An Introduction to Economic Impact Assessment

Dave Swenson
Regional Scientist
Department of Economics
Iowa State University
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Regional analysts are often asked to assess local economic conditions. As regional and national economies change, and they continually do, we are called upon to try to assess and interpret the consequences. These consequences are sometimes called *economic impacts*, but we will make distinctions in this report between reporting on the economic *structure* of an economy, identifying regional economic *values* or *effects*, and isolating economic *impacts*.

There are several steps to describing and understanding regional economic structures, values, effects, and, if appropriate, economic impacts. In the first instance, we need to scrutinize the structure of the local economy. The structure of the local economy entails not only its obvious composition – agriculture, manufacturing, trade, etc. – but those industries' relationships with each other locally and non-locally, and those industries' relationship with households in the region of scrutiny. To do this we have come to rely on input-output accounts of local economies.

At its most basic, an input-output (I-O) model is an accounting of transactions among industries, governments, households, and imports and exports. These types of models help us to track the flow of resources and commodities into and out of industrial production. They help us to identify the value and the extent of *linkages* among firms and industries in our study territory. When one firm makes a purchase of an input from another in a region, there is a linkage. The stronger the linkages, the more important the two (or more) industries are to each other and to the regional economy. Input-output models, allow us to identify the structure and the linkages that exist in the regional economy. It is that strength that allows us to take I-O modeling a step forward and compile economic effects and economic impact studies. We also produce an array of output from these models that helps us to further characterize the economy that we are studying. Among this output are sectoral multipliers.

These will be explained later, but in short multipliers are a ratio of regional economic value in relation to the particular industry that you may be scrutinizing.

Once we understand industrial structures and linkages, we can then assess the overall importance of a set of industries in a region or the likely economic consequences if there is some change in production, earnings, or employment in these firms. We can also identify whether the effects are localized or regional.

I. Kinds of Economic Measures and Key Terminology

Input-output models (I-O) produce quite a bit of information for planners and decision makers. The more useful results for most projects are estimates of total industrial output, different kinds of income, value added, and jobs.

Total industrial output for most industries is simply gross sales. For public or quasi-public institutions we include all public outlays, to include the value of government sales and other subsidies received. This helps us to isolate the current economic value of their output to the citizens or the area served.

Employment compensation includes all salaries, wages, and wage-like benefits paid to workers.

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Proprietor incomes are the normal returns to sole proprietors.

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Other property incomes are composed of dividends, interests, and rents. They are the payments to owners of land and capital or to investors.

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Indirect tax payments are those to local, state, and the federal government that are part of the production or consumption process among households and industries. They are primarily use and sales taxes, along with excise taxes. These taxes are built into the value of the product that is produced or consumed (e.g., sales and use taxes on household consumption, sales taxes on office supplies, state and federal taxes on petroleum products).

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Value added is a measure of regional product. It includes all of the aforementioned employment compensation, incomes to sole proprietors, property incomes (dividends, interests, and rents), and indirect tax payments (primarily excise, use, and sales taxes paid by individuals to businesses). Value added is closely analogous to Gross Regional

Product, and it is usually the preferred statistic for measuring productivity, income, and wealth produced in a region or by a type of manufacturing activity.

Jobs, the last measure, represent the number of positions in the economy, not the number of employed persons. The distinction is important. Many industries produce full-time jobs, primarily. Manufacturing firms, for example, tend only to hire full-time, full-year positions. Many other industries, like recreational services, retail sales, and dining and drinking establishments may hire a preponderance of part time or seasonal workers.

We also get detailed breakdowns of these economic data into the direct, indirect, induced, and total economic effects.

Direct effects refer to the operational characteristics of the firms or institutions that we are studying directly.

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Indirect effects measure the value of additional economic demands that the direct firms or institutions place on supplying industries in the region. When firms conduct business or public entities provide public goods, they must make many direct purchases from suppliers in the area.

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Induced effects accrue when workers in the direct and indirect industries spend their earnings on goods and services in the region. Induced effects can also be called household effects.

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Total economic effects are the sum of direct, indirect, and induced effects. They are all of the transactions attributable, either directly or indirectly, to the activities that we are measuring.

The term ***multiplier*** or ***multiplier effect*** is often used when referring to economic effects or economic impacts. There are different ways in which industrial activity can be expressed. The most commonly used multiplier is a ratio of the total economic effects in a particular category divided by the direct effects. The multiplier tells you how much the overall economy changes per unit change in the direct effects (e.g., how much the remaining economy changes per change in a dollar of output, a dollar of personal income, or per job in the direct industries or institutions that we are analyzing). Multipliers help us to anticipate the potential change in the regional economy attributable to a change in direct activity in a particular industry.

