AE Staff Paper AE94004   June 1994

ECONOMIC AND FISCAL IMPACT ASSESSMENT

F. Larry Leistritz

ECONOMIC AND FISCAL IMPACT ASSESSMENT[1]

F. Larry Leistritz[2]

When major resource or industrial development projects are proposed or when *policy* changes that will substantially affect *patterns* of economic activity and resource use are considered, decision makers are increasingly requesting analyses of the socioeconomic impacts that may result. The *socioeconomic impacts* of development projects and programs have been categorized in a number of ways. One classification of such impacts identifies (1) *economic* impacts (including changes in local employment, business activity, earnings, and income), (2) *demographic* impacts (changes in the size, distribution, and composition of the population), (3) *public service* impacts (changes in the demand for, and availability of, public services and facilities), (4) *fiscal* impacts (changes in revenues and costs among local government jurisdictions), and (5) *social* impacts (changes in the patterns of interaction, the formal and informal relationships resulting from such interactions, and the perceptions of such relationships among various groups in a social setting) (Leistritz, Murdock 1981; Leistritz, Ekstrom 1986; Murdock *et al.* 1986).

This paper provides a brief overview of the conceptual bases, methodological alternatives, and assessment techniques that are commonly used to assess two of these categories of impacts (i.e., economic and fiscal impacts). In addition, the importance of economic and fiscal impact assessment to policy making and impact management is discussed, and the likely future of the field is described.

ECONOMIC IMPACT ASSESSMENT

The purpose of an economic impact assessment is to estimate changes in employment, income, and levels of business activity (typically measured by gross receipts or value added) that may result from a proposed project or program. As with assessment of other categories of impacts, the general approach involves projecting the levels of economic activity that would be expected to prevail in the study area with and, alternatively, without the project. The difference between the two projections measures the impact of the project.

Conceptual Bases

Export base theory (also termed economic base theory) provides the conceptual foundation for all operational economic impact assessment models. A fundamental concept of export base theory is that an area's economy can be divided into two general types of economic units. The basic sector is defined as those firms which sell goods and services primarily to markets outside the area. The revenue received by basic sector firms for their exports of goods and services is termed basic income. The remainder of the area's economy consists of those firms which supply goods and services primarily to customers within the area. These firms are referred to as the nonbasic sector or sometimes as *residentiary* or *local trade* and *service* activities.

A second key concept in export base theory is that the level of nonbasic activity in an area is uniquely determined by the level of basic activity. A given change in the level of basic activity will bring about a predictable change in the level of nonbasic activity. This relationship is known as the *multiplier* effect. Thus, export base theory emphasizes external demand for the products of the basic sector as the principal force determining change in an area's level of economic activity.

The basis for the multiplier effect is the interdependence (or linkages) of the basic and nonbasic sectors of an area's economy. As the basic sector expands, it requires more inputs (e.g., labor and supplies). Some of these inputs are purchased from local firms and households. As the firms in the nonbasic sector expand their sales to the basic sector, they too must purchase more inputs, and so on. Increased wages and salaries paid to labor and management by the basic sector, together with similar payments by the nonbasic sector, lead to increases in the incomes of area households.

Some of this additional income is spent locally for goods and services, some is saved, and some leaves the area as payments for imported goods and services (or as additional tax payments to government). To the extent that additional income is spent locally for goods and services, the output of local firms is increased; additional cycles of input purchases and expenditures result. This cycle of spending and respending within the local economy is the basis for the multiplier effect (Leistritz, Murdock, 1981).

The magnitude of the multiplier effect is determined by the proportion of a given dollar of additional income that is spent locally. High multiplier values are associated with high levels of local spending, which in turn imply a diversified, relatively self-sufficient economy. Larger regions tend to have higher multiplier values.

Assessment Methods

When estimating the magnitude of secondary economic effects (resulting from the multiplier process) for a specific project in a given area, most analysts employ either an *export base model* (employment or income multipliers) or an *input-output (I-O) model*. In recent years, input-output models have been applied with increased frequency in impact assessment. Some reasons for the increasing use of I-O models are (1) this technique provides more detailed impact estimates (e.g., business volume and employment by sector) than other approaches and can better reflect differences in expenditure patterns among projects, and (2) data bases and data management systems are now available that enable development of I-O models tailored to local conditions, but based largely or totally on secondary data.

