made in the budget by multiplying the margins and the budget costs. Margining will make the I/O model more accurate in terms of the impact farm or ranch trade has on local retail businesses.

Import purging is done through the use of regional purchase coefficients (RPC's). RPC's represent the proportion of the total local demand met by local production and attempts to account for "cross hauling" of goods. This process will not change the total output or value of production for the I/O account, all that is done is a transformation of the vector into local purchases and imports of all other commodities and services. With the imports now purged from the I/O account the technical coefficients for the new agricultural sector can be derived. Dividing the vector of now margined and import purged costs by the value of production results in a vector of technical coefficients. Once the direct requirement vector (or matrix with all sectors in the I/O model) is constructed, all that is needed for updating the I/O model, if all production functions remain unchanged, is the output (value of production for agricultural sectors), income, and employment estimates. These estimates of output can be multiplied through the direct requirement matrix and re-balanced to updated the model with respect to the agricultural industries.

Typically cost and return estimates are a useful tool when used as guidelines for appraisers, bankers and farmers to benchmark different farm and ranch operations. These tools can also transform a typical "black box" or national-based IMPLAN I/O table into a more precise local or regional matrix. With the steps outlined above, an IMPLAN data can be updated to include more accuracy without gathering costly primary data through survey techniques.

Cattle Ranches Cattle ranching is the single most important agricultural industry in Owyhee County. And range and grazing policy and thus cattle ranch industry is the impacted sector being considered in this study. More than one enterprise budget exists for cattle ranching thus the various costs and returns are weighted by the number of AUM's, or number of head. For this model, four cow-calf enterprise budgets were created to take into account the different production practices and their respective costs and returns. The budget values were weighted by an estimate of the number of head represented by each budget area. The weighting is Bruneau 46%, Jordan Valley 32%, Three Creek 11%, and Marsing 11%. The various weighted production items from the cost and returns were summed to arrive at a localized and weighted production function for cow-calf operations in the region. Cost and return estimates were transformed into a single vector of production purchases and gross returns for the a typical cattle ranch in Owyhee County. A detailed description of the in estimating the cattle ranching and other crop and livestock sectors if found in Darden, Harris, Rimbey, and Harp.

Dairy Industry Dairy budgets are also developed and maintained by the University (Fiez, et al. 1991). In addition, contact with the University of Idaho Dairy Specialist (Fiez, 1998) provided access to the Dairy Herd Improvement Association (DHIA) database for use in allocating cattle numbers, livestock sales and milk production at the county level. Existing University budgets were used to allocated costs and returns to the I/O sectors, based upon DHIA records and knowledge of the Dairy Specialist on cattle numbers and milk production.

Feedlots There are three known commercial feedlots in the county and a number of ranch-based backgrounding lots that provide marketing alternatives and flexibility to county cow-calf producers. Nearly all of the cattle fed in these commercial lots are under custom feeding arrangements, with the producers retaining ownership of the cattle during the feeding phase. There is also a large feedlot in Elmore County (with an Owyhee County address) that purchases cattle from ranches. Although ties from the cattle producers to these feedlots are extremely critical, no attempt is made to assess them in this document, other than the transactions estimated in the I/O phase of the study. Feedlot budgets are prepared by the University and could be adapted to analyze that phase of the beef production cycle, if the need arises. In addition, a long-term extension-research project exists that could be used to analyze the economics of retained ownership decisions by cow-calf producers (Momont, et al. 1994, 1998).

Miscellaneous Livestock Miscellaneous Livestock sector is a catch-all, that includes all animal agriculture other than cattle. Included are horses, swine, fish, poultry, but principally sheep. Historically, sheep grazing had significant impacts on the resources, culture, economy and social setting in Owyhee County. However, this industry has suffered from adverse market conditions, labor issues, predators and a number of other factors. Idaho sheep numbers have declined significantly since World War II. Over the past 50 + years, Idaho sheep have declined from about 1.5 million head to slightly under 300,000 head (USDA-NASS, various issues). Reviews of historical accounts and local literature indicate similar trends have taken place with sheep numbers in the county. It appears from various sources (Census of Agriculture, NASS, permit lists, etc.) that there are only 4 or 5 range sheep operations that graze in the county. Only one of these operations is based in the county. To avoid disclosure, sheep costs and returns are not included in this analysis. And the sheep industry in aggregated within the Miscellaneous Livestock.

