



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Economic conditions



WITHDRAWN

PROCEEDINGS

Twenty-Third Annual Pacific Northwest Regional Economic Conference

April 26-28, 1989



Corvallis, Oregon

Published by the Pacific Northwest Regional Economic Conference,
the Northwest Policy Center of the University of Washington,
and the Western Rural Development Center

**THE ECONOMIC BASE MODEL
AND LOCAL ECONOMIC DEVELOPMENT POLICY***

by

Thomas Michael Power

of the
Department of Economics
University of Montana
Missoula, Montana 59812

* This is a summary of a longer study of the use of the economic base model to analyze the Montana economy. That study was funded by the Montana Department of Commerce and the University of Montana Small Grants Program.

POWER

INTRODUCTION

The simple, two sector, single equation economic base model continues to play a very influential role in the analysis of local economies throughout the West. In some states, such as Montana, it is used to guide state economic development policy by focusing public attention on some sectors and away from others. This influential role continues despite repeated attacks on the model by academic economists who see it as naive and grossly oversimplified. In a recent review article on regional economic modeling, for instance, Harry Richardson urged that the economic base model be "buried, and without prospects for resurrection" (1985, p 646).

Such recommendations have been made regularly over the last several decades, but seem to have done little to discourage use of the model. The economic base model has shown an impressive staying power. This can be largely explained by the fact that what academic economists see as the model's chief failing, its simplicity, is seen by those doing local economic analysis as its chief virtue. Federal and state laws regularly require that the "socioeconomic" impacts of major public and private activities be analyzed. When the impacted area lies outside of a major metropolitan area, there is likely to be very limited economic data available. The virtue of the economic base model is that it has very modest data demands and can be easily manipulated by the non-economist. This has assured an ongoing demand for its use.

In the rural West, the economic base model is also attractive because the actual economy, dominated as it often is by a few, easily identified export-oriented firms, may be as primitive and simple as the model assumes. That is, the characteristics of the model that have led it to be so harshly criticized may make for a good fit with the rather particular local economies of the West (Polzin, ca. 1980).

It is important to note the use in which the economic base model has been found helpful: short run economic impact analysis. The model has been used to analyze the impact on the overall local economy of various types of external "economic shocks." (See Pleeter, 1980.) This focus on short-run impact is to be contrasted with long-run concerns with economic development. To most economists, economic development is not simply an accumulation of the impacts of external shocks. That suggests that whatever the usefulness of the economic base model for local impact analysis, it may be inappropriate as a model to guide local economic development. That is the focus of this paper which is a summary of points raised in a longer study of the use of the economic base model to analyze the Montana economy (Power, 1989).

II. THE ECONOMIC BASE MODEL AS A SHORT-RUN IMPACT MODEL

The repeated use of the economic base model to describe the expected impact of various changes in the local economy has made it the most familiar type of economic analysis to main street businesses, local policy makers, and the informed citizen. This familiarity has led to the economic base model becoming the primary conceptualization of the local economy and the extension of the model to a broad array of local economic problems including local economic development policy. Such an extension has been facilitated by the early history of the model in which it was offered by one of its developers as *the* primary explanation for regional and national development in the United States (North, 1955; Tiebout, 1956).

But it needs to be emphatically understood that the economic base model is not a model of local economic development. Rather, it is a short run impact model. Polzin, one of the leading advocates of the ongoing usefulness of the model in the rural West, has been explicit and emphatic on this point.

Economic base models simply assert that a change in the exogenous sector will have a measurable and predictable impact on the derivative sector. Thus, their limitations must be kept firmly in mind. In the first place, economic base models are valid only for the short run. There are no explicit allowances for changes in a region's comparative advantage, capital-labor ratios,

or other factors thought to determine the course of long-run economic growth. Secondly, they do not account for changes originating independent of the exogenous sector. That is, there are no provisions for a region to "pull itself up by its bootstraps" through endogenous growth. (Polzin, ca. 1975, pp. 2-3.)

A consensus seems to have emerged that if the economic base model has a role to play in modeling local economies, that role is in short-run impact analysis. [See, for instance, Williamson, 1975; Richardson, 1985; Polzin, 1986; Plaut, 1982; Watkins, 1980; also see Power, 1988, Chapter 7, for a critique.] More recent analysis of the time it takes for the impact of changes in the base to be fully felt indicate general agreement that the time lag is short. Many analysts report that the full impact is felt in less than a year (Connaughton and McKillop, 1979; Miller and Henry, 1979; Epley, 1983; Williamson, 1979; Sylvester, 1986). Others have concluded that the impact works its way through the local economy within two years (Cook, 1979, Henry and Nyankori, 1981).