Commonly used I-O models of this type include REMI (Treyz *et al.*, 1977), RIMS (U.S. Department of Commerce, 1992), and IMPLAN (Alward *et al.*, 1989). Recent evaluations of these and similar I-O models are provided by Crihfield and Campbell (1991) and by Brucker *et al.* (1987). For examples of studies that apply input-output models in the analysis of various projects and programs, see Mortensen *et al.* (1990), Mulkey and Clouser (1991), and Bangsund and Leistritz (1992).

Practical Problems

Whatever modeling system is used, the analyst will need specific information about the proposed project to prepare an assessment of its economic impacts. The magnitude and distribution of impacts from any project depend on many factors, but among the most important of these are: (1) work force requirements, including temporary vs. permanent workers, timing of employment patterns (e.g., duration of construction periods), earnings, and skill requirements; (2) capital investment; (3) local input purchase patterns; (4) output; and (5) resource requirements (Murdock, Leistritz, 1979; Leistritz *et al.*, 1982). Obtaining reliable information on these topics can be a major task and may require not only extensive consultation with project officials but also examination of experience in developing analogous projects in similar areas. On the other hand, much of the information is useful in assessing other impact dimensions as well.

History

Interest in the economic base concept goes back more than 60 years (Haig, 1926; Hoyt, 1933), while the input-output model concept can be traced to the works of Leontief (1936, 1941). Early work on the export base concept emphasized alternative

methods for estimating employment and/or income multipliers (Gillies, Grigsby, 1956; Levan, 1956; Tiebout, 1962; Ullman, Dacey, 1960), while more recent work has included estimation of disaggregated multipliers (i.e., separate multipliers for each basic industry) (Weiss, Gooding, 1968; Braschler, 1972; Bender, 1975).

The initial development of input-output (I-O) models was at the national level (Leontief, 1941), and subsequent work was directed at estimating I-O models for states and regions (Isard, 1951; Miernyk, 1965; Roesler et al., 1968). State and regional input-output models have been developed both from primary data (from surveys of firms and households in the study area) and from secondary data (by adjusting national coefficients), as well as by methods using a combination of primary and secondary data. (For an example of the latter approach, see Henry et al., 1980.)

Another trend in the development of economic impact assessment methods and models has been the development of integrated assessment models that incorporate multiple impact dimensions (e.g., economic and demographic). The initial models of this type were developed during the 1960s, primarily for use as regional planning tools (Hamilton et al., 1969). Development of such integrated assessment models was rapid during the 1970s and early 1980s, largely in response to needs related to assessing the impacts of large-scale development projects (Leistritz et al., 1986). These models often incorporated economic, demographic, public service, and fiscal impact dimensions and allowed for rapid analysis of alternative scenarios. More recently, demands for assessments of large-scale projects have been less frequent (at least in North America), and so the degree of interest in large integrated assessment systems appears to have lessened.

FISCAL IMPACT ASSESSMENT

The purpose of fiscal impact assessment is to project the changes in costs and revenues of governmental units that are likely to occur as a result of a development project. The government units of primary interest are those local jurisdictions that may experience substantial changes in population and/or service demands as a result of the project.

The fiscal implications of a new project are determined by the interactions of a number of factors, including project characteristics (e.g., the magnitude of investment, the size and scheduling of the work force) and site area characteristics (e.g., state and local tax structure, the capacity of existing service delivery systems) and by the nature of the economic and demographic effects resulting from the project. Further, because the fiscal impacts of a project are of considerable interest to

local officials and their constituents and to developers, the fiscal impact assessment should be designed to produce information in a form that is most useful to policy makers (Leistritz, Murdock, 1988).