Crop Industries

Crop enterprise budgets for southwestern Idaho are developed and maintained by the University of Idaho. A review of Census of Agriculture and USDA-NASS data sources and contact with growers (Hamby, 1998), association and company representatives (Thornton, 1998; Idaho-Eastern Oregon Onion Committee, 1998; Schmitt, 1998), county Extension faculty (Bolz, 1998) resulted in a determination of which crops were grown in Owyhee County. Major crops included alfalfa hay, alfalfa seed, feed barley, potatoes, corn for grain, corn silage, dry beans, mint, onions, other hay, sugar beets and wheat. Enterprise budgets were derived for these crops from existing University publications and

costs and returns were allocated to the I/O sectors (as detailed below) based upon a five year average of acreage in the county.

Sugar Beets Sugar beets production is one of the major crops in the county. As with all of the row crops, sugar beet acreage is along the northern boundary of Owhyee County, which means that many of the production inputs are purchased outside the county. In addition to the high leakages of inputs, all sugar beets are processed outside the county; i.e. all sugar beets are exported with no value added in Owhyee County.

Forage Crops The forage crops grown in the Owhyee County are alfalfa, corn silage, and grass hay. Separate budgets were constructed for all three of the forage crops along with the control totals. And in the final I/O model alfalfa, grass hay and silage were aggregated into the Forage Crop industry.

Alfalfa Seed Due to the size of the alfalfa seed production a separate industry in the I/O model was developed for this crop. The Alfalfa Seed industry in particular illustrates the need to develop data outside the IMPLAN data source. Alfalfa seed being a very local and specialized crop does not exist as a separate crop in IMPLAN nor does the production recipe in IMPLAN represent Owhyee County. The five step process outlined above becomes necessary.

Grains Irrigated barley and wheat are the principal grains grown in Owhyee County. Separate enterprise budgets were constructed for both crops and separate control totals estimated. The two crops were then aggregated in the final I/O model.

Miscellaneous Crops Onions, fruit crops, mint, dry beans, potatoes, and other minor crops. Crop enterprise budgets were constructed for dry beans, mint, onions, and separate control totals were estimated for onions, fruit crops, mint, dry beans, potatoes. The IMPLAN production recipe was maintained for the minor fruit and potato acreages. All of these crops were then aggregated in the final I/O model.

Proprietors Income

Proprietors income are the return to business owners. Proprietor's income increases as an industry becomes more profitable. Thus, for agricultural industries the returns to the owner are paltry. As with Households, the regional location of the business owner is the region where the income is attributed. When business owners reside outside the county their proprietary income is classified as an import. The portion of proprietor's income in each industry that are incommuters formed the data base to estimate an regional purchase coefficient for proprietor's income for each industry. Thus the final I/O table displays a row for resident proprietor's income and a separate row for proprietor's income paid to non-resident's, the equivalent of an import. Proprietor's income of the resident business owners was added to household wages and salaries in the computation of the Type II multiplier. This definition was necessary when Owyhee County economy is dominated by resident small businesses, particularly in agriculture.

Other Property Income

Other property income includes corporate dividends, income, corporate transfer payments, interest and rental income.

Indirect Business Taxes

Indirect business taxes are all taxes except federal income taxes: sales, excise, property, and value added taxes. Other taxes such as income are paid out of income, therefore exogenous to the I/O model.

