

Determining Economic Contributions and Impacts: *What is the difference and why do we care?*

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Abstract. Economic contribution and impact studies are common tasks for regional economists, but the semantics of the discipline suffer from a lack of standardization with respect to differences between economic contributions, impacts and benefits. These terms refer to 3 distinct metrics which are useful for answering different questions and each has situations when their use is appropriate. This article provides a pedagogical and methodological framework for how and when these terms should be applied in the context of regional economic analysis. Past studies are reviewed and a standardized semantic is presented. It is recommended that economists working in this field use a more explicit and unified terminology and methodology when conducting regional economic analysis.

1. Introduction

Researchers working in the field of regional economics are often asked to determine the economic contribution, impact, or benefit of various industries, events, or policies in a given region. Local decision-makers come to regional economists seeking answers about how policy changes will affect their economy and use such numbers in the educational or political campaigns to inform policy decisions or garner support for a specific position or business strategy.

However, the terms 'contribution', 'impact', and 'benefit' are often used interchangeably in these studies and there is a great deal of confusion as to how these should be applied in a regional economic analysis (Crompton 1993, Frechtling 1994, Aruna et al. 1997, Moore and Barthlow 1998). This is particularly problematic in situations that are political in nature, given that the inappropriate or inconsistent use of some terms may be misleading. Economic contribution, economic impact, and economic benefit are separate terms for distinctly different metrics and the analysis of each of these, taken separately, may all be perfectly reasonable studies to perform. Therefore, it is imperative that researchers be explicit in their terminology and methodology and that what constitutes a contri-

bution, impact, or benefit in a study must be consistent across the discipline.

The degree of variation in methods and semantics of regional and industry economic analysis has confounded the comparability and interpretation of results (Hudson 2001). A great deal of the debate could be avoided if a well defined semantic were to be employed for the science of regional economic analysis and if practitioners were to explicitly state the type of analysis they are performing. For the purposes of standardization and to foster greater credibility for applied research results with respect to economic principles, the authors propose a terminology for regional and industry economic assessment and then suggest when each is an appropriate method of research.

2. Case in Point

The January 26, 2006, edition of the Missoulian newspaper (Missoula, Montana) ran an article that highlights the scope of the problem. The article reports how a consulting economist was forced to adjust down the estimate of the economic impact of restoring wild salmon runs in Idaho after an independent re-

view of the study estimated the impact at \$7 million, down considerably from the initial \$544 million. How can two seemingly qualified economists arrive at such widely disparate numbers? Aside from simple dishonesty or poor methodology, is it possible for two economists to, in good faith, come up with such different results. In fact, there are likely numerous cases where economists conduct distinctly different economic analyses with different methods but one may erroneously label the results as an “economic impact” (or worse, an “economic benefit”) when it should be labeled an “economic contribution”.

The bulk of the \$544 million dollars was estimated based on recreational fishing expenditures for the wild salmon. In the initial study all expenditures by all types of anglers, both local and non-local, were included. No concessions were made for the fact that if local anglers go salmon fishing more often, they will likely do some other activities less often (such as trout fishing). Public policies that either promote or harm salmon habitat are not likely to have any affect on local resident’s disposable income or total allotment of leisure time. Additionally, no adjustments for retail margins of fishing related expenditures and expenditures that were likely made outside the study area were included in the analysis. Not surprisingly, changing these assumptions can greatly alter the final answer obtained.

What figures actually belong in this type of study depend greatly on how the researcher defines the terms in the study. Obviously, if a researcher takes credit for every dollar that can even remotely be linked to an activity, then that number will be higher than a researcher who conservatively includes only expenditures that constitute new dollars being brought into the region that would not otherwise exist. What is appropriate to include depends largely on whether the analyst is conducting an economic contribution analysis, an economic impact analysis, or cost-benefit analysis.

