

A NOTE ON MEASURING THE ECONOMIC IMPACT OF INSTITUTIONS OF HIGHER EDUCATION

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Universities and other institutions of higher education are frequently asked to justify, in economic terms, the allocation of state monies toward their programs. These institutions have often responded by conducting economic impact studies. The traditional approach to economic impact views increases in expenditures by a university as a means to create new jobs within the state and to expand the state's economic base. Recent studies have employed a new approach that also accounts for increases in the state's skill base as part of the economic impact. Although the skill-base approach yields favorable results for higher education, recent applications of the technique fail to consider fully the effects of migration on a university's economic impact and, thus, substantially overestimate the impact. Researchers are well advised to avoid the skill-base approach and to utilize the traditional economic-base approach, which produces more reliable estimates of local economic impact. Moreover, states and universities are cautioned not to place the debate over education financing exclusively in the realm of economic impact, since there are other reasons to provide publicly funded higher education.

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In an era of tightening state budgets, institutions of higher education are being asked by state governments to justify their expenditures on an economic basis. Legislatures recognize that expenditures on higher education usually substitute for expenditures in other areas that are also important to the state. Therefore, the question naturally arises as to whether monies would be better spent on some other program.

Institutions of higher education have often responded to legislative requests for economic justification by conducting economic impact studies. This approach was popularized with the development of a formal method by Caffry and Isaacs (1971). Since then, a myriad of institution-based studies has been

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produced on the subject (e.g., Afiat, 1995; Altman, 1985; Ashton and Huff, 1982; Backhaus and Whiteman, 1994; Bluestone, 1993; Breslin, 1979; Brown, 1995; Butler, 1980; Elliott and Meisel, 1987; Gana, 1994; Lewis, Kise, and Peddle, 1995; Peddle, Kise, and Lewis, 1995; Pursell and Deichert, 1984; Seybert, 1991; Stevens, 1994; University Planning, 1990). The majority of these studies employ an economic-base approach, which treats the increase or decrease in expenditures by a university as analogous to the expansion or withdrawal of an industry from a region.¹

In a recent paper, Bluestone (1993) revised the traditional economic-base approach. He argued that the scope of an economic impact analysis should be expanded to include additions to the skill base of the state; through higher education, a university produces skilled workers, who earn higher incomes than they would without that education and, thus, pay more money to the state in taxes. This skill-base approach, which has been adopted in other studies (e.g., Stevens, 1994; Peddle, Kise, and Lewis, 1995), yields substantially higher estimates than the economic-base approach. Since universities use this approach in institution-based research and decision makers utilize their results, it is important to consider the validity of this method to estimate economic impact.

We argue that the skill-base approach substantially overestimates the economic impact of a university. The overestimation arises from an incomplete consideration of the potential effects migration has on human resource location. This note argues that the ultimate source of economic impact is expansion of the economic base from the creation of new and higher-paying jobs. Attempts to depart from this approach generate questionable methodologies.

TWO APPROACHES TO ECONOMIC IMPACT ANALYSIS

Refinements were made to Caffry and Isaacs's seminal approach by Booth and Jarrett (1976), Dorsett and Weiler (1982), Fowkes (1983), and Lillis and Tonkovish (1976), among others. A comprehensive review of the current state of knowledge on the economic-base approach was given by Elliot, Levin, and Meisel (1988) in an earlier volume of this journal. This approach accounts for the increase in the total economic base of a region resulting from new federal grants, tuition from out-of-state students, and other exogenous influences; the injection of this new money into the economy is an impetus for economic growth in the form of new jobs and higher incomes for area residents. Elliott, Levin, and Meisel (1988, p. 17) noted that "the basic objective of an economic impact study is relatively straightforward—to measure the increase in a region's economic activity attributable to the presence of a college or university." The task of the researcher is to ask the hypothetical questions: What would happen if the university did not exist? How many fewer jobs and how much less income would be present in the region?

Elliott and colleagues outlined a six-step procedure to answer such questions and calculate the economic impact of a university. First, carefully identify the region of analysis, which may consist of a metropolitan area, county, state, or multistate area. Second, randomly survey students, faculty, and staff to obtain accurate information on expenditure patterns and identify students who would attend school outside the region if the university did not exist. Third, identify funds received by the university from sources outside the region. Fourth, sum the expenditures estimated in steps two and three. Fifth, properly select and apply input-output multipliers to the sum in step four to determine the final economic impact. Sixth, estimate tax revenue generated from the university's economic impact (estimated in step five). The figure generated in step six measures the extent to which the state receives a monetary return on its investment in a university. If this procedure is followed properly, a reliable estimate of economic impact (in terms of expansion of the economic base) can be obtained. This process is diagramed in Figure 1.