They are calculated two ways: one way isolates linkages with other industries. We can call this the ***inputs multiplier*** **(or Type I)**; the second identifies all regional transactions to include linkages with other industries and the associated induced spending by workers and households. This is called the ***total multiplier*** **(or Type II or Type "SAM").**

Type I = (direct + indirect) / direct
Type II = (direct + indirect + induced) / direct

The Type I multiplier helps us to understand the value of industrial linkages by gauging input (indirect) sales, employment, and incomes in the region in relation to the industry that we are studying. The Type II multiplier helps us to understand how the whole economy might be related to the industry that we are studying.

Multipliers can be instructive for anticipating economic growth, in the case of a new or expanding firm, and economic decline, in the case of a plant closing. Firms with strong linkages to area supplying firms or that pay relatively high earnings may yield comparatively higher multipliers. Firms that are otherwise not linked strongly to local suppliers or that pay lower than average wages will usually produce lower multipliers. Urban areas with their more highly developed and diversified economies have, on the average, much higher multipliers than rural or smaller urban areas.[*]

The generic term ***economic impact*** is frequently used to describe a set of economic activities in a region. This term also suffers from misapplication. A

[*] Economic multipliers are often misunderstood or misused because users fail to account for regional production and cost of living differences, they use the wrong multiplier to describe a phenomenon, or they seek out the largest multiplier possible within a range of industrial activity without consideration of either the appropriateness of the application or of the actual scope of local production.

For these reasons and others, there has been a generalized inflation in the reporting of multipliers by those not trained in their generation and interpretation. The multiplier that we produce is called the Type II multiplier. The multipliers for different categories of economic activity that are produced by our research are specific initially to region that we are studying and are not directly derivative of national averages. The resulting data are more sensitive to the kinds and amounts of earnings and incomes that are produced in the region than would be determined using national averages.

distinction must be made between a multiplier that expresses the value of a set of inter-industrial linkages in a region versus multipliers that can be interpreted to mean causation.

To help illustrate this we need to be aware that there are several kinds of economic activities that may occur within a particular region. A useful distinction can be made between firms that produce goods or services for export or which otherwise attract outside income and firms that produce goods and services for local consumption (either by industries or by households). Firms that produce goods intended primarily for export sales generate economic impacts because outside demand supports local employment.

If my town has a Tastee Freeze drive-in, it is probably primarily serving mostly local household demand. We can measure the overall size and contribution of the drive-in to the local economy, but the presence or absence of that particular place in the region does not necessarily present an economic impact -- one way or another the aggregate regional demand for cones and corn-dogs will be met somehow. What we can identify is the overall size and contribution of the firm to the local mix of economic activity. Accordingly, we can measure its ***economic effect*** or ***economic value*** in the region along with interdependencies that exist between it and other firms or service suppliers. In this instance, when we use I-O models we are isolating the strength of linkages that exist among industries and the firm that we are studying and the overall value (output, incomes, and jobs) of its production.

In contrast, if my town has a rocking chair factory, then it is producing a good that is intended primarily for sales beyond my community. Money from outside of the region flows into our community and supports employment, industrial purchases, and household spending in my community. An external demand (for rocking chairs) is creating local economic activity. The associated local production that is linked to this demand is producing an export. In this instance we have a measurable and clear economic impact – were it not for the external demand for the locally produced product, the economic activity would not be in the community. We are declaring economic causality. The firm is *causing* a measurable set of economic activity in the region that would otherwise not have existed were it not for the external (exported) demand.

Another clear example of economic impact can be associated with tourism. Here we know that large fractions of transactions in the region are attributable to some set of local attractions or events. Along with those direct purchases of entertainment or recreation, the initial economic impacts, are also collateral purchases of food, lodging, transportation, and other trade and services. These, too, are considered economic impacts for a region. We call them the visitor effects.

Large government institutions like a military base, hospital, school, or a prison also can represent a discernible economic impact to a region. Payments for institutional maintenance along with wages and salaries are primarily borne by non-resident tax payments. Non-residents are purchasing a locally produced good (public safety), the residual economic benefits of which remain largely in the community. Hence, in the last decade, the incredible inter-community bidding war for prisons.

Another category where a local impact may be evident is called ***import substitution***. If an indigenous firm can begin to produce for sale a commodity that people had been importing, then money that would otherwise have gone elsewhere stays in the community. A true import substitution can be counted as a localized economic impact.