Issues Related to Fiscal Impact Assessment

Some issues that frequently concern policy makers relate to the distribution of project-related costs and revenues, both over time and among jurisdictions, and the risks to which the local government may be exposed because of uncertainty regarding the future of the project and/or the nature of its impacts. The problem of cost and revenue timing, frequently referred to as "the front-end financing problem," arises because during the early years of a project, local public sector costs frequently increase more rapidly than project-induced revenues. While project-related revenues may exceed project-related costs over the life of the project, local jurisdictions may face short-run cash flow problems.

These problems can be exacerbated if local governments are unable to obtain funds to offset revenue shortfalls through borrowing. Uncertainty associated with a proposed project also may discourage local officials from incurring financial obligations, even though borrowing might seem a logical approach to financing new infrastructure. Questions concerning (1) whether a project will actually be developed, (2) whether it may be abandoned prematurely, and (3) what the actual magnitude and distribution of project-related growth will be may make local officials reluctant to make commitments.

The interjurisdictional distribution problems may be as severe as those associated with cost and revenue timing. The project facilities that generate most of the new public sector revenues may be located in one county while most of the project-related population lives in a different school district, county, or even a different state. Fiscal impact assessments should be designed to identify these intertemporal and interjurisdictional distribution problems in advance so that decision makers can devise strategies for coping with them. (For more detailed discussions of these coping strategies, see Leistritz et al., 1983; Leistritz, Murdock, 1988.)

Fiscal Impact Assessment Techniques

Specific techniques employed to estimate the fiscal impacts of new projects or programs differ somewhat in the details of the estimation procedure, and assessments differ substantially in the scope of costs and revenues addressed. In general, local government revenues can be broadly classified as own-source

revenues (i.e., taxes and charges assessed and collected directly by the local jurisdictions) and intergovernmental transfers (i.e., funds received from state and federal levels). Own-source revenues can be further classified according to their primary determinants into those based on property valuation, those based on income or sales, those based on the level of production of some industry, and those based largely on changes in population. The techniques which are most appropriate for estimating revenues from these sources will differ depending on the revenue source (Burchell, Listokin, 1978).

Intergovernmental revenues are often more difficult to project than own-source funds. These difficulties arise because the allocation formulas are frequently complicated, eligibility for certain forms of assistance changes as local wealth or other indicators change, and overall community effects often must be considered. For example, in the United States, state school aid often is inversely related to local wealth, and so a new project that significantly affects the local tax base could affect the level of state assistance not only for the new students associated with the specific project but also for all other students in the locality. In such situations, the analyst must take account of this overall net change in order to obtain a realistic estimate of the effect of the project on the community.

A number of approaches can be used to estimate the community service costs associated with growth. Methods for estimating service costs are, of course, closely related to those used in projecting service requirements. The major difference is the nature of estimates developed. Whereas the objective of public service analysis is to evaluate changes in requirements for service facilities and personnel, fiscal impact analysis involves estimating the capital and operating costs of these services.

Cost estimation methods can be categorized into average cost and marginal cost approaches by the nature of the cost estimates they provide. The average cost approaches include the per capita expenditures method, the service standard method, and the use of cost functions derived from cross-section regression analyses. Marginal cost approaches include the case study approach, comparable city analysis, and economic-engineering methods. (For a detailed discussion of fiscal impact assessment techniques; see Burchell et al., 1985; Leistritz, Murdock, 1981; Burchell, Listokin, 1978.)

History

Fiscal impact analyses have been part of the planning profession since the 1930s (Mace, 1961). Planners first employed this type of analysis in connection with public housing projects, seeking to justify replacement of deteriorated housing due to its

negative local fiscal effects. In the 1940s, fiscal impact analysis was used in the urban renewal process to demonstrate the advantages of the new land use over the old (Burchell, Listokin, 1978). During the 1950s, it was employed during the suburbanization movement to gauge the impact of single family homes on local school districts. In the 1960s, supported by local planning assistance funding (primarily provided by the HUD 701 program), it was used to evaluate the fiscal effects of the master plan (Burchill, Listokin, 1978).