The newer skill-base approach does not disregard the economic-base approach, but adds to it. The skill base consists of the technical know-how of workers within a region. Through providing education, a university expands the skills and, thus, the productivity and income of workers. Bluestone argued that economic impact should be conceptualized as the increase in the economic base *plus* the income generated from increases in the skill base. Thus, Bluestone added three additional steps to the process of estimating economic impact. First, estimate the net income received by all graduates of the university (who remain in the state after graduation) in excess of what they would have earned without a university education. This figure was computed by taking the difference between the earnings of college and noncollege graduates. Second, compute the discounted present value of the sum computed in the previous step. Bluestone argues that this amount is an economic impact on the state uniquely attributable to the university. Third, estimate the tax revenue generated from the increase and subtract the state subsidy on education. This amount is considered a return on the state's investment in a university. A diagram of this process is presented in Figure 2.

Bluestone noted that the skill-base approach is particularly useful in the case of the University of Massachusetts at Boston (UMB), since 89% of undergraduates and 82% of graduates remain in Massachusetts after graduation. Bluestone estimated a yearly income flow to the state government of \$664.3 million (economic base plus skill base). This estimate is about 19 times higher than estimates produced using the economic-base approach alone (\$34.3 million). Using the economic-base approach alone, the state's direct return through tax revenues to expenditures on UMB is \$0.08 cents on each dollar invested. Whereas, using the skill-base approach, the state's return through tax revenues is \$1.57 for every dollar invested (Bluestone, 1993, pp. 1-2).

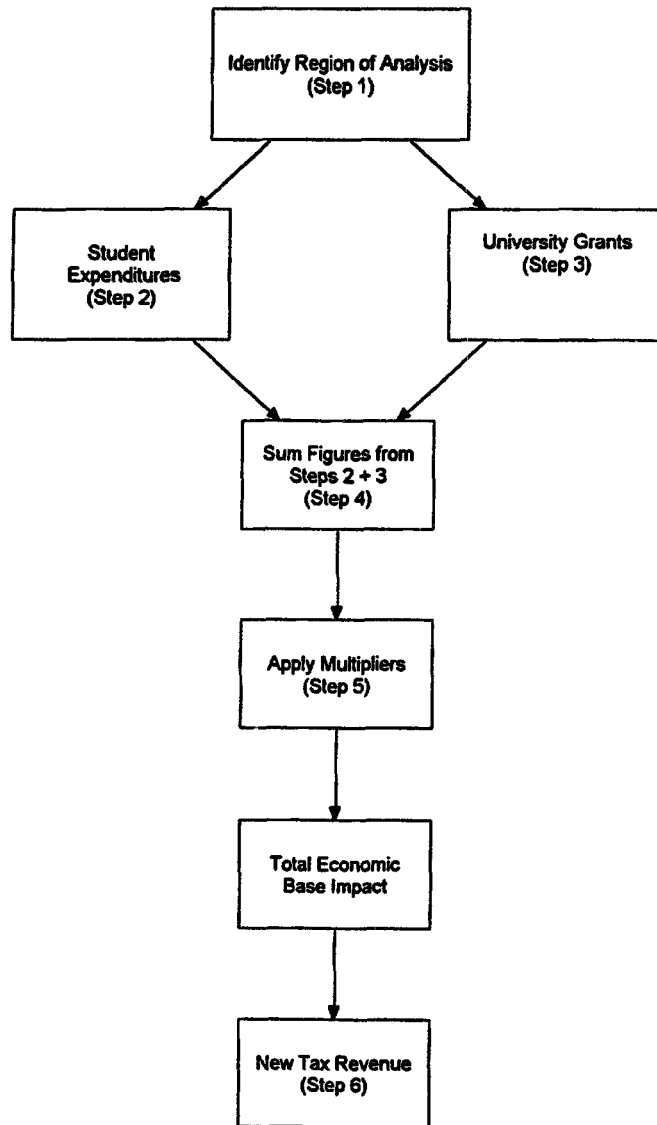


FIG. 1. Economic-base approach.