We are cautious about using the term economic impact when assessing the overall size or contribution of one industrial sector unless is very clear that the industrial activity is totally new to the area and the industrial activity will stimulate export sales or act as an import substitute. Otherwise, we prefer to use the terms ***economic value*** or ***economic effect***. The distinction to our mind is not trivial.

The Study Region

Input-Output study regions can range from a single county, to multiple counties, to states, to multiple states, to the nation, depending on the nature of the study and the industries assessed. Care must be take when specifying an economic region. We are often called to assess county level impacts because for one reason or another that is the locus of all decision making and expected economic impacts. But county level analysis may not adequately capture the regional value of the economic change that we are trying to measure.

Consequently, we believe that care should be given at the outset to adequately describing the economic territory that is being measured. It is usually more adequate to describe a collection of counties as comprising a study region instead of just one. It is usually inadequate to describe a set of non-adjacent counties as representing a study region.

The Data

The Iowa Department of Workforce Development, the U.S. Department of Labor, and the U.S. Department of Commerce periodically compile information on specific Iowa industries, their employment, and their production and payroll characteristics. A major data source for the state of Iowa is the ES-202 file (ES means "employment security"), which isolates firm-level employment and the amount of payroll subject to withholding for social insurance tax purposes. Estimates of detailed industrial sector activity are generally not available at the county level. The state and federal agencies simply do not produce the estimates at that detail or there are so few firms that state and federal disclosure rules prevent reporting on the firms and their characteristics to protect their identities.

Very reliable estimates are produced by a private firm, however. Minnesota Implan, Inc., (MIG) which produces the input-output modeling software that we use, annually produces a complete set of county level industrial accounts for the U.S. for up to 538 industrial, governmental, and household sectors. These data sets are manufactured from data from:

- Benchmark input-output accounts of the U.S. economy (BEA—Commerce)
- National income a product accounts (BEA -- Commerce)
- Quinquennial industrial surveys (Commerce; USDA)
- ES 202 files (BLS – IDWD)
- County Business Patterns (Commerce)

II. The Organization of Information in Input-Output Models

There are several levels of information that constitute an input-output model: (1) social accounts, (2) estimates of direct coefficients and production functions, and (3) regional purchase coefficients and regional purchases.

Social Accounts

In input-output accounting the foundation data begins with social accounts. These accounts are basic and straightforward and come primarily from secondary data sources, like the U.S. Department of Commerce or the Bureau of Labor Statistics. They describe the major elements of industrial activity to include industrial output, employment, and the composition of value added for that sector of the economy.

Table 1 contains selected data from a social accounting of the Iowa economy in 1998. Here we can see the elements of industrial activity as they are attributed directly to specific kinds of industries. We see, for example, that all agriculture produced $11.5 billion in industrial output, accounted for 129,400 jobs, paid $3.5 billion in income to workers and land owners, and generated a total of $5.3 billion in value added in the state. For that year, the state of Iowa generated $159.8 billion in industrial output, had 1.9 million jobs, paid $53.5 billion to workers and sole proprietors, and produced $80.96 billion in overall value added (or gross state product).

Table 1. Iowa Industrial Output, Jobs, Labor Income and Value Added by Industrial Sector, 1998

	Output	Percent of Total	Jobs	Percent of Total	All Labor Income	Percent of Total	Value Added	Percent of Total
Agriculture	11,505.8	7.2%	129,378.5	6.8%	3,485.7	6.5%	5,315.0	6.6%
Mining	299.9	0.2%	2,508.0	0.1%	96.7	0.2%	204.6	0.3%
Construction	11,477.5	7.2%	118,108.1	6.2%	3,921.8	7.3%	4,403.0	5.4%
Food Processing	18,293.4	11.4%	50,781.5	2.7%	1,857.9	3.5%	3,098.9	3.8%
All Other Manufacturing	39,050.8	24.4%	217,526.8	11.4%	8,942.3	16.7%	13,297.3	16.4%
TCPU	10,714.3	6.7%	79,012.1	4.1%	2,957.2	5.5%	5,987.4	7.4%
Trade	19,487.6	12.2%	415,396.1	21.8%	8,473.4	15.8%	14,075.2	17.4%
Finance, Ins., & Real Est.	15,914.6	10.0%	124,353.1	6.5%	3,867.0	7.2%	11,253.3	13.9%
Services	22,446.5	14.0%	510,159.1	26.7%	11,591.1	21.7%	13,693.0	16.9%
Government	10,269.7	6.4%	248,702.9	13.0%	8,174.9	15.3%	9,307.7	11.5%
Other	328.4	0.2%	11,675.0	0.6%	99.4	0.2%	328.4	0.4%
	159,788.6	100%	1,907,601.1	100.0%	53,467.5	100.0%	80,963.8	100.0%

Note: All financial amounts in $millions.