Households

The consumers which purchase goods and services created by the economy. They are also the recipients of wages which create the purchasing power of the economy. The household row is the wages and salaries paid by industries located within Owyhee county. The household row is accounted for by "place-of-work", e.g. workers that live in Boise and work for an Owyhee County firm are recorded along with wages and salaries of resident workers. The Household column is recorded by "place-of-residence", i.e. there is an entry for the amount of imports that country residents make from the nearby Boise area. The conflicting accounting stance was resolved by using the survey data. The portion of the labor force in each industry that are incommuters formed the data base to estimate an regional purchase coefficient for each industry. Thus the final I/O table displays a row for resident households and a separate row for wages and salaries paid to non-resident households, the equivalent of imported labor.

Federal Government

Sales are goods or services that have been produced or stockpiled by the federal government. Purchases are expenditures for goods and services to provide federal government services.

State/Local Government- Non-education

Sales are non-education goods and services produced or stockpiled and sold. Purchases are expenditures for goods and services required to provide government services or goods.

State and Local Government- Education

Sales are education goods and services produced or stockpiled and sold. Purchases are expenditures for goods and services required to provide government services or goods.

Capital/Inventory

Capital goods purchased for formation of private capital. Inventory is the value of

goods not dispersed or purchases which are additions to inventory.

Exports

Commodities or services sold outside the region being analyzed or to non-residents visiting the region. Thus sales to tourists are export sales from the retail, food stores, or gas station sectors.

Bibliography

Burchell, R. W., N. A. Shad, W. R. Dolphin, and M.H. Robison. 1998. Public Works Program - Multiplier and Employment Generating Effects. Economic Development Administration, U.S. Department of Commerce Washington, D.C.

Cartrwright, Joseph et al. 1981. "Regional Input-Output Modeling System: Estimation and Evaluation and Application of Dissaggregated Regional Impact Models." Washington, DC: U.S. Department of Commerce, Bureau of Economic Analysis.

Coupal, R and D. Holland. 1995. On the use of Farm Enterprise Budgets in Interindustry Analysis: An Example from the Washington State Wheat Study. Washington State Univ. Dept of Agri. Econ. Report A.E. 95-10.

Fletcher, R. R., D. T. Taylor, T. R. Harris, G. W. Borden, and T. D. Darden. 1998. Public Land Policy and Rural Economies. University Center for Economic Development, Univ. of Nevada, Reno, University of Wyoming, Laramie, Wyoming. Paper presented at AAEA meetings in Salt Lake City.

Bolz, Darrell. 1998. Personal communication related to crop production in Owyhee County. Caldwell, ID.

Burchell, R. W., N. A. Shad, W. R. Dolphin, and M.H. Robison. 1998. Public Works Program - Multiplier and Employment Generating Effects. Economic Development Administration, U.S. Department of Commerce Washington, D.C.

Fiez, Edward A., Neil R. Rimbey and Leroy D. Stodick. 1991. DBUDGET: A Dairy Budget Generator. Univ. of Idaho. Cooperative Extension Service. Microcomputer Users Guide No. 43. Moscow, ID .

Fiez, Edward A. 1998. Personal communication related to dairy production in Owyhee County. Caldwell, ID.

Hamby, Mike. 1998. Personal communication related to onion production in Owyhee County. Parma, ID.

Hawkins, Richard, Robert Craven, Kevin Klair, Rann Loppnow, Dale Norquist and Wynn Richardson. 1993. FINPACK User's Manual. Center for Farm Financial Management. Univ. of Minnesota. St. Paul.

Idaho-Eastern Oregon Onion Committee. 1998. Personal communication related to onion production in southwestern Idaho. Parma, ID.

Lamphear, F. Charles, Raymond J. Supalla, Duane Jewell, Ron Konecny and Cheryl

Montgomery. 1983. "The ADOTMATR Software Program for Developing and Applying Regional Input-Output Models for Economic Analysis." Lincoln, Nebraska: University of Lincoln.

Minnesota IMPLAN Group, Inc. 1997. IMPLAN Professional: Users Guide, Analysis Guide, Data Guide. MIG, Inc.; Stillwater, Minnesota.