Other studies that implemented the skill-base approach were Stevens (1994), which assessed the impact the University of Maryland System (UMS), and Peddle, Kise, and Lewis (1995), which assessed Northern Illinois University (NIU). The Stevens (1994) report estimated a \$4.6 billion economic impact

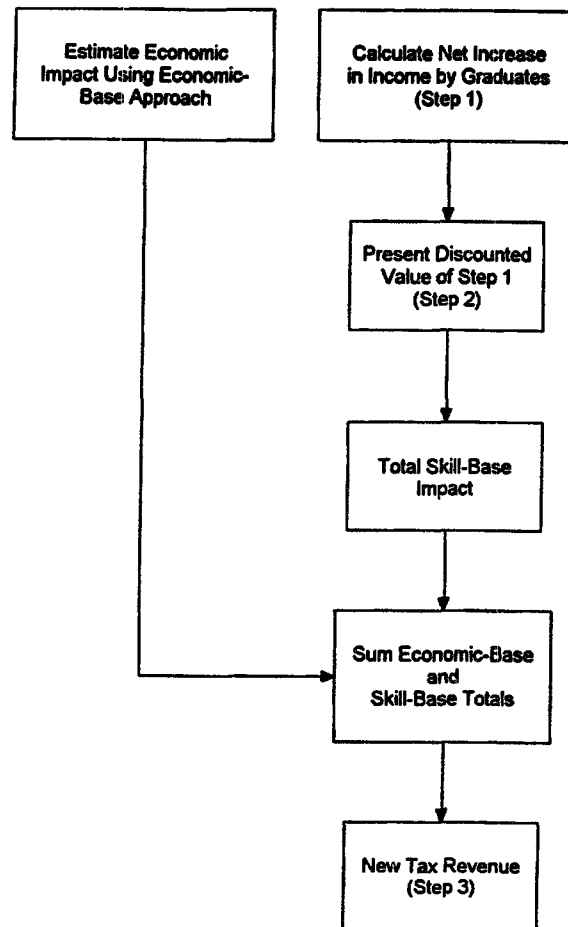


FIG. 2. Skill-base approach.

(economic base plus skill base), which is \$1.3 billion higher than would be obtained by using the economic-base approach alone. The increase in estimates from the skill-base approach makes the difference from UMS being a “break-even” system (in terms of state tax revenue) to “an exceptional 28% return on investment!” (Stevens, 1994, p. iii, emphasis in original). Peddle, Kise, and Lewis (1995) estimate an economic impact for NIU of \$477.5 million using the economic-base approach only, but increase their estimate approximately five times (to \$2.6 billion) by using the skill-base approach (implying an increase of \$44.4 million in state tax revenues).

From the results of the three studies cited above it is clear that the skill-base

approach generates a significantly higher impact figure than the economic-base approach. In addition, each study presents investment in a university as a huge windfall to a state in tax revenue. The use of skill-base methodology converts a university from being a drain on the state treasury into a profitable investment for the state. The political implications of this result are clear: state governments should reverse present trends that cut expenditures to higher education in order to take advantage of high financial returns. However, as we argue in the next section, this approach misrepresents the true economic impact of a university.

MIGRATION AND PROBLEMS WITH THE SKILL-BASE APPROACH

Bluestone and others who have employed the skill-base approach begin their argument with the observation that a large percentage of a university's graduates remain in that state after graduation. These individuals become productive, tax-paying citizens who make an increased marginal contribution to the state's economy because of their education. This increased contribution arises not only from workers' ability to take higher-paying jobs, but also from their willingness to adapt and their effectiveness in implementing new technologies (Bartel and Lichtenberg, 1987). From this perspective, the economic impact of the university is dependent on the graduates' decisions *not* to migrate. The major shortcoming of this approach is that it fails to analyze more completely the dimensions of migration and how migration affects a university's return on its investment in higher education.

Migration and investments in higher education interrelate in three ways relevant to economic impact analysis. First, the completion of a university education increases the likelihood of migration. Greenwood (1973) and Bartel (1979) note that higher education improves one's knowledge of the national and international labor markets, along with the ability to search and compete in these markets. They document empirically that this knowledge and ability increase the likelihood that an individual will choose to migrate from the state. By increasing one's geographic and occupational mobility a university education actually *lowers* the chances that a given individual will become a tax-paying citizen in the state. In some states, expenditures on higher education may have negative effects on the state's economy if the "brain drain" effect is strong enough.