We can aggregate these tables in several ways. The model allows us to aggregate at the one-digit level, like the table above, the two-digit SIC level, which allows for greater industrial scrutiny but is still manageable, to the model

level, which can grow to just a little over 500 sectors. We can create our own aggregation sectors, too, if we want, if it makes sense for us to do so.

These tables can be produced for individual counties, multiple counties, states, multiple states, and the nation. At this level of analysis, everything is additive.

Total Requirements and Direct Coefficients

When industries make a product they must make purchases of commodities and services from other industries. These purchases are called inputs. Inputs constitute all of the indirect measures that we mentioned in the previous section. When we are doing economic impact assessment, we are very interested in the kinds of purchases that an industry makes, as they may inform us initially about the relative value that firm may have for the region.

Table 2 itemizes the expected purchases that were made in1998 by Iowa feed grain producers. As we read the table we see at the top that total industrial output in that sector was $2.9 billion. To produce that $2.9 billion in sales, purchases were made from several components of the national economy. We can represent those purchases as total dollar amounts or as a ratio of total output. Both representations are contained in the table. Iowa feed grain producers purchased $227.6 million in real estate inputs (land payments, mostly) in 1998, which represented 7.85 cents of each dollar's worth of output. Payments to wholesale trade were $175.4 million, 6.1 cents per dollar of output. In total, that sector of the economy purchased $1.222 million in production inputs, which represented 42.1 cents of each dollar of output.

Feed grain producers also make payments to value added. Employee compensation amounted to $46 million, payments to land-owners were $.957 billion, payments to investors or property owners added another $.525 billion in costs, and indirect tax payments (sales, use, and excise taxes) ere $150.3 million. In all payments to value added amounted to nearly 58 percent of total industrial output in that sector. We see that in this balance sheet commodity demand plus value added adds up to the total industrial output of $2.9 billion and the coefficients add up to 1.0.

Table 2. Industry Balance Sheet

Feed Grains Industrial Output (millions)	2,900.88

Inputs

Industry Commodity Demand	Direct Coefficients	Total Requirements (millions)
Real Estate	0.07847	227.62
Wholesale Trade	0.06045	175.37
Agriculture Services, Etc.	0.05615	162.87
Other Agricultural Chemicals	0.05401	156.68
Nitrogenous and Phosphatic Fertilizers	0.04301	124.77
Maintenance and Repair Other Facilities	0.01169	33.91
Motor Freight Transport and Warehousing	0.01076	31.20
Petroleum Refining	0.00915	26.54
Lubricating Oils and Greases	0.00825	23.93
Feed Grains	0.00673	19.53
Miscellaneous Repair Shops	0.00668	19.38
Sanitary Services and Steam Supply	0.00590	17.12
Automobile Rental and Leasing	0.00549	15.91
Farm Machinery and Equipment	0.00420	12.19
Hay and Pasture	0.00413	11.98
Dimension Stone	0.00359	10.40
Communications- Except Radio and TV	0.00350	10.17
Electric Services	0.00336	9.73
Miscellaneous Fabricated Wire Products	0.00327	9.48
Banking	0.00286	8.31
Miscellaneous Plastics Products	0.00282	8.17
Grass Seeds	0.00272	7.90
Railroads and Related Services	0.00261	7.56
Gas Production and Distribution	0.00247	7.15
Storage Batteries	0.00241	7.00
Engine Electrical Equipment	0.00237	6.87
Miscellaneous Crops	0.00225	6.52
Motor Vehicle Parts and Accessories	0.00201	5.82
Credit Agencies	0.00188	5.46
Water Transportation	0.00188	5.45
Insurance Carriers	0.00175	5.06
Tires and Inner Tubes	0.00151	4.38
Cordage and Twine	0.00142	4.12
Computer and Data Processing Services	0.00118	3.41
Minerals- Ground Or Treated	0.00092	2.67
Equipment Rental and Leasing	0.00091	2.63
Chemical Preparations- N.E.C	0.00066	1.91
Accounting- Auditing and Bookkeeping	0.00056	1.61
Rubber and Plastics Hose and Belting	0.00052	1.52
Carburetors- Pistons- Rings- Valves	0.00052	1.51
Industrial Machines N.E.C.	0.00045	1.31
Hotels and Lodging Places	0.00045	1.31
Other State and Local Govt Enterprises	0.00045	1.31
Business Associations	0.00043	1.26
Electrical Repair Service	0.00042	1.21
All Other Costs	0.00390	11.30
Total Commodity Demand	**0.421088**	**1,221.52**