During the 1960s, fiscal impact techniques also were applied to evaluate the effects of industrialization on local governments (Hirsch, 1964; Kee, 1968). In the 1970s, fiscal impact analysis emerged as an almost universal accompaniment to large-scale development proposals, either volunteered by the developer or required by local governments or state regulatory bodies.

IMPORTANCE TO POLICY MAKING AND MANAGEMENT

Economic and fiscal impact assessments are increasingly demanded by policy makers and resource managers because they address issues that are key to a wide variety of decisions. For example, in determining whether to designate certain public lands as wilderness areas, land managers may need to consider the economic and fiscal impacts of alternative land uses (e.g., wilderness vs. ranching, or ranching vs. mining). When large-scale mining and resource development projects have been proposed, the local economic and fiscal impacts often have been one of the principal topics of debate (Leistritz, Murdock, 1988). Special taxes and/or impact payments have sometimes been imposed to mitigate potential fiscal problems for local governments. On the other hand, the economic impacts of proposed resource and industrial development projects are often seen as among the most positive (Murdock et al., 1986). Project proponents frequently volunteer estimates of secondary employment and income effects as part of their applications for required permits.

As state and local governments become more heavily involved in economic development efforts, economic and fiscal impact analysis tools can be useful in helping to establish priorities for incentive programs. While a number of states are now using selected measures of direct economic impact (generally the number of jobs created) as criteria in awarding financial support (Leistritz, Hamm, 1994), the total economic impact (including secondary effects) would appear to be a more meaningful criterion.

Similarly, local governments have long been involved in providing tax abatements and other incentives to new firms. In an era of budget stringencies, local units may feel an increasing need to examine secondary as well as direct benefits and costs to

determine the use of scarce resources for incentive programs. Economic and fiscal impact analysis offers tools that can be useful in guiding such decisions (Lansford, Jones, 1991; Coon *et al.*, 1993).

THE LIKELY FUTURE OF THE FIELD

Economic and fiscal impact analyses have developed as areas of applied research largely in response to demands of clientele. Over the past several decades, decision makers have increasingly been demanding information regarding the economic base of their community or region, the likely effect of a specific project or program on the area's economy, and the effect of specific projects or programs on the costs and revenues of local governments. Researchers and analysts have responded, using the principles and methods of regional economics and public finance. Over time, the ability of economic and fiscal impact assessment practitioners to provide timely and reliable information in response to such requests has improved, but the field continues to be one that is largely driven by clientele demands.

Looking to the future, the development of economic and fiscal impact assessment likely will continue to be heavily influenced by the demands of decision makers. Recent emphases on assessing potential impacts at the level of policies and programs, rather than specific projects, will probably lead to the development of analytical tools better suited to such applications (whereas most previous applications have been at the project level). The emphasis on moving impact assessment to higher levels in the decision-making process also will likely lead to a more proactive approach to assessments.

In keeping with the tradition of development and evaluation in response to user needs, economic and fiscal impact assessment will likely continue to be applied to problems and issues of priority concern to decision makers, which may be somewhat different from those which have been the focus of such assessments in the recent past. For example, with economic development becoming a high priority issue for many states and regions, economic and fiscal impact analysis likely will be increasingly applied in economic development planning and analysis. For economic impact analysis, this represents something of a full circle, as many of the applications of economic impact tools in the 1960s and early 1970s were in conjunction with regional development and planning efforts (Hamilton *et al.*, 1969; Bohm, Lord, 1972; Battelle Columbus Laboratories, 1973).

On the other hand, fiscal impact assessment has generally been undertaken largely at the level of specific projects with local governments as the major focus of concern. In the future,

we may anticipate increased demands for development and
application of methods suitable for analyzing the state
government fiscal impacts of projects, policies, and programs.

Economic and fiscal impact assessment have developed as
pragmatic approaches attempting to bring appropriate concepts and
tools from regional economics and public finance to bear on
problems of concern to policy makers. Their development as areas
of applied research has been enhanced by developments in their
parent disciplines; and, in turn, pressures to improve economic
and fiscal impact analyses have stimulated advances in those
disciplines. Further development of this field can be expected,
and the nature of that development will be heavily influenced by
the expressed needs of clientele groups, as these needs evolve
over time.