However, what is and is not included in a regional economic assessment and whether a contribution, impact, or cost-benefit analysis is conducted is not always simply a matter of preference. There are times when only one is the appropriate answer to the question at hand. Thus, it is the best practice to explicitly state what type of analysis is being performed and what is being included in the measure of direct effects and how the regional model is being estimated.

The bulk of the issue centers on 1) what direct expenditures or values to include, 2) the appropriate methodology to perform the analysis of regional effects (such as input-output, computable general equilibrium, social benefit/cost ratio, net present value, etc.)

and 3) the geographic scale of the analysis. In-depth discussion of techniques for choosing the appropriate estimation methodology and geographic scale are beyond the scope of this paper (see Miller and Blair 1985, Davis 1990, or Shaffer et. al 2004 for more discussion of methods). Consequently, the discussion will be limited to what types of expenditures are appropriate for inclusion as direct effects in different types of regional economic analysis.

To this end it would be beneficial if regional scientists would agree on a tightened definition for what constitutes a regional economic contribution or impact and how these differ from an economic benefit. The goal of this paper, then, is to provide a semantic for regional economic analyses and describe the different expenditures that belong in each of these types of studies.

3. Definitions

For the purposes of clarity, standardization, and conformity to regional science, the authors propose the following terminology for regional economic analysis (Table 1). The terminology initially diverges into two broad distinctions, those that measure economic activity and those that measure economic benefits. Economic activity measures actual expenditures and how those cycle through the region’s economy. The first three terms: economic contribution, regional gross domestic product (GDP), and economic impact, are all different measures of economic activity. The term economic benefit is not solely a measure of economic activity, but rather a measure of social welfare. This paper will focus primarily on measures of economic activity and will only touch on economic benefits in order to distinguish them from the former.

3.1 Economic Contribution

The term ‘economic contribution’ will be used to address the broader and more general case of the how the economic activity cycles through the region’s existing economy. An economic contribution is defined as the gross changes in a region’s existing economy that can be attributed to a given industry, event, or policy. If the analysis is to be performed with a standard Input-Output Model (IOM) then the appropriate measure of economic activity is total final demands (Miller and Blair 1985). If the analysis is to look at the effects of changes in output of an industry rather than final demands, then a Mixed Exogenous/Endogenous Variables Input-Output Model or an appropriately speci-

Table 1. A Definition of Terminology for Regional Economic Analysis

Term	Definition
Economic Activity	Dollars spent within region that are attributable to a given industry, event, or policy.
Economic Activity Analysis	An analysis that tracks the flow of dollars spent within a region (market values). Both economic impact and economic contribution analysis are types of economic activity analysis.
Economic Contribution	The gross change in economic activity associated with an industry, event, or policy in an existing regional economy.
Economic Impact	The net changes in new economic activity associated with an industry, event, or policy in an existing regional economy.
Economic Benefit	A net increase in total social welfare. Economic benefits can be both market and nonmarket values.
Cost-Benefit Analysis	An economic efficiency analysis that measures net changes or levels in social welfare associated with an industry, event, or policy. This type of analysis includes both market and non-market values and accounts for opportunity costs.
Input-Output Model	A specific methodological framework that characterizes the financial linkages in a regional economy between industries, households, and institutions. Input-Output only measures economic activity and does not include any nonmarket values.

fied Computable General Equilibrium model (CGE) is necessary (Steinback 2004)¹.

Contribution analysis is a descriptive analysis that simply tracks the gross economic activity of the given event, policy, or industry as the dollars cycle through the region's economy. Policies or events can be analyzed for the extent to which they increase or decrease the gross economic activity of a given industry in a given region. An economic contribution analysis says nothing about how spending on one industry may crowd out spending in another industry. This type of analysis is arguably the most common analysis that is performed and is very often mislabeled as an "economic impact".