Second, migration decisions are based primarily on job opportunities; if a state does not experience employment growth in appropriate sectors, many of its graduates may migrate from the state. A number of studies confirm that the existence of appropriate job opportunities is a key factor in an individual's migration decision. Romans (1974, p. 449) reported that "[O]ut-migration probably occurs because of lack of economic opportunity and not vice versa." Fields

(1979, p. 31) concurred with this result, noting that "perhaps the most important variable [which determines migration behavior] is availability of jobs. . . . Workers move where jobs are." Furthermore, in a study of the migration behavior of Iowa's university graduates, Rives and Yousefi (1989, p. 10) found that "[O]f those who moved, 54.3 percent overall (and 56 percent of Iowans) indicated they would *not* have moved had appropriate employment been found within the state." These studies suggest that increases in the skill base cannot affect a state's economy unless appropriate jobs are available to the graduates. Thus, state economic development policy is well advised to focus on job creation.

Third, if a state fails to provide sufficient educational opportunities for its residents to meet the needs of local industry, educational opportunities will either be provided by the private sector, or migrants will come from other states (nations) to take job opportunities. For example, Krieg (1991, p. 72) documented that California experienced substantial in-migration of human capital in 1980, presumably in response to the job opportunities in the burgeoning defense industry and other sectors. However, California ranked last in the nation in per capita state expenditures on higher education (Council of State Governments, 1980, p. 377); some of the gap left by low investments in education was readily filled by migrants. Conversely, Krieg documented that Massachusetts experienced net outflows of human capital resources in the same period, while it ranked fifth in spending on higher education (Council of State Governments, 1980, p. 377).

The implications of the above arguments can be understood in terms of a simple example. Suppose a national firm based in New York provides funding to its branch office in Boston to hire an additional employee. Suppose further that there are only two applicants for the position: one is a graduate of a local university and the other is a lifetime resident of another state. According to the skill-base approach, if the firm hired the local graduate, then the income earned at the job (over and above what would be earned at another job that did not require a university education) constitutes an economic impact of the university on the state. However, if the job were offered to the resident from out of state (who would then migrate to Boston to take the job), there would be no economic impact from the university on the state in this case. This approach does not make sense, since in either case the economic impact on the state and, thus, the size of the state's economy, is the same. After all, the source of the impact is the new job (an expansion of the economic base), not the university's contribution to the local skill base.

Investment in higher education by a particular state is neither a necessary nor a sufficient condition for economic impacts to arise from the increase in the state's graduates' skill levels. We do not dispute that more highly educated workers usually contribute more to the economy than less highly educated

workers. However, the actual and potential effects of migration mitigate the ability of any state exclusively to capture the benefits of increased skill levels.

COMPLICATIONS FROM REGIONAL ECONOMIC RIGIDITIES²

The preceding arguments have presumed a free flow of firms, migrants, and information about job opportunities among states. But what happens when rigidities in the economy prevent people and firms from moving in response to new opportunities? Is it possible that firms near a university will have a differential advantage in attracting the limited supply of highly educated workers, making states with strong university systems more productive than other states? Or, does the location of a university affect the average level of skills in an area? If rigidities in the economy cause the average level of skills to rise near universities, then it is possible that universities will cause some of the skill-base impacts suggested by Bluestone. Moreover, if firms located near a university have an advantage in capturing technology spillovers from university research, then university research spending may have economic effects in excess of those captured by standard multiplier analysis.

These questions regarding a university's impact on a local economy have been raised in recent work by Beeson and Montgomery (1993) and Bania, Eberts, and Fogarty (1993). Beeson and Montgomery (1993) focused their attention on local labor markets and tested the hypotheses that annual income, labor force composition, employment growth, and migration rates are dependent on the location of a university. They find that "[d]espite the common belief of the importance of universities as an engine of growth [there is] only mixed evidence that they have a measurable effect on local labor markets" (Beeson and Montgomery, 1993, p. 759). They find support for the views that employment growth is directly related to research and development spending and that the employment of scientists and engineers in the local economy is related to the number of degrees granted in those fields by local universities. However, they find little support that universities affect the composition of the labor force in other fields, increase average income near to the university, or significantly change migration patterns. Bania and colleagues (1993) address the question of whether research and development spending creates large technology spillover effects for local firms. They find that "states cannot generalize from the Route 128 and Silicon Valley experiences" (Bania, Eberts, and Fogarty, 1993, p. 765). Therefore, there is little evidence that firms located in the same state as a research university will necessarily benefit disproportionately from its research and development activities.

While Beeson and Montgomery (1993