References

Alward, G.S., E. Siverts, D. Olson, J. Wagner, D. Senf, and S. Lindall. 1989. *Micro IMPLAN Software Manual*. St. Paul: University of Minnesota.

Bangsund, D.A., and F.L. Leistritz. 1992. *Contribution of Public Land Grazing to the North Dakota Economy*. Agricultural Economics Report No. 283. Fargo: NDSU, Department of Agricultural Economics.

Battelle Columbus Laboratories. 1973. *Final Report of the Arizona Environmental Economic Trade-off Model*. Phoenix: Arizona Office of Planning and Development.

Bender, L.D. 1975. *Predicting Employment in Four Regions of the Western United States*. USDA Technical Bulletin No. 1529. Washington, DC: USDA, ERS.

Bohm, R.A., and J.H. Lord. 1972. *Regional Economic Modeling-- The TVA Experience*. Knoxville, TN: Tennessee Valley Authority.

Braschler, C. 1972. "A Comparison of Least Squares Estimates of Regional Employment Multipliers With Other Methods." *Journal of Regional Science* 12(3):457-468.

Brucker, S.M., S.E. Hastings, and W.R. Latham. 1987. "Regional Input-Output Analysis: A Comparison of Five Ready-Made Model Systems." *Review of Regional Studies* 17(2):1-16.

Burchell, R.W., and D. Listokin. 1978. *The Fiscal Impact Handbook*. Piscataway, NJ: Rutgers University, Center for Urban Policy Research.

Burchell, R.W., D. Listokin, and W.R. Dolphin. 1985. *The New Practitioner's Guide to Fiscal Impact Analysis*. Piscataway, NJ: Rutgers University, Center for Urban Policy Research.

Coon, R.C., R.R. Hamm, and F.L. Leistritz. 1993. *North Dakota Microcomputer Economic-Demographic Assessment Model (MEDAM): User's Guide and Technical Description*. Agricultural Economics Software Series No. 8. Fargo: NDSU, Department of Agricultural Economics.

Crihfield, J.B., and H.S. Campbell, Jr. 1991. "Evaluation of Alternative Regional Planning Models." *Growth and Change* 22(2):1-16.

Gillies, L., and W. Grigsby. 1956. "Classification Errors in Base-Ratio Analysis." *Journal of the American Institute of Planners* 22:17-23.

12

Haig, R. 1926. "Toward an Understanding of the Metropolis: Some Speculations Regarding the Economic Basis of Urban Concentration." *Quarterly Journal of Economics* 40:179-208.

Hamilton, H.R., S.E. Goldstone, J.W. Milliman, A.L. Pugh, E.B. Roberts, and A. Zellner. 1969. *Systems Simulation for Regional Analysis: An Application to River Basin Planning.* Cambridge, MA: MIT Press.

Henry, M.S., A. Leholm, G. Schaible, and J. Haskins. 1980. "A Semi-Survey Approach to Building Regional Input-Output Models: An Application to Western North Dakota." *North Central Journal of Agricultural Economics* 2(1):17-24.

Hirsch, W.Z. 1964. "Fiscal Impact of Industrialization on Local Schools." *Review of Economics and Statistics* 46:191-199.

Hoyt, H. 1933. *One Hundred Years of Land Values in Chicago.* Chicago: University of Chicago Press.

Isard, W. 1951. "Interregional and Regional Input-Output Analysis: A Model of a Space Economy." *Review of Economics and Statistics* 33:318-328.

Kee, W.S. 1968. "Industrial Development and Its Impact on Local Finance." *Quarterly Review of Economics and Business* 8:19-24.

Lansford, N.H., and L.L. Jones. 1991. "Tax Abatement as a Development Incentive: Economic Impact on Rural Communities." *Impact Assessment Bulletin* 9(3):31-42.

Leistritz, F.L., and B.L. Ekstrom. 1986. *Socioeconomic Impact Assessment and Management: An Annotated Bibliography.* New York: Garland Publishing.