If this short-run impact focus of the economic base model were always made explicit, much of the debate over the interpretation and use of the model would disappear. It is when this potentially useful short-run model is used to interpret and guide long-run development policy that confusion and disagreement are bound to develop.

III. ECONOMIC DEVELOPMENT IN THE CONTEXT OF THE ECONOMIC BASE MODEL

The economic base model crudely estimates the "structure" of the local economy in the sense of estimating the degree to which income injected into the local economy can be used locally to satisfy consumer demands. With that local economic "structure" determined, it then focuses its attention on the cumulative impact that external shocks have on the local economy. It is a short-run impact model which purposely "freezes" the structural relationships within a local economy so that these short-run adjustments can be the focus of attention.

Since economic development consists of the transformation of many of the structural relationships within the economy, it cannot be looked upon simply as the accumulation over time of a series of exogenous shocks. That means that, in general, the economic base model cannot be used to model economic development or inform public policy with respect to it. Unfortunately, however, the model *is* regularly used for this and other long-run public policy purposes. As the past has proven, urging the abandonment of this intuitively attractive and convenient model is not very effective. Possibly urging a broadening and reinterpretation of the model can be more effective. If the economic base model is not interpreted in a mechanical way, it *can* provide insights into the development of the local economy.

A. Import Substitution

The economic base model, while focusing upon the role that changes in exogenous demand play in triggering changes in the rest of the local economy, does not focus exclusively upon the external economy. The parameters of the model, especially the multiplier, are determined by the character of the local economy. Change in the local economy can come from either changes in exogenous demand *or* changes in the character of the local economy which influence the type of impact the existing exogenous demand has on the overall economy. That is, the level of local economic activity can be affected by a change in the multiplier and "independent" sources of local income as well as by a change in export or exogenous income.

The export base model is usually interpreted to mean, as the Montana Department of Labor has put it, that "basic industries play the key role in promoting economic growth, while the nonbasic sector has essentially a passive role" to play (1981, p 3). But that need not be the interpretation. To the extent that the multiplier is changeable and changing, the model invites investigation into what it is that determines the multiplier and the way it changes.

POWER

If the multiplier were relatively fixed and unchanging or dictated by the size of any given urban area, it could be taken as a determinant of local economic activity, exogenous income. But the multiplier is not a predetermined parameter. The size of the multiplier depends upon the degree to which the local economy can serve local needs. To the extent that the local economy is relatively diverse and self-sufficient, the multiplier will be large. To the extent that the local economy can serve few local needs, imports will have to be depended upon, income will "leak" rapidly from the community, and the multiplier will be small.

B. The Role of Non-labor Income

Income derived from export-oriented businesses is not the only source of income flowing into a local economy. On a quantitative basis, it is dwarfed by income flows that often are not even considered by the economic base model, namely non-labor income in the form of transfer payments and property income. In 1985, for instance, income generated by economic base industries in Montana was about \$1.6 billion while non-labor income came to over \$3.5 billion. Transfer payments by themselves equaled economic base industry earnings while property income significantly exceeded them. (Keegan and Polzin, 1987, P 3 and Johnson, 1988, p 3.)

These income flows unassociated with current participation in the labor force make up almost 40 percent of personal income in Montana and in some communities contribute even more. This is not true only in Montana. Nationwide non-labor income has been rising in importance (Polzin et al., 1987, p 1; WSU, 1986). Between 1968 and 1975 one study indicated that transfer payments were the leading source of growth in over a thousand U.S. counties (Hirschl and Summers, 1982, p. 216).

The economic base model by focusing upon *export earnings* has tended to ignore this very substantial flow of income into the local economy. To the extent that these non-labor incomes support locally-oriented economic activity, the explanation of these activities entirely in terms of the export industry earnings significantly exaggerates the importance of those export industries in the local economy. For instance, the economic base income multiplier for Missoula and Flathead Counties is estimated at 2.0 to 2.5 for the years 1961 through 1984 if derivative earnings are explained solely by export base industry earnings. If, however, non-labor income is treated as part of the economic base, the income multiplier falls to about 1.5. That is, if the non-labor income is ignored, each dollar of income from basic activity generates another dollar or dollar and half of derivative income. If the non-labor income is included as basic income, however, the impact of a dollar of basic income on the derivative sector is cut by half or two-thirds to only half a dollar. The strength of the impact of export industry earnings on the locally-oriented activity is cut by half or more (See Polzin et al., 1987, Tables 1 and 2).