Value Added	Coefficients	Value Added (millions)
Employee Compensation	0.01621	47.03
Proprietary Income	0.32977	956.63
Other Property Income	0.18113	525.43
Indirect Business Taxes	0.05180	150.27
Total Value Added	0.57891	1,679.35

Summary

Commodity Demand	0.42109	1,221.52
Plus		
Total Value Added	0.57891	1,679.35
	1.00000	2,900.87

Regional Purchase Coefficients and Regional Purchases

Now that we know how what it takes to produce a commodity and the kinds of payments that are made, we need to get an idea of the likelihood that those purchases will by made by local suppliers. The probability that the local supply of a good or service will meet local demand is called the regional purchase coefficient or RPC. RPCs are the adjustments to the direct coefficients

that take into account the likelihood of a local purchase of an input. They are econometrically determined based on the distribution of all industries in the U.S. relative to the economic region that you are studying, with a built-in adjustment for the likelihood of purchasing inputs from a foreign supplier.

RPCs are simultaneously the strongest and weakest element of economic impact modeling. The give us a good idea of the kinds of local purchases to expect, but, as they are econometrically determined, there are always, and legitimately so, questions about their accuracy.

In Table 3 we get an idea of the importance of RPC adjustments in our analysis. The model data indicate that the feed grain sector requires $227.6 million in inputs from the broad real estate sector – banking, insurance, realty sales and services, etc. The RPC for that sector is 44 percent, meaning that 44 percent of the demand for this particular kind of real estate service can be obtained in the region of study. To get the estimated regional purchase from this industry, then, we multiply the total requirements times the RPC:

Estimated Regional Purchase	=	Total Requirement X RPC
	Or	
$100.05	=	$227.62 million X 44.0%

The RPCs on the table vary considerably. For maintenance and repair the RPC is high, 96.5 percent; nearly all purchases are made from suppliers within the study region. For others, like fabricated wire products (fencing), the RPC is low, 18.2 percent ; four-fifths of the purchases are made from out-of-state producers. When we multiply the total requirements times each sector's RPC and then sum the all of the products we get an estimate of all regional purchases. In Table 3 we see that of the $1.222 million in industrial purchases by Iowa's feed grain producers, $644.55 million (52.8 percent) were purchased from in-state suppliers. Out of state purchases (1-RPC) were $577 million (47.2 percent).

Table 3. Regional Purchases and Coefficients -- Feed Grains

Industry Commodity Demand	Total Requirements (millions)	Regional Purchase Coefficents	Estimated Regional Purchases (millions)
Real Estate	227.62	44.0%	100.05
Wholesale Trade	175.37	81.3%	142.57
Agriculture Services, Etc.	162.87	55.5%	90.37
Other Agricultural Chemicals	156.68	48.1%	75.41
Nitrogenous and Phosphatic Fertilizers	124.77	45.6%	56.91
Maintenance and Repair Other Facilities	33.91	96.5%	32.74
Motor Freight Transport and Warehousing	31.20	71.2%	22.22
Petroleum Refining	26.54	0.9%	0.23
Lubricating Oils and Greases	23.93	39.8%	9.54
Feed Grains	19.53	26.4%	5.15
Miscellaneous Repair Shops	19.38	58.6%	11.37
Sanitary Services and Steam Supply	17.12	76.8%	13.14
Automobile Rental and Leasing	15.91	55.4%	8.82
Farm Machinery and Equipment	12.19	75.3%	9.17
Hay and Pasture	11.98	26.4%	3.16
Dimension Stone	10.40	13.3%	1.38
Communications- Except Radio and TV	10.17	44.5%	4.52
Electric Services	9.73	82.3%	8.01
Miscellaneous Fabricated Wire Products	9.48	18.2%	1.72
Banking	8.31	60.2%	5.00
Miscellaneous Plastics Products	8.17	0.2%	0.02
Grass Seeds	7.90	5.1%	0.40
Railroads and Related Services	7.56	98.3%	7.44
Gas Production and Distribution	7.15	49.3%	3.53
Storage Batteries	7.00	71.5%	5.01
Engine Electrical Equipment	6.87	59.0%	4.05
Miscellaneous Crops	6.52	2.3%	0.15
Motor Vehicle Parts and Accessories	5.82	25.5%	1.49
Credit Agencies	5.46	60.2%	3.29
Water Transportation	5.45	33.9%	1.84
Insurance Carriers	5.06	61.9%	3.13
Tires and Inner Tubes	4.38	0.2%	0.01
Cordage and Twine	4.12	0.1%	-
Computer and Data Processing Services	3.41	56.8%	1.94
Minerals- Ground Or Treated	2.67	0.1%	-
Equipment Rental and Leasing	2.63	58.6%	1.54
Chemical Preparations- N.E.C	1.91	77.4%	1.48
Accounting- Auditing and Bookkeeping	1.61	56.2%	0.90
Rubber and Plastics Hose and Belting	1.52	0.2%	-
Carburetors- Pistons- Rings- Valves	1.51	0.0%	-
Industrial Machines N.E.C.	1.31	0.0%	-
Hotels and Lodging Places	1.31	51.2%	0.67
Other State and Local Govt Enterprises	1.31	87.2%	1.14
Business Associations	1.26	75.5%	0.95
Electrical Repair Service	1.21	67.5%	0.82
All Other Costs	11.30	28.8%	3.25
Total Commodity Demand	1,221.52		
Regional Totals		52.8%	644.55
All Imports (1-RPC)		47.2%	576.97
		100.0%	1,221.52