Morimoto, Y. 1970. "On Aggregation Problems in Input-Output Analysis." ***Review of Economic Studies*** **37:119-126.**

Momont, P.A., N.R. Rimbey and G.C. Keetch. 1994. A to Z Retained Ownership Company. Univ. of Idaho College of Ag. Ext. Bull. 763. Moscow, ID.

Momont, Patrick, Gordon Keetch and Neil Rimbey. 1998. A to Z Retained Ownership, Inc.: 1998 Year-end summary. Univ. of Idaho. Dept. of Ag. Econ. and Rural Soc. A.E. Extension Series No. 98-10. Moscow, ID.

Powell, T.A., K.H. Lindeborg and C.S. McIntosh. 1980. North Idaho Crop Enterprise Budgets. Univ. of Idaho Ag. Exp. Sta. Misc. Series No. 62. Moscow, ID.

Powell, T.A., C.E. Drury and N.L. Meyer. 1981. Idaho Livestock Enterprise Budgets. Univ. of Idaho. Ag. Exp. Sta. Misc. Series No. 71. Moscow, ID.

Round, J.I. 1983. "Non-Survey Techniques: A Critical Review of the Theory and the Evidence." ***International Regional Science Review*** **8:189-212.**

Schaffer, W.A. and K. Chu. 1969. "Non-Survey Techniques for Constructing Regional Industry Models." ***Papers and Proceedings of the Regional Science Association"*** **23:83-101.**

Willis, D. and D. Holland. 1997. Translating Farm Enterprise Budgets into Input-Output Accounts: Another Example from the Washington State. Washington State Univ. Dept. of Agri. Econ. Report A.E. 97-1.

Schmitt, Gene. 1998. Personal communication related to mint production in southwestern Idaho. Caldwell, ID.

Smathers, R. A. and various other authors. 1997. 1997 Crop Enterprise Budget Book. Univ. of Idaho. Coop. Ext. System. Moscow, ID.

Stodick, Leroy D., Neil R. Rimbey and C. Wilson Gray. 1997. The LBUDGET User Guide. Univ. of Idaho. Dept. of Ag. Econ. and Rural Soc. A.E. Extension Series No. 97-05. Moscow, ID.

Thornton, Mike. 1998. Personal communication related to crop production in southwestern Idaho. Boise, ID.

U.S. Department of Agriculture. Idaho Agricultural Statistics Service. Various issues. Idaho Agricultural Statistics. Boise, ID.