Spending by people who are explicitly participating in activities associated with the industry's output represents a "stemming from effect" and could also be considered a direct effect of the industry. For example, people who come to the golf course and spend \$10 on lunch at the restaurant across the street are a stemming from effect of the golf course operations. The contribution analysis would then follow the direct economic activity and associated stemming from effects through the regional economy. The economic model is built to represent the structure and degree of interconnectedness in the regional economy with the output of each sector broken down and attributed to expenditures on intermediate inputs or to value-added components such as labor, taxes, and returns to capital. Output multipliers, which are sector and region specific, are derived from the appropriate model and relate an industry's economic activity (or changes in the industry's economic activity) to gross sales in the other sectors of the regional economy. The direct effect multiplied by the sector's multiplier for that re-

¹ This paper is primarily concerned with discussing terminology, not methodology. Therefore, there will be little discussion here of the distinctions or appropriateness of output versus final demands as a metric for economic activity under different situations. This, however, is an important issue for how many industries whose output is further processed locally (such as fisheries and forestry) are modeled. For further discussion see Steinback 2004.

gion gives the total economic contribution of the industry to the regional economy.

The contribution analysis simply looks at the actual regional data and the current linkages that exist within the economy. The purpose of the analysis is to determine how much economic activity was associated with the industry, event, or policy. It is a “just the facts” type of analysis and is based on exploring the revealed preference of how people spent their money.

When related to an existing industry, a contribution analysis may provide evidence of how relatively large a sector is in the existing economy and how much economic activity is being cycled through the economy by a given industry. The contribution analysis does not account for the fact that if the person that came to golf was a local, then the \$10 they spent on lunch potentially represents \$10 they are not spending at another restaurant elsewhere in the town. The direct effect in a contribution analysis includes purchases by local consumers and non-local consumers and is neither a measure of changes to the region’s economic base nor a measure of the value added to the region above what was paid to input suppliers.

3.2 Regional GDP

GDP can be defined as the sum of all value added at every stage of production within a defined region. A regional GDP analysis examines the fraction of the region’s total value added for which a given industry accounts. Thus, a regional GDP analysis is a subset of the full contribution analysis and represents a more conservative analysis of the role of a given sector in the regional economy. Linking the analysis to a more commonly understood concept like GDP provides additional theoretical grounding and gives additional perspective to the results. This type of analysis can easily be performed through the use of a ‘value-added multiplier’ that is calculated in ready-made regional Input-Output models such as IMPLAN².

Therefore the total direct contribution to GDP of an industry is the value of the sector’s output that is above what is paid to intermediate inputs. An appropriate regional economic model would then be employed to generate a value added multiplier which determines the value added generated in the regional economy from each dollar of value added generated by the given sector.

For example, if the restaurant sells a \$10 lunch to a golfer but pays \$6 for the meat, bun, and cheese, then the value-added of the hamburger is \$4. The \$6 in intermediate inputs represent either expenditures to another local sector, which will be accounted for in the multiplier, or represent money paid to out of region suppliers, which would then not cycle through the regional economy. Notice we are still not saying that \$4 would have been lost to the regional economy if this lunch had not been purchased; no concessions for substitutes exists in this analysis.

3.3 Economic Impact

An ‘economic impact’ should be reserved for the narrow results where an industry, event, or policy has the result of either: 1) bringing new revenues into the region that would otherwise not occur in the region or 2) keeping revenues in the region that would otherwise be lost to the region. Economic impacts are defined as the net changes to the economic base of a region that can be attributed to the industry, event, or policy that would otherwise not be there. Measure of the direct effects in an economic impact analysis consist of the value added portion of revenues that are generated by an industry from sales outside the region (exports), the value added portion of sales to visitors that come to the region (tourist spending), and the value added from locals who would have spent their money on goods from outside the region had the industry not been present inside the region (import substitution). Positive economic impacts may potentially also arise from the additional value added portion of revenue that is kept in the economy by a local’s expenditures in an industry which is more connected to the local economy relative to their second choice substitute. Figures that should be included in an economic impact should be limited to cases that constitute new dollars being brought into the region or dollars kept in the regional economy that would otherwise leak out. In short, economic impact is the best estimation at what economic activity would likely be lost from the local economy if the event, industry, or policy were removed.