It needs to be pointed out that initial efforts at incorporating these nonlabor income flows into the economic base model have not significantly improved their forecasting accuracy (Polzin et al., 1987). But economic development is not about accurate short-run forecasting. It is about structural change in the local economy and the guide that we need to understand the full set of long-run forces acting on the local economy. It seems clear that the economic base model, if it is to be used to guide economic policy, should be modified to include non-labor sources of exogenous income. The size of these flows is just too large to be ignored.

More important from an economic development point of view are the determinants of these massive income flows. If they are tied to policy, the, like fluctuations in the price of commodities, may simply be something to which an area has to adjust. If, however, these income flows are attracted to certain types of communities and drawn away from others, it may be important to consider policies that allow local communities to maintain and enhance these non-labor income flows. If, for instance, a substantial part of these flows is associated with retirement income and benefits, then it may be important to consider what it is that determines whether our retiring senior citizens decide to remain in the local area or move elsewhere. Likewise, if there are aspects of a local area that could attract retirees, promotion and development of these qualities could be quite important for economic development.

C. Shifts in Production Processes and Consumer Preferences

In the discussion above, the possibility that the multiplier could change as a community grew and developed was discussed. Another possibility is that because of shifts in the character of production processes and consumer preferences nationwide, there could be a shift in the mix of goods-producing and service activities. Since service activities are more difficult to import and export, this could cause a similar shift within the local economy that increased the role played by locally-oriented economic activities. That is, such shifts could also cause the multiplier to increase.

D. Demographic Shifts and Economic Change

Changes in the age structure of the population can have relatively strong impacts on the level and character of economic activity in our communities. Since these demographic shifts are somewhat predictable in the sense that we can see them coming as a "bulge" or "gap" moves through the age structure, they can be used to supplement the economic base model by indicating expected shifts in the structural parameters of the model.

One example was the maturation of the "baby boom" generation during the 1970s. As this relatively large generation began to leave high school and set up their own households, the size of the labor force and the number of households began to rise much more rapidly than the population as a whole. This labor force growth and household formation and the income and expenditures that went with it had a significant impact on the economy that would not have been suggested by the contemporary changes in population by itself.

Clearly "home grown" growth, if only temporary, is a possibility due to demographic forces. Part of this is simply tied to the investment component of local activity. To accommodate the larger number of household, more houses and apartments have to be built; new stores, restaurants, entertainment centers, etc. constructed; streets expanded; etc. This construction activity has a stimulating impact on the local economy. Since, however, it builds long-lived assets, that expansion in economic activity is usually not sustainable. Construction comes and goes in cycles, in this case, a cycle tied to demographic changes.

At the other end of the age structure are people who are retiring. This age group will be growing in relative size on into the next century. Significant institutional developments during the last 50 years have changed the economic circumstances these senior are likely to be in as they retire. The adoption of employee deferred income (pension) plans by both private businesses, government agencies, and the federal government (social security), has had an accumulating impact on the discretionary income of senior citizens. Many people retiring now have been in such programs for their entire working lives. In addition, many families maturing during the expansive period following the Second World War were able to save for retirement and make investments. As a result, older Americans are increasingly affluent with both above-average per capita incomes after taxes and the highest household spendable discretionary incomes of any age group. Both "transfer payments" and "property income" flows support these senior households (WSU, 1986).

E. The Role of Labor Markets in the Adjustment to Changes in the Demand for an Area's Exports

The aggregate size of the income received by the total of all individuals within a community is not the only, or even primary, dimension of the local economy that is of concern to residents. Other dimensions that are likely to be considered equally or more important include employment opportunities and the level of family income. To move from the export base model's focus on aggregate income to these other dimensions required that the local labor market and labor and population migration be analyzed. The economic base model by itself is silent on how many jobs are created, what those jobs pay, who gets the jobs, and who gets the income.

The relationship between economic expansion, population growth, employment, and average family income is anything but simple. There is not even a single simple line of causation (Power, 1988, Chapter 8). The economic base model does not directly speak to employment issues at all. It is an income model. As Polzin has

POWER

pointed out, unless supplemented by a labor market model, the export base model will not tell us what the employment impact of a change in the exogenous income will be (Polzin, Ca 1976, p 18). If the economic base model is to be used to discuss job creation and population changes, it has to be supplemented with a labor market and population adjustment model (Polzin, 1977; Smith et al. 1981).