Owyhee County, Idaho 1995 I/O Gross Transactions	Dairy	Cattle Ranch	Cattle Feedlots	Misc. Livestock	Grains	Forage Crops	Alfalfa Seed	Misc. Crops
Dairy	654,906	0	2,668	0	0	0	0	0
Cattle Ranch	0	1,090,530	1,651,208	0	0	0	0	0
Cattle Feedlots	0	1,651,208	211,444	0	0	0	0	0
Misc. Livestock	0	0	16	11,465	0	0	0	0
Grains	306,538	865,636	334,627	9,174	0	0	0	0
Forage Crops	430,278	938,239	311,681	398,157	0	0	0	0
Alfalfa Seed	0	0	0	0	0	0	0	0
Misc. Crops	0	0	0	0	0	0	0	0
Sugar Beets	216,405	0	0	0	0	0	0	0
Ag Services	277,295	260,606	24,298	12,061	733,654	3,601,144	944,615	679,653
Mining	0	0	0	0	0	0	0	0
Const & Maintance	119,190	1,089,187	13,737	4,632	0	0	0	0
All Manufacturing	9,430	92,791	5,622	2,691	102,297	750,846	117,789	195,704
Tran & Comm	36,034	427,369	28,544	12,712	11,010	46,498	8,533	11,798
Electric Services	0	0	5,266	3,359	0	0	0	0
Irrig, Sanitary, Water Serv	0	0	378	330	258,703	1,169,586	117,722	77,775
Wholesale Trade	63,798	1,219	18,750	7,808	140,371	314,052	128,477	189,597
Misc. Retail	47,971	62,519	0	0	363,461	708,627	169,878	794,756
Food Stores	0	0	0	0	0	0	0	0
Auto & Service Stations	22,715	314,502	0	0	0	0	0	0
Eating & Drinking	0	0	0	15	0	0	0	0
F.I.R.E	62,654	491,823	28,395	3,149	43,532	98,205	13,572	66,418
Hotels and Lodging	0	0	0	0	0	0	0	0
Services	540,532	289,622	4,633	88	161,792	672,336	80,802	274,871
Health Care	0	0	17,669	4,771	0	0	0	0
Employee Comp (Residents)	1,338,956	554,684	121,753	120,836	287,587	364,388	12,213	3,766,697
Prop Income (Residents)	2,264,510	508,153	64,765	148,845	148,845	1,021,133	37,497	1,583,762
Employee Comp (Non-Res)	148,773	61,631	318,995	30,209	0	40,488	643	418,523
Prop Income (Non-Residents)	0	338,769	582,886	0	0	113,459	0	0
Other Property Income	933,983	506,115	747,719	164,001	2,509,308	2,657,302	161,244	6,367,795
Indirect Business Taxes	50,024	267,358	214,181	32,886	498,677	717,974	7,564	441,331
Fed Gvt	0	56,957	954	388	0	0	0	0
State/Local Govt NonEd	0	4,496	1,115	471	0	0	0	0
State/Local Govt Education	0	0	0	0	0	0	0	0
Capital & Inventory	0	0	9,314	3,280	0	0	0	0
Imports	4,158,745	19,266,262	1,867,974	455,986	1,487,348	8,103,747	1,506,513	2,019,451
COLUMN TOTAL	11,682,738	29,139,676	6,588,591	1,427,312	6,746,584	20,379,785	3,307,064	16,888,130
Employment	63	104	101	48	104	345	26	151

Owyhee County, Idaho 1995 I/O Gross Transactions	Sugar Beets	Ag Services	Mining	Const & Maintance	All Manufacturing	Tran & Comm	Electric Services	Irrig, Sanitary, Water Serv
Dairy	0	0	0	0	0	0	0	0
Cattle Ranch	0	0	0	0	200,000	0	0	0
Cattle Feedlots	0	12,796	0	0	200,000	0	0	0
Misc. Livestock	0	0	0	0	0	0	0	0
Grains	0	0	0	0	0	0	0	0
Forage Crops	0	0	0	0	0	0	0	0
Alfalfa Seed	0	0	0	0	0	0	0	0
Misc. Crops	0	0	0	76	0	0	0	0
Sugar Beets	0	0	0	0	0	0	0	0
Ag Services	358,433	20,420	0	0	0	0	0	0
Mining	0	0	9,798	424	10,871	0	0	0
Const & Maintance	0	22,126	232,734	5,093	43,182	85,093	573,312	59,336
All Manufacturing	143,648	71,341	35,727	117,027	277,792	33,548	8,802	7,131
Tran & Comm	6,787	20,921	72,014	178,565	265,144	726,060	40,885	37,805
Electric Services	0	2,195	614,966	5,236	29,696	10,663	688	4,230
Irrig, Sanitary, Water Serv	56,894	25	32	13,033	27,799	47,180	10,859	130,241
Wholesale Trade	99,256	21,845	18,256	99,736	156,619	28,122	15,899	11,261
Misc. Retail	214,241	19	22	26,806	409	906	126	807
Food Stores	0	82	97	118,184	1,628	3,993	558	3,560
Auto & Service Stations	0	78	93	113,057	1,766	3,820	534	3,405
Eating & Drinking	0	2,369	204	5,311	15,275	10,531	12,332	1,996
F.I.R.E	65,104	8,880	1,135	59,754	73,631	57,841	90,210	8,582
Hotels and Lodging	0	3,288	0	8,053	24,093	17,087	19,707	0
Services	214,559	22,843	21,811	449,499	108,867	163,343	110,112	19,656
Health Care	0	0	0	0	0	736	0	0
Employee Comp (Residents)	299,635	1,749,380	3,959,936	998,130	0	764,809	2,517,380	336,836
Prop Income (Residents)	801,367	74,318	0	634,273	0	172,604	0	296,466
Employee Comp (Non-Res)	74,909	1,166,253	1,979,968	1,219,937	2,354,268	1,363,356	629,345	301,749
Prop Income (Non-Residents)	0	668,866	9,544	634,273	541,394	258,906	2,029,762	0
Other Property Income	4,294,946	634,316	2,936,607	303,315	1,232,823	2,442,718	10,071,040	286,517
Indirect Business Taxes	330,384	185,839	636,446	82,482	66,625	331,608	1,934,639	258,295
Fed Gvt	0	1	26,263	35	0	1	0	0
State/Local Govt NonEd	370	847	75,486	41,850	20,506	11,620	80,383	2,800
State/Local Govt Education	0	0	0	0	0	0	0	0
Capital & Inventory	0	2,195	0	541	152	88	65	2
Imports	1,392,954	3,612,619	6,680,309	5,823,357	7,047,736	2,172,298	3,897,946	660,713
COLUMN TOTAL	8,353,486	8,303,862	17,311,448	10,938,047	12,700,276	8,706,931	22,044,584	2,431,388
Employment	112	328	184	144	127	85	75	25