It should be evident to the reader that we can have significant variance across industries in both the distributions of total requirements and the actual RPCs for that industry's needs. As a consequence, these models all allow us to modify both the RPCs and the total requirements to reflect either better data or characteristics of production that are obliterated by aggregation. The higher the RPC for a particular input, the higher the possible multiplier that could associated with that industry. Modifications are usually made as the result of special surveys of industries or industry groups. While the collection of primary data are very desirable and nearly always preferred to secondary data and industrial aggregates, there are major concerns with this approach:

1. Surveys are slow and costly
2. Industries are very reluctant to complete surveys
3. Even when they do complete the surveys, they are often unwilling to be completely forthcoming about their costs.

We can supplement our models by using information from, for example, university research, the quinquennial censuses of industry in the U.S. and in our states, or actual information aggregates published by industry trade groups.

III. The Economic Assessment Process

There are several components to orchestrating an economic assessment of an industry or a region. The first is the definition of the event that we are trying to describe. We call this the study scenario. The next involves identifying and securing needed data. Finally, we have to figure out what to include and what to exclude from our analysis.

The Scenario

Scenario development is often the most difficult and frustrating part of economic analysis. Sometimes it is not. In the case of a plant closing, it would seem that the total regional economic impacts would be straightforward: a plant is closing, workers will lose their jobs, the regional economy will suffer. All of these were true statements, but all require some interpretation.

Aggregate demand from the region for the product produced by the plant may not have changed, indeed, overall production levels in the region may be constant. What we might be witnessing are production shifts to another city in the county or nearby. In this case, what has changed is the particular node at which the activity is occurring. This has been the pattern of change from much of the meat packing industry in Iowa over the last two decades. In addition, the closing of a meat packing plant, to continue the example, may have only a small impact on suppliers (beef or swine producers, primarily) in the region, so care must be taken to not infer economic change up the production stream too far.

Workers surely lose their jobs, but there are several offsets to the aggregate impacts that would accrue due to reduced household spending. Severance packages, unemployment insurance, and overall demand for labor in the region may seriously soften the effects.

And the regional economy will be affected, but sometimes not to the extent that an I-O model might predict. The point is that care must be taken to describe what is known, what is speculative, and what cannot be known about a particular economic change.

Getting the Numbers

In general, for any economic assessment there are several kinds of information that we would want to obtain:

- Information about the firm(s) that we are studying
    - Their total industrial output (gross sales)
    - Total number of employees/jobs
    - Total payroll and benefits costs
    - Production inputs, prices paid, and the percentages purchased locally
    - Whether the firm is locally owned/incorporated or not
- Information about the workers
    - Number eligible for social insurance (unemployment compensation) and the value and duration of those benefits
    - Other severances and offsets
    - Residence of the workers
- Information about the community economic structure
    - Regional distribution of jobs by industry (competitive strengths or weaknesses)
    - Recent changes in jobs and industrial activity (trends and transformations)
    - Characteristics of local trade and commerce (pull factors, change over time)
- Demographics – what's been going on with the regional population and its composition

It is very rare that we collect all of this information or report on it in our studies. Plants that are opening and plants that are closing almost never give detailed information about production costs or gross sales. When they do, they usually lie. They have no incentive to tell the truth, and they often have strong incentives to not be forthcoming at all.