REFERENCES

- Connaughton, Kent P. and William McKillop, 1979. "Estimation of 'Small Area' Multipliers for the Wood Processing Sector — an Econometric Approach," *Forest Science* 25(1):7-20.
- Cook, Thomas, 1979, "An Application of the Transfer Function to an Economic Base Model," *Annals of Regional Science* 13(2):81-92.
- Epley, Donald R., 1983, "Further Evidence of a Short Run Economic Base Multiplier," *Annals of Regional Science* 17(3):77-83, November.
- Henry, M.S. and J.C.O. Nyankori, 1981, "The Existence of Short Run Economic Base Multipliers: Some New Empirical Evidence," *Land Economics* 57(3):448, August.
- Hirschl, Thomas A. and Gene F. Summers, 1982, "Cash Transfers and the Export Base of Small Communities," *Rural Sociology* 47(2):295-316.
- Johnson, Maxine C., 1988, "Montana and the National and World Economies: The Outlook for 1988 and Beyond," *Montana Business Quarterly*, 16(1):2-9, Spring.
- Keegan, Charles E., III, and Paul E. Polzin, 1987, "Trends in the Wood and Paper Products Industry and Their Impact on the Economy of the Pacific Northwest," *Montana Business Quarterly* 25(4):2-7, Winter.
- Miller, Stephen E. and Mark S. Henry, 1979, "Basic and Non-basic Employment Linkages," *Review of Regional Studies* 9(2):80-88.
- Montana, State of, 1981, "Basic Industries in Montana," Department of Labor and Industry, Research and Analysis Division, September.
- North, Douglas C., 1956, "Exports and Regional Growth: A Reply," *Journal of Political Economy* 64(2):165-168, April.
- Plaut, Thomas R., 1984, "Labor Force Migration and Regional Employment Growth in the United States," *Papers of the Regional Science Association* 50:75-77.
- Pleeter, Saul, ed., 1980, "Economic Impact Analysis: Methodology and Applications," *Studies in Applied Regional Science*, Vol. 19, Martinus Nijhoff Publishing, Boston, Mass.
- Polzin, Paul E., ca 1976, "Impact Analysis with a Two-Sector Income Model," unpublished, Bureau of Business and Economic Research, University of Montana, Missoula, Montana 59812.
- Polzin, Paul E., 1977b, "Urban Labor Markets: A Two Sector Approach," *Growth and Change* 8(1):11-15, January.
- Polzin, Paul E., 1980b, "Resurrecting Economic Base Analysis: Modeling Small Communities," unpublished, Bureau of Business and Economic Research, University of Montana, Missoula, Montana 59812.
- Polzin, Paul E., Et a., 1986, "How Accurate are Forecasts Based on the Economic Base Model," unpublished paper presented at the Western Regional Science Association Meeting, Feb. 28, 1986, Bureau of Business and Economic Research, University of Montana, Missoula, Montana 59812.

- Polzin, Paul E., et al., 1987, "The Role of Transfer Payments and Property Income in Economic Base Analysis," Unpublished paper presented at the Western Regional Science Association Meeting, February 18, 1987, Bureau of Business and Economic Research, University of Montana, Missoula, Montana 59812.
- Polzin, Paul E., et al., 1988, "New Tests of the Time Dimension in Economic Base Analysis," unpublished paper presented at the Western Regional Science Association Meeting, February, 1988, Bureau of Business and Economic Research, University of Montana, Missoula, Montana 59812.
- Power, Thomas M., 1989, "The Economic Base Model and the Montana Economy," report prepared for the Montana Department of Commerce, unpublished, available from author.
- Power, Thomas M., 1988, *The Economic Pursuit of Quality*, ME Sharpe, New York.
- Richardson, Harry W., 1985, "Input-Output and Economic Base Multipliers: Looking Backward and Forward," *Journal of Regional Science* 25(4):607-661.
- Smith, Eldon D., et al, 1981, "A Modified Regression Base Multiplier Model," *Growth and Change* 12(3):17-22.
- Sylvester, James T., 1986, "The Economic Base Model — An ARIMA Alternative," unpublished paper, Bureau of Business and Economic Research, University of Montana, Missoula, Montana, 59812.
- Tiebout, Charles M., 1956, "Exports and Regional Economic Growth," *Journal of Political Economy* 64(2):160-64, April.
- Washington State University, 1986, "Transfer Payments and Investment Incomes: Sources of Growth and Cyclical Stability for Nonmetropolitan Counties of Oregon and Washington," Agricultural Research Center, Research Bulletin 0981, College of Agriculture and Home Economics.
- Watkins, Alfred J., 1980, "The Practice of Urban Economics," Sage Publications, Beverly Hills, California.
- Williamson, Robert B., 1975, "The Predictive Power of the Export Base Theory," *Growth and Change* 6(1):3-10, January.