Owyhee County, Idaho 1995 I/O Gross Transactions	Wholesale Trade	Misc. Retail	Food Stores	Auto & Service Stations	Eating & Drinking	F.I.R.E	Hotels and Lodging	Services
Dairy	0	0	0	0	0	0	0	0
Cattle Ranch	0	0	0	0	0	0	0	0
Cattle Feedlots	0	0	0	0	0	0	0	1
Misc. Livestock	0	0	0	0	0	0	0	1
Grains	0	0	0	0	0	1	0	2
Forage Crops	0	0	0	0	0	0	0	0
Alfalfa Seed	0	0	0	0	0	0	0	0
Misc. Crops	0	0	0	0	0	0	0	2
Sugar Beets	0	0	0	0	0	0	0	0
Ag Services	0	0	0	0	0	0	0	0
Mining	0	0	1	1	0	0	0	1
Const & Maintance	8,049	3,570	13,264	8,854	19,429	147,510	13,795	36,713
All Manufacturing	47,255	16,890	62,748	41,884	51,363	43,758	8,894	106,796
Tran & Comm	34,453	5,198	19,309	12,889	36,139	54,022	10,438	121,137
Electric Services	6,359	3,400	12,632	8,432	23,085	17,621	7,989	24,601
Irrig, Sanitary, Water Serv	3,949	1,525	5,665	3,781	18,415	29,064	9,237	23,735
Wholesale Trade	14,742	522	1,938	1,294	36,892	3,371	1,231	35,884
Misc. Retail	381	105	391	261	277	159	80	919
Food Stores	1,678	464	1,724	1,151	1,220	700	355	4,050
Auto & Service Stations	1,605	444	1,649	1,101	1,167	670	339	3,873
Eating & Drinking	4,420	943	3,503	2,338	23,168	8,945	1,770	15,701
F.I.R.E	31,741	12,830	47,662	31,814	56,525	261,774	23,813	144,263
Hotels and Lodging	0	0	0	0	0	0	0	24,158
Services	83,595	13,212	49,085	32,765	62,898	151,157	26,609	476,369
Health Care	0	0	0	0	0	0	0	6
Employee Comp (Residents)	242,501	168,910	952,651	296,036	541,120	794,780	73,187	1,016,397
Prop Income (Residents)	48,349	126,446	197,465	54,117	163,718	20,599	21,421	937,533
Employee Comp (Non-Res)	565,836	126,683	1,214,631	460,500	341,760	476,868	88,374	1,227,305
Prop Income (Non-Residents)	48,349	54,191	197,465	54,117	18,191	185,387	0	234,383
Other Property Income	239,311	80,006	586,600	204,765	176,205	2,865,442	63,719	102,698
Indirect Business Taxes	473,079	213,831	933,335	397,081	230,662	749,565	27,516	161,677
Fed Gvt	0	0	0	0	0	5	0	25
State/Local Govt NonEd	4,582	1,099	4,083	2,726	4,265	10,398	1,805	37,774
State/Local Govt Education	0	0	0	0	0	0	0	0
Capital & Inventory	30	0	10	6	35	38	3	1,895
Imports	926,115	2,447,142	458,583	614,824	1,615,789	1,935,994	267,540	3,900,084
COLUMN TOTAL	2,786,379	3,277,411	4,764,394	2,230,737	3,422,323	7,757,828	648,115	8,637,983
Employment	36	51	176	50	140	81	21	246

