or whomever, and start a monitoring program. The process has caught fire in Montana where ranchers realize the importance of monitoring. Through the efforts of the Governors Rangeland Resource Executive Committee, Montana Riparian Association Education Committee, Montana Stockgrowers Association, Montana Public Lands Council, and Montana Association of State Grazing Districts, ranchers are becoming very active in developing monitoring projects.

One example is the Badland, Buggy Creek, North Valley County, and Willow Creek Grazing Districts in northeastern Montana. A workshop was conducted in mid-July 1992 by Montana State University, BLM, and SCS individuals. Individual ranchers then spent the remainder of the week setting up plots on their individual ranches.

In addition, the Highwood Mountain Grazing Association in central Montana, held a workshop which dealt with riparian area monitoring in August of 1992. Plans are already underway for a monitoring workshop in July of 1993 with the Williams Coulee Grazing District also in central Montana.

There are no longer glazed looks when monitoring is mentioned. Instead, the response is one of interest, curiosity, and genuine appreciation that there is something ranchers can do to insure themselves a future.

Economic Multipliers: A Comment

E. Bruce Godfrey and Martin K. Beutler

An article by Martin K. Beutler in the February 1992 issue of *Rangelands* entitled "Economic Multipliers" contained many of the basic ideas associated with the use of this concept. However, a major reference was omitted (Figure 1 was from the publication by Coppedge and Youmans 1970),¹ some important items were not covered in the article, and some relevant references were not included. This article was written to eliminate these deficiencies.

Type of Multiplier

The article by Beutler emphasized income multipliers. Other multipliers can also be developed and used. The most common include output, value-added, and employment multipliers. The different types of multipliers are not interchangeable because they measure different variables. As a result, the type of multiplier used must be appropriate to the impact of interest (e.g., income, sales, employment).

Size of Multiplier

A commonly misunderstood concept concerns the size of a multiplier. Empirical estimation is the only valid way to determine the size of a particular type of multiplier for a specific area or region because each region has different "leakages" (leakages represent the degree that local purchases—imports—are made "outside" the region), but the following generalizations will be valid for most areas.

First, income multipliers should rarely be larger than 2.0, especially for small regions where leakages are commonly large. The exception to this general rule will

occur when the personal income in a sector is small and it purchases a large portion of its inputs from other local businesses. An output or employment multipliers for a particular sector or industry will usually differ from the income multiplier for that industry and may be greater than 2.0.

Secondly, because small regions generally have high leakages, their multiplier(s) will usually be smaller than those of a larger more self-sufficient region. For example, a multiplier for a state will generally be larger than the multiplier for any region within a state.

Third, "basic" sectors will generally have the largest multipliers. These "basic" industries generally purchase a high portion of the inputs (e.g., labor, natural resources) from locally *owned* businesses, and their sales are primarily to "outsiders." An industry that purchases most of its inputs from outside the region (large leakages) would have a smaller multiplier than a sector that relies more on locally owned resources. Conversely, a new firm that did not increase exports but simply took business from existing firms would have a very small multiplier effect (*net* effect in the region), even if the sales associated with this firm were relatively large.

Fourth, if the structure of a regional economy changes (e.g., a new industry or major firm is established or leaves an area), the multipliers that existed before the change will generally no longer be valid.

Measurement of Change

A commonly misunderstood concept associated with multipliers concerns whether they represent marginal or average values—most are average values. As a result, the total impact of a marginal change will commonly be overestimated when an average multiplier is used.

Multipliers include the direct as well as indirect effects

Utah State University Agricultural Experiment Station journal paper 4394. This reference was inadvertently omitted from the original article. Beutler offers his apology for this omission.

of a change. Thus, an increase in rancher income of \$1,000 times a multiplier of 1.5 gives a *total* impact of \$1,500 in a region.

Estimation of Multipliers

At one time, it was very expensive to estimate economic multipliers because primary data had to be collected for all types of business in an area. Improved computer technology and research have made this task much easier today. The most common method used to estimate multipliers is an input-output (I/O) model, but other methods are also available (e.g., location quotients, economic base studies). Most regional I/O models are constructed using national data that have been adjusted for local conditions. I/O models that use adjusted data have usually vielded results that are comparable to those that are based on survey data. Even though widely used and easily accessible I/O models, such as IMPLAN (IMPLAN Development and Support Group 1992) that are based on nationally adjusted coefficients, have been criticized (Keith 1982, Taylor and Fletcher 1992, and Borgen and Cooke 1992), they are generally the most cost-effective means of estimating the economic multipliers for an area.

Application

The most troublesome problems associated with economic multipliers involve their misapplication and inappropriate use (publications by Lewis et al. 1979, Shaffer 1989, Taff 1988, and Fjeldsted 1990 outline many of these problems).

In most cases, impacts may be relatively large at the regional level but relatively small in a larger context (e.g., the nation) because increases in activity in one region are commonly offset by decreases in activity in another region. Thus, the region(s) selected for analysis affects the multipliers as well as the relative impact of the action(s) being evaluated. Conversely, changes in local activity may be important even if they have little impact in a larger region (state or nation). This is especially true when one is trying to determine who is benefitted or harmed by a particular action or policy (Godfrey 1985).

Conclusion

When used properly, regional economic models and their associated multipliers provide information that is not available from other sources and are an important tool in determining the winners and losers from an action or change in policy.

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