Information about the workers is usually easier to get, though overall payroll costs might be obscured. In the case of a new or expanding plant, we are often given both rosy employment and compensation figures. In the case of a shut-down, the industries are sometimes belligerent about payroll information. Otherwise, characteristics of social insurance and other impact offsets can be deduced from secondary data.

Regional effects are also difficult to ascertain. Unless the plant tells us its local purchases by kind and value, we don't know whether we are specifying the model properly. Unless the plant tells us where the workers come from, we can't get a good idea of the regional trade impacts.

In most cases, especially in a plant closing, we are given simply the total jobs lost. We do the assessment using default values for that industry and that county – in effect, we have to rely on regional averages that are contained in the model.

Specifying the Region

We next need to get a good handle on the primary region of analysis. Though an industrial change is usually localized in a particular city or county, the economic effects are usually better measured if a multiple county model is specified to take into account inter-county cross-hauling of goods and services and in- and out-commuting among workers.

Occasionally we produce accounts and tables for regions that are non-contiguous. These exercises are usually done for heuristic purposes or for particular policy perspectives that do not make sense, necessarily, at the local level. We may for example construct accounts for all metropolitan and all nonmetropolitan counties in Iowa. In these cases we are trying to draw conclusions about industries in metropolitan counties. Except in these instances, they are usually frowned upon.

Interpreting the Output: Iowa's Veterinary Services

I-O models produce reams of information. All of it is useful – not all of it is useful to the client or for describing the event that we are studying. The following two tables give us an idea of some of the summary information that can be obtained from an impact/effects assessment.

In this actual study, Iowa's veterinary clinics and hospitals were measured to ascertain their overall economic value to the state of Iowa. Using a host of sources, we were able to determine the industrial output of all veterinary-related activity in the state to be $138.04 million in 1998. We also found $70.4 million in labor income (payments to workers and returns to sole proprietors), $74.3 million in value added, and 2,836 jobs in all of the veterinary facilities in the state. All of these values are summarized in Table 4 in the Direct column.

Using the model we estimated that these facilities purchased $42.3 million in Iowa-supplied inputs. These values are found in the Indirect column. To produce those inputs the suppliers required 569 jobs, which were compensated

to the tune of $14.6 million. Overall value added in indirect production was $24.2 million.

Table 4. Economic Values by Category for Veterinary Services in Iowa

	Direct	Indirect	Induced	Total	Multiplier Type I	Multiplier Type II
Total Industrial Output $	138,040,320	42,260,737	58,403,485	238,704,542	1.31	1.73
Labor Income	70,417,330	14,583,573	23,843,027	108,843,931	1.21	1.55
Value Added $	74,252,103	24,218,946	35,375,433	133,846,481	1.33	1.80
Employment	2,826.0	569.3	1,109.3	4,504.6	1.20	1.59

Workers spend their paychecks on household goods and services. When they do, they "induce" another round of regional spending. In Iowa, we estimated that the household effects or induced effects were $58.4 million in additional sales. This required another 1,109 workers who together made $23.9 million. When we add all of this up we find $238.7 million in industrial output, $108.8 million in labor income, $133.85 million in value added, and 4,504 jobs that are one way or another dependent on Iowa's veterinary clinics and services.

We also list Type I and Type II multipliers. The output Type I multiplier of 1.31 means that for every dollars worth of output in veterinary services, it had to purchase $.31 in inputs from Iowa suppliers. The labor income Type I multiplier of 1.21 means that for every dollar in labor income that the sector paid, its supplying sectors paid $.21. The Type I job multiplier of 1.20 means that for every job in veterinary services, there were 2/10^{ths} of a job in supplying industries.

The Type II multiplier for output is 1.73. That means simply that for every dollar of output in the direct column, $.73 in output was stimulated in the indirect and the induced column. A multiplier of 1.55 for labor income means that for every dollar of salary in the veterinary industries, $.55 was realized in total in the rest of the economy. The jobs multiplier of 1.59 means that for every job in veterinary services, 59/100^{ths} of a job is sustained in the rest of the economy.

Table 5 gives us the broad industry total effects that we were measuring. You will notice that the totals in this table and in Table 4 are the same. Here we have isolated the location of all economic activity that is either directly, indirectly, or through induction associated with veterinary services production in Iowa.

Excepting the veterinary sector, we find $29.6 million in service sector transactions, $21.1 million in the financial sector, $19.5 million in trade, and $13.4 million in manufacturing. In terms of jobs we see 734 jobs in services, 546 in trade, but much less in manufacturing and financial services than their output might suggest. This table gives a good idea of the broad sectors of the economy that are either dependent on or otherwise linked to the veterinary services sector in Iowa. We can use it to gauge transactions, incomes generated, or job relationships.

The I-O model provides tables in excruciating detail. Here we have summarized to 11 industry groups. In many studies we can have over 100 industrial sectors, so the ability to isolate overall economic effects in particular sectors is very high.

Table 5. Total Economic Values by Major Industry for Veterinary Services in Iowa, 1998

	Total Industrial Output	Labor Income	Value Added	Employment
Agriculture	1,148,148	359,871	496,250	13.6
Mining	8,501	2,367	5,644	0.1
Construction	2,468,477	1,253,010	1,272,580	37.4
Manufacturing	13,404,767	2,854,227	4,658,264	74.6
Transp., Commun., & Uti	9,001,278	2,438,412	5,501,139	57.2
Trade	19,492,369	9,258,006	13,498,695	546.5
Finance, Ins., & Real Est.	21,090,721	3,813,266	14,676,754	135.2
Services	29,646,349	15,755,360	16,891,418	734.1
Veterinary Services	139,243,493	71,006,540	74,885,668	2,850.6
Government	3,074,988	1,931,112	1,834,618	39.2
Other	125,451	171,759	125,451	16.1
Total	238,704,542	108,843,931	133,846,481	4,504.6

The reader will also have noticed that the tables are labeled “Total Economic Values…” Iowa’s veterinarians serve agricultural and household demand. They themselves are a production input or a unit of household consumption. They produce few goods or services that are intended for export consumption. Their particular locations are functions of concentrations and distributions of agricultural activity and of household densities. The industry, per se, does not have an economic impact in Iowa. We cannot have, for example, a

with – without scenario when we conceive of this industry. To do so would be absurd. So we carefully point out that veterinary services have an economic value to the state that is measurable and substantial.

To I-O or Not to I-O, That is the Question

Whether 'tis nobler in the mind and career to suffer the rings and e-mails of outrageous requests for assistance, or to take arms against a sea of economic developers, and by opposing end them?

Some economic events are candidates for analysis; some are not. Sorting them out is sometimes difficult. What follows are some examples of actual studies or requests for studies.

> Case: The hospital in a medium sized Iowa community is moving lock, stock, and bedpan from the center of town to a new state-of-the-art facility in an adjacent, smaller community about two miles away. We are asked to isolate the economic damage that would accrue to the original city and the region as a result of the move. We tell them that, overall, there might be more economic gains to the region than losses. They call me names and tell me that I am stupid.
>
> Case: In another Iowa city, a discount store has applied for and received assistance from the city to build a new store downtown. The city, feeling quite proud of this economic development coup would like us to do an economic impact study (they are willing to pay big bucks because they got an IDED grant to do this). We tell them that pay or no pay there is no economic impact study to be done. Why is that?
>
> Case: Grain prices have plummeted and farmer incomes have collapsed. A crisis of biblical proportions is looming. When we compare expected farm incomes with last year we see that they are projected by really reliable economists, as opposed to the other kind, to be $1.72 billion less. We are told that we are looking at a rural economic and state government revenue disaster. Strike forces are organized. Blue-ribbon panels convened. Round-tables sat at. Hands wrung. We tell them that, yes, there will be some effects but the overall economic impacts might not be too big. Over time this becomes even more evident. In fact, after awhile the outcomes are positive. Why is that?
>
> Case: For the umpteenth time, a major city floods. An enterprising reporter, with urging from the state office of disaster services, calls

asking for a summary of the economic impacts. We tell them what they are but not what they are. How could that be?

Case: Iowa's air transportation economy is studied. We look at all of the industries that constitute that sector: airports, air cargo and passenger service, business and general aviation, ticket agents and agencies, and all enterprises affiliated strongly with the process of transporting goods and people by air. The head of one major (international?) airport is outraged that I omit nearby hotels, restaurants, and car rental firms. He is upset that I omit all of the concessions within his airport in this study. He is further upset because I am very, very cautious about using the term economic impact regarding air transportation activities in the region. I tell him that he is a dunderhead. Why is this?

Case: For years, groups have called us to give them a summary of the potential economic impacts of professional golf tournaments, big Broadway-style productions, and other spectaculars that our larger cities sponsor. They call us less and less now, and I am *Les Miserable*. Why is that?

Case: In rural Iowa there is a place to which people make religious pilgrimages. What is the economic impact of redemption?

Appendix

Types I and II multipliers for Iowa industries