This, obviously, is a much more complicated and exclusive way to perform a regional economic analysis but one that really attempts to get at the net effects of an industry, event, or policy on a region’s economic base. This method also requires more data than does a contribution or even GDP analysis. It may require more elaborate models (such as a properly specified CGE) or the ability to estimate people’s likely behavior had they not purchased this good or service and then

² IMPLAN is a computer based regional input-output economic impact and contribution assessment modeling system (www.implan.com).

subtracting this scenario from the “gross” economic measure of the industry, event, or policy.

A well done impact analysis should also be able to get at some measure of net gains in regional economic activity and requires information on how people will substitute other activities, purchases, or employment in the absence of the primary study industry; something rarely available unless primary data is collected to augment available secondary data. An economic impact of an increase in an industry’s economic activity, therefore, could potentially be negative whereas the economic contribution of additional economic activity of an industry is always positive.

This can be seen, for example, if a local baseball stadium is renovated and subsequently generates an additional \$100,000 a year in output. An economic contribution analysis can be performed to determine how this \$100,000 cycles through the regional economy. Further analysis, then, determines that all this additional revenue comes from local people (people within the study area) and that these people would have all gone bowling had they not gone to the ball park. It is also determined through the economic model that the bowling industry is actually more interconnected to the region’s economy and that the \$100,000 in spending at the ball park actually leaks out of the region more quickly than does the same revenue spent in the bowling sector. In this simplistic and hypothetical situation, the increase in the economic contribution associated with the ball park, then, could actually have a negative regional economic impact after substitutes are netted out.

It must be explicitly stated that an economic impact does not equate to any measure of net welfare change and that an economic impact analysis is not the same as a benefit-cost analysis. There is no way to say how much “better off” the local people were made due to the renovation of the ball park. The only thing the analysis can say is that the local people choose to spend their money by going to the ball park, that money then cycles through the economy in a specific way, and that if they had spent their money on what was determined to be the most likely alternative, the money would have cycled through the economy in the alternative way. To answer questions of how people are made “better off” it is necessary to determine net benefits which are very different from economic contributions or even impacts.

4. A Cursory Look at Economic Benefits

The term economic benefit is often mistakenly interchanged with economic impact (Frechtling 1994). An economic impact is still a step away from an eco-

omic benefit as impact analysis is only concerned with what takes place in the given study area and only counts actual market transactions. Thus economic impact and contribution studies are useful for looking at distributional effects of the economic activity associated with industries, events, and policies, but can not look at welfare measures such as changes in consumer surplus, equivalent variation, or compensating variation. For this reason the authors will collectively refer to contribution, GDP, and impact analysis as types of activity analysis.

The term ‘economic benefit’ is reserved for an entirely different type of analysis: a cost-benefit analysis. Cost-benefit analysis is an economic efficiency analysis that, unlike economic activity analysis, is concerned with overall economic efficiency and social welfare measures. For example, Colorado’s wine industry has a positive economic impact on the state of Colorado because the local purchase of wine that is produced in Colorado displaces some of the wine that would have otherwise been purchased from California, other states or imported from other countries. This is not necessarily a true benefit in the economic definition of this term because California is made financially worse off by the same amount that Colorado is made financially better off. This could be a true benefit, however, if consumers’ total utility is enhanced by the availability of local wines. Most cost-benefit analyses follow the Kaldor-Hicks criterion, also known as the potential pareto efficiency rule, which implies that actions are only warranted in cases where those parties who gain can fully compensate those who are made worse off, and still be better off themselves (Boardman et. al, 2001). However, economic activity analyses focus on a certain region, thus little thought is given to those individuals outside of the study area.