Leistritz, F.L., and R.R. Hamm. 1994. *Rural Economic Development, 1975-1993: An Annotated Bibliography.* Greenwich, CT: Greenwood Publishing Group.

Leistritz, F.L., and S.H. Murdock. 1988. "Financing Infrastructure in Rapid Growth Communities: The North Dakota Experience," pp. 141-154 in *Local Infrastructure Investment in Rural America.* T.G. Johnson, B.J. Denton, and E. Segarra, eds. Boulder, CO: Westview Press.

Leistritz, F.L., and S.H. Murdock. 1981. *The Socioeconomic Impact of Resource Development: Methods for Assessment.* Boulder, CO: Westview Press.

Leistritz, F.L., R.A. Chase, and S.H. Murdock. 1986. "Socioeconomic Impact Models: A Review of Analytical Methods and Policy Implications," pp. 148-166 in *Integrated Analysis of Regional Systems*. P. Batey and M. Madden, eds. London: Pion.

Leistritz, F.L., S.H. Murdock, and A.G. Leholm. 1982. "Local Economic Changes Associated With Rapid Growth," pp. 25-61 in *Coping With Rapid Growth in Rural Communities*. B. Weber and R. Howell, eds. Boulder, CO: Westview Press.

Leistritz, F.L., J.M. Halsted, R.A. Chase, and S.H. Murdock. 1983. "Socioeconomic Impact Management: Program Design and Implementation Considerations." *Minerals and the Environment* 4:141-150.

Leontief, W. 1941. *The Structure of the United States Economy, 1919-1939*. Cambridge, MA: Harvard University Press.

Leontief, W. 1936. "Quantitative Input and Output Relations in the Economic System of the United States." *Review of Economics and Statistics* 18:105-125.

Levan, C.L. 1956. "Measuring the Economic Base." *Papers of the Regional Science Association* 2:250-258.

Mace, R.A. 1961. *Municipal Cost-Revenue Research in the United States*. Chapel Hill, NC: University of North Carolina.

Miernyk, W.H. 1965. *Elements of Input-Output Economics*. New York: Random House.

Mortensen, T.L., F.L. Leistritz, J.A. Leitch, R.C. Coon, and B.L. Ekstrom. 1990. "Socioeconomic Impact of the Conservation Reserve Program in North Dakota." *Society and Natural Resources* 3:53-61.

Mulkey, D., and R.L. Clouser. 1991. *The Economic Impact of the Dairy Industry in Okeechobee County, Florida*. SP #91-40. Gainesville, FL: University of Florida, Institute of Food and Agricultural Sciences.

Murdock, S.H., and F.L. Leistritz. 1979. *Energy Development in the Western United States*. New York: Praeger.

Murdock, S.H., F.L. Leistritz, and R.R. Hamm. 1986. "The State of Socioeconomic Impact Analysis in the United States: Limitations and Opportunities for Alternative Futures." *Journal of Environmental Management* 23:99-117.

14

Roesler, T.W., F.C. Lamphear, and M.D. Beveridge. 1968. *The Economic Impact of Irrigated Agriculture on the Economy of Nebraska*. Lincoln: University of Nebraska, Bureau of Business Research.

Tiebout, C.M. 1962. *The Community Economic Base Study*. Supplementary Paper No. 16. New York: Committee for Economic Development.

Treyz, G., A. Friedlaender, E. McNertney, B. Stevens, and R. Williams. 1977. *The Massachusetts Economic Policy Analysis (MEPA)* Model. Amherst: University of Massachusetts.

Ullman, E.L., and M.F. Dacey. 1960. "The Minimum Requirements Approach to the Urban Economic Base." *Papers of the Regional Science Association* 6:175-194.

U.S. Department of Commerce, Bureau of Economic Analysis. 1992. *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II)*. 2nd ed. Washington, DC: U.S. Government Printing Office.

Weiss, S.J., and E.C. Gooding. 1968. "Estimation of Differential Employment Multipliers in a Small Regional Economy." *Land Economics* 44(2):235-244.

sds\fiscal.art