Owyhee County, Idaho 1995 I/O Gross Transactions	Health Care	Households	Federal Gvt	State/Local Govt NonEd	State/Local Govt Ed	Capital & Inventory	Exports
Dairy	0	0	0	0	0	0	11,025,163
Cattle Ranch	0	76,486	0	0	0	230	26,121,221
Cattle Feedlots	0	158,001	0	0	0	475	4,354,665
Misc. Livestock	0	0	0	0	0	12	1,415,818
Grains	0	0	0	0	0	144	5,230,463
Forage Crops	0	0	0	0	0	0	18,301,430
Alfalfa Seed	0	0	0	0	0	612	3,306,452
Misc. Crops	97	239,045	0	1,782	188	0	16,646,940
Sugar Beets	0	0	0	0	0	0	8,137,081
Ag Services	0	16,913	0	0	0	0	1,374,770
Mining	0	361	0	0	0	1	17,289,990
Const & Maintance	36,922	524,420	77,060	193,927	134,096	307,464	7,165,352
All Manufacturing	136,598	413,910	0	173,373	7,624	100,807	9,516,191
Tran & Comm	130,496	1,796,605	0	181,219	23,110	187,185	4,164,052
Electric Services	25,539	738,908	0	154,480	14,566	0	20,330,673
Irrig, Sanitary, Water Serv	20,299	246,550	0	16,129	7,186	92	135,203
Wholesale Trade	44,114	942,586	0	68,709	7,582	57,304	255,145
Misc. Retail	727	846,577	0	1,675	0	6,617	28,693
Food Stores	3,205	2,510,992	0	4,269	0	136,760	1,969,724
Auto & Service Stations	3,066	1,423,046	0	3,300	0	33,749	296,758
Eating & Drinking	24,340	2,617,241	0	98,788	0	0	573,133
F.I.R.E	252,500	4,288,840	0	238,645	2,324	50,546	1,141,667
Hotels and Lodging	33,209	70,405	0	68,621	3	106	379,385
Services	352,412	2,776,536	132,216	528,283	39,383	4,673	773,424
Health Care	161,504	6,136,983	325,912	10,743	0	0	3,064,166
Employee Comp (Residents)	809,769	0	1,568,545	4,348,791	1,986,091	0	21,783,155
Prop Income (Residents)	0	0	0	0	0	0	0
Employee Comp (Non-Res)	2,429,307	0	1,894,028	5,251,189	220,677	0	0
Prop Income (Non-Residents)	1,229,399	0	0	0	0	0	0
Other Property Income	298,971	7,448,219	1,549,748	225,929	225,929	0	0
Indirect Business Taxes	133,558	1,504,134	22,134,000	5,767,000	0	0	0
Fed Gvt	0	9,781,212	11,725,645	611	39	4,669,307	(4,729,950)
State/Local Govt NonEd	40,627	10,794,192	1,220,027	11,207,693	700	8,952,472	(10,462,199)
State/Local Govt Education	0	0	0	0	0	0	(2,432,697)
Capital & Inventory	86	6,385,278	0	43,043	2,700	31,565,216	28,243,093
Imports	3,555,746	66,105,107	716,520	8,522,461	598,007	8,350,513	65,993
COLUMN TOTAL	9,722,491	127,842,547	41,343,701	37,110,660	3,270,205	54,424,285	195,464,953
Employment	231		110	440	122		