Likewise, the economic contribution of the Arapahoe-Roosevelt National Forest in Northern Colorado is likely to be very small because there is little commercial logging or mining and recreational users are not required to pay to use the trails. Subsequently, there is little economic activity that is generated in the market from the National Forest being there. The social welfare benefit, however, may be very large as the participants may have a very large willingness to pay for the associated recreation. Therefore, the welfare gain from the National Forest may be immense. Additionally, the benefits of the forest will include less tangible goods such as ecosystem services and nonuse values. In summary, the term benefit should be reserved for welfare and cost-benefit analysis and should not be employed in contribution or impact analysis. There are many subtleties and nuances associated with benefit-cost analysis concerning measuring benefits and

costs, the likes of which are beyond the scope of this paper on regional economic activity analysis, but warrant future investigation. The issue remains that the two types of analysis are different and different terminology and “framing” of discussion should be employed respectively.

5. The Importance of Study Area Size

Another important parallel consideration in conducting regional economic impact and contribution studies is the size of the study area selected. The size and boundary of the study area will affect the results of an economic contribution or impact analysis in two fundamental ways: by affecting the size of the multiplier and by affecting the total economic activity associated with the study area, thereby affecting the relative size of the contribution of a given industry.

Multipliers are a function of the structure of the local economy and the size of the multiplier depends directly on the ability of the local economy to retain revenues generated locally within the region. If a study area has a large, broad and diverse local economy it is likely that it will have the ability to retain these revenues longer as there are more opportunities for households and industries to purchase good and services from local suppliers. If a local economy is not very broad or diverse, it will not be as likely to have the structural capacity to recycle revenues through the economy. Small regions generally do not have highly diversified economies and must import a great many of their goods and services. The necessity to import these goods and services represent leakages from the local economy and serve to lower a region’s economic multiplier.

Using a very large study area will almost certainly increase the economic multiplier by including a more diversified set of industries. Large regions (especially if they include a large city) contain an increased number of suppliers of goods and services, which then allow for more local purchases within the study area.

Choice of study area size will also influence the relative importance of various industries in a region. Choosing a relatively small study area will make whatever industries are in that region look very important. Choosing a very large study area will dilute the effects of locally important industries. Therefore, choosing a large study area, while making the multiplier larger, may also serve to diminish an individual sector’s relative importance in a specific region.

The importance of study size choice is often overlooked in regional impact and contribution analysis. An analyst can manipulate results of these studies in numerous ways simply by changing the area of analy-

sis. Generally a higher multiplier for a given industry can be obtained simply by increasing the study area size or the relative importance of a given industry can be enhanced by simply reducing the study area to a smaller region. Choosing the appropriate scale and size of the analysis region must be considered carefully and justified for the purposes of the analysis. For example, if the question at hand involves how the output from the logging industry in a small town ripples through the regional economy then a larger study area is the appropriate choice. On the other hand, if the relevant question involves the impacts of the logging industry on the income of the specific small town adjacent to the National Forest, then a smaller study area is the appropriate scale for the economic impact and contribution analysis.

6. Policy Implications

Economic contribution and impact analyses are often used to inform public policy and by interested parties with a vested interest who are lobbying for a certain outcome. The different factions may employ their own economists to analyze the “economic impact” of the industry, event, or policy. Policy makers, researchers, and governmental organizations themselves may also conduct a regional economic assessment for their own purposes. The result can be multiple models with differing results based on the methodology and the quality of the analysis. This can be both confusing to the public and harmful to the credibility of regional economic analysis, however it may also be helpful at getting to the heart of complex issues and bringing out real nuances and subtleties of the issues at hand may encourage more thoughtful discussion.

Sporting events and new stadium construction are often claimed to bring much needed revenue to the region. However, analysts such as Porter (2001) use the more circumscribed methods of economic impact analysis to show that the net impact of such an event can be significantly smaller, and may be reduced to zero. Proponents of large events and stadium development consistently prefer economic contribution studies because of the larger numbers may make for better headlines and may help their cause. Only when someone is willing to insist upon an economic impact analysis will the more accurate and conservative estimate enter the debate.

