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Policy Uses of Economic Multiplier and Impact Analysis

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A proposal being floated by a local economic development organization predicts that a new food processing plant will add 800 jobs and $100 million to the local economy. Jobs and income will be generated at the plant and in real estate, health care, and agriculture. The plant is also touted as having a local economic multiplier of $6. As an industry policy analyst, you are asked to evaluate the proposal. To do so, you will need to understand what these values really mean, the assumptions underlying their estimation, and whether they are realistic. Your reply is important, because public and private sector leaders, the general public, and even professionals can misinterpret economic impact and multiplier analysis. Worse yet, impact studies can be used to exaggerate the benefits of policies or proposals in some cases and their costs in others.

Outlined here are issues that should be considered in conducting and interpreting impact and multiplier analysis (see Checklist). These issues should influence choice of models and interpretation of results by policy analysts. The emphasis is on the regional (multistate, state, substate, or local) level, where such studies are normally conducted.

Multiplier and Impact Analysis

Although a variety of methods can be used to generate economic multipliers, the focus here is on input-output (I-O) models as the most popular tool for such analysis. This popularity has been engendered by the growth of ready-made I-O modeling systems such as IMPLAN, where a basic knowledge of personal computers is sufficient for generating models, multipliers, and impacts.

Export base theory underlies the use of economic multiplier and impact analysis. It springs from the idea that a region must earn income to survive by producing a good or service that the outside world will purchase. The use of I-O models has caused this idea to be extended to the sales generated by any industry—whether export oriented or not. The income injected into an economy by exports has a multiplier effect, as it is respent locally. The level of respending is based on how much local businesses and consumers buy from local businesses.

Impact analysis looks at the effects of a positive or negative change in economic activity. Impact analysis is based on economic multipliers, which account for the total effect across the entire economy of the event under study. For example, impact analysis is often used to estimate the effects of a new local industry on jobs and incomes in all parts of the economy. It is also used to estimate policy or investment impacts and the total contribution of an industry to an economy.

I-O Model Construction and Assumptions

I-O models examine the market flow of products between industries, sales by industries to households and other final users, and industry use of factors of production (labor and capital). Such models can be very detailed, containing several hundred industries.

Backward Linkages and I-O Multipliers

Several different types of multipliers are generated using regional I-O models. For a given local industry, the output multiplier measures the combined effect of a $1 change in its sales on the output of all local industries. All I-O multipliers measure the strength of backward linkages or the degree to which an increase in activity by a given local industry causes additional purchases from other local industries and local resource providers. The same relationships are used in impact analysis, but the initial change in output is much larger than $1 and is usually spread across several local industries.

Multipliers are generated in I-O models based on the key assumption of fixed-proportion production functions, where input use moves in lockstep fashion with production. For example, if a poultry processor doubles production, its use of each input also doubles. This production function is based on a completely elastic supply. That is, shifts in demand only result in changes in output, with no changes in real (inflation removed) prices. Such supply curves are based on the assumption that all units of a given input are equal in quality, and there are no barriers to firms entering or exiting markets.

Similar assumptions are also made in I-O models of regional economies. For example, if a local poultry processor doubles production, its current use of regional inputs will also double. Household spending (and implicitly population) is also assumed to move in a lockstep fashion with economic activity.

Limitations of Multiplier and Impact Analysis Including Possible Solutions

Several issues can influence the interpretation of results in multiplier-based studies. These issues may lead policy analysts to do additional analysis or use alternative models. Such issues include investment or project feasibility, employment impacts, effects on current residents, considerations about capital, impacts on local government, and accounting stance. Concerns about feasibility and profitability can be particularly important in interpreting model results.

Profitability and Other Feasibility Issues

Impact analysis does not by itself address several issues related to feasibility in project (investment) analysis—the most important being profitability. A local industry with a sizeable multiplier is not necessarily profitable, and multipliers do not account for this lack of profitability. If profitability is negative, then further development of the industry is not feasible. For a particular study, it is preferable to include profitability analysis as a separate component. For multipliers in general, policy analysts should be aware that by themselves multipliers do not speak to profitability.

Second, resource constraints are often ignored in multiplier impact analysis. For example, a local community may be considering a new paper mill, but the regional timber supply does not meet mill needs. In this case, the investment may be infeasible. A solution is to expand the study explicitly to include resource impacts. Basic I-O model textbooks contain examples of approaches to environmental and energy issues, which can be used in looking at resource pressures.

Another issue related to feasibility is possible impacts on prices. In a growing economy, supply pressures may lead to big price increases often ignored in multiplier-based studies. Rapid growth could lead to upward pressure on local wages, forcing businesses to cut back on employment. Such cutbacks would mute the expansion estimated with multipliers based on the no change in prices assumption. When price pressures are significant, policy analysts should be aware that more complex models are available (such as a computable general equilibrium model, which allows for changes in prices). Alternatively, they can interpret the quantity change (such as a change in output) as an upper bound on the expected actual change. Sound judgment is required in deciding if an I-O model yields appropriate answers in such situations.

Employment Impacts

The major concern in most impact studies is the effect on local employment. Under a growth scenario, job impacts are generally based on the assumption that new jobs go to new residents, which leads to population growth. This in turn leads to increased consumer spending on local products. However, any number of factors could break this chain of events. For example, the new jobs could go to current residents (the unemployed, job upgraders, or current out-commuters). New jobs could also go to new in-commuters. In either

What are SAMs and CGEs?

A Social Accounting Matrix (SAM) provides a detailed picture of the economy but in a more complete fashion than an I-O by explicitly accounting for all market and nonmarket (such as government welfare payments to households) income and resource flows. A CGE also provides a complete and detailed picture of an economy. However, prices are free to change and thus impact product, consumption, and trade relationships. Hence, more data is used in a complex set of nonlinear equations. Consequently, eliminating the fixed-price assumption may lead to less precise model estimates.

case, the increase in local population and spending would be less than expected.

For a decline impact scenario, job losses could be less than predicted. For example, those losing their jobs could commute to work elsewhere, with no loss in population and little decline in local spending.

An integrated I-O labor market model is one possible solution to this limitation. These models use other sources of information to help determine the distribution of job changes between new and current residents. If this approach is viewed as too resource intensive, policy analysts should be aware that the projected change in employment is an upper bound on the actual change with the caveat that model predictions could be wide of the mark.

Other considerations should also be raised in evaluating employment impacts. For example: Under a growth scenario, will new jobs be permanent and full-time? Another consideration is the type of occupations that will be generated (a key determinant of desirability in many rural areas). In addition, local workers may be unqualified for the new positions, and in-migrants or in-commuters will be employed instead.

Some of these issues can be examined with an I-O model. For example, wage estimates—an important part of desirability—are imbedded in such models. An industry occupation table (matrix), showing the distribution of occupations by industries, can be used to predict the types of generated occupations. The table translates employment estimates for each industry into a group of occupations. For example, ten new jobs in a given agricultural industry directly lead to one new farm management and nine new farm laborer jobs. Coupled with information about the local labor force, the matrix can show if local individuals can fill the new occupations. Other questions such as the permanence of employment impacts can be evaluated based on knowledge of the economy and the issue at hand.

Financial and Physical Capital Considerations

Another set of issues involves financial and physical capital. In evaluating a growth scenario, the level of the new capital investment and the residency of investors (local or otherwise) may be important. A regional SAM, which extends I-O by tracing all market income flows, could be used to shed light on these issues.

In evaluating a decline in economic activity, one should consider if the facilities involved (physical capital) could have an alternative use. For example, the impacts of the closure of military bases are important concerns for local economies. Economic impact analysis could indicate a major loss in local jobs and income when the base closes. However, the base is now available for other uses that may benefit the local economy. The proper response is to also evaluate the likelihood of success and economic impact of such alternative uses.

Impact on Current Residents and Activity

The effect on current residents and economic activity is another set of issues often ignored in multiplier-based studies looking at local economic growth. The value of the current housing stock may increase, especially if the economy is already growing and the anticipated impact is large. If population growth cannot be easily absorbed, surges in economic activity may create a tax burden for current residents by increasing property values.

Population growth can also place additional pressures on other industries that should be considered. In particular, local farms may close because of subdivision growth and other population-related impacts. Environmental degradation from a new industry could also have negative consequences for existing industries.

Local Government Impacts

The effect on government services and revenues is another important consideration, especially at the local level. A new industry may place pressures on locally provided public services. An impact study of a proposed casino touted the projected increase in local tax yield, but ignored possible increases in the cost of public services (such as additional police protection). If population growth occurs, local government may have to finance new roads, schools, and other infrastructure. Likewise, residents may have to endure crowding costs (such as increased traffic) if infrastructure development does not keep up with population growth.

An integrated public service I-O model can help shed light on these issues. Such models predict changes in employment and population and then

Table 1. What are some reasonable values for local economy multipliers?

County employment size class	Average multiplier	Probable range
1,000-2,999	1.7	1.5-1.9
3,000-4,999	1.8	1.5-2.0
5,000-9,999	1.9	1.6-2.1
10,000-19,999	2.0	1.8-2.2
20,000-49,999	2.2	2.0-2.4
50,000 and over	2.2	2.0-2.5

All things else equal, multipliers will tend to be higher where: (a) the community is larger with a more diverse economy; (b) the community is a substantial distance from competitive retail/service centers; and (c) the per capita income is low. Any output multiplier larger than 2.5 should be especially examined!
Source: Mulkey, 1978.

indicate how changes in both lead to increases in the cost of publicly provided services and government revenue. If using such a model is not possible, then the tax analysis should be eliminated from the study or at least tempered by indicating that changes in the cost of government services are not estimated.

Accounting Stance

Improper accounting stance (comparison of apples and oranges) also occurs in impact studies. For example, a statement sometimes made concerning the statewide impact of an institution of higher learning is the following: "$3 of output are generated in the state economy for every $1 that we receive in state funding". The comparison is one of apples and oranges because output measures gross sales while state government revenue has some type of income as its source.

Part of the solution to such accounting stance issues is not to compare apples and oranges. Education and proper interpretation concerning the different measures of economic activity estimated with I-O models should also help eliminate this problem.

Summary

Multiplier and impact analysis indicate the level of economic activity that may be generated by a given industry or event. Although useful, limitations of such work should always be discussed. Policy analysts should consider additional efforts to shed further light on critical issues when appropriate.

Table 2. Multiplier and impact analysis checklist (concerns and solutions).

Concerns	Solutions
Feasibility:	
Profitability	Include profitability in analysis; warn that profitability is not addressed
Resource constraint	Include resource impacts in analysis; warn that resource availability is assumed
Price impacts	Use price change model; interpret quantity changes as upper bounds
Employment impacts:	
Who gets job	Use integrated I-O labor market model; interpret local resident job changes as upper bound
Type of job	Include industry-occupation analysis; use knowledge of the situation to interpret results
Capital considerations:	
Financial capital	Use model that traces capital flows; use knowledge of the situation to interpret results
Physical capital	Determine likelihood of success of alternative uses
Current versus new residents:	
Housing stock	Use knowledge of situation to interpret results
Pressure on other industries	Include resource impacts; include declines in other industries in analysis
Local government impacts	Use integrated public service model; omit tax analysis; indicate public service impacts not considered
Accounting stance	Do not compare apples and oranges; properly interpret different variables

For Further Information:

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