However, even if a sporting event or a new stadium construction is shown to have no impact on the total economic activity generated in a city, there may be new net economic activity (and therefore an actual impact) that will occur in a specific area of the city. If

that area is a previously economically depressed area, then the support of the stadium may potentially be desirable for "urban renewal" purposes. Because economic contribution and impact analysis are performed on a specific geographic area that is determined prior to conducting the analysis, then how that geographic area is defined will have profound implications on the results. A new stadium may have no affect on net economic activity in a city, but it may generate increased net economic activity in a deteriorating section of the downtown (Weiler 2000). Therefore the economic impact of the stadium on the city as a whole may be zero, but the economic impact on the section of downtown may be sizable.

Additionally, people may or may not be made better off in ways that are not fully tractable by the economic activity (dollars spent) in a region credited to the new stadium or sporting event. Many of the locals may be made "better off" by being able to go to the event or new stadium and they are "happier" spending the \$100 on the sporting event than they would be spending the same \$100 on the closest substitute activity. If this is the case, then the actual economic activity in the city has not been changed but the net benefits to the local population have increased.

7. Conclusion

It is the hope of the authors that an explicit and consistent semantic will be adopted by practitioners of regional economic activity analysis. This paper is an attempt to present a standard set of terminology for use in regional economic assessments. This terminology coupled with a thorough description of methodology and assumptions used in a given study will serve to reduce the confusion and misuse of regional economic analysis. Moreover, the short set of examples may prompt Extension programmers to integrate economic impact and contribution discussions into planning and prioritizing exercises with regard to traditional and new clientele groups as outreach programming targets new topic areas. This is particularly relevant given the emerging role of economic development in Land Grant and government agency missions, and the renewed call for local-based industry development in rural America.

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References

- Aruna, P.B., Frederick Cabbage; Karen J. Lee and Clair Redmon. 1997. Regional economic contributions of the forest-based industries in the South. *Forest Products Journal* 47(7/8):35-45.
- Boardman, A. E., D. H. Greenberg, A. R. Vining, and D. L. Weimer. 2001. *Cost Benefit Analysis: Concepts and Practices*, Second Edition. New Jersey: Prentice Hall.
- Crompton, John L. 1993. Economic impact analysis: Myths and misapplication. *Trends* 30(4):9-13.
- Davis, H. 1990. *Regional economic impact analysis and project evaluation*. Vancouver: UBC Press.
- Frechtling, Douglas C. 1994. Assessing the impacts of travel and tourism: Measuring economic benefits. In: J.R. Ritchie and C. Goeldner (eds.) *Travel, Tourism and Hospitality Research*, revised edition. New York: John Wiley and Sons.
- Miller, R.E. and P.D. Blair, 1985. *Input-Output Analysis: Foundations and Extensions*. Prentice-Hall, London.
- Moore, R. L. and K. Barthlow. 1998. The economic impacts and uses of long-distance trails: Featuring a case study of the Overmountain Victory National Historic Trail. National Park Service. Washington, D.C.
- Porter, P. 1999. Mega-sports events as municipal investments: A critique of impact analysis." In J. Fizele, E. Gustafson, and L. Hadley (eds.) *Sports Economics: Current Research*. Westport, CT: Praeger Press.
- Shaffer, R., S. Deller, and D. Marcouiller. 2004. *Community economics: Linking theory and practice*, Second Edition. Blackwell Publishing.
- Steinback, S. 2004. Using ready made regional input-output models to estimate backward-linkage effects of exogenous output shocks. *The Review of Regional Studies* 34(1):57-71.
- Weiler, S. 2000. Pioneers and settlers in Lo-Do Denver: Private risk and public benefits in urban redevelopment. *Urban Studies* 37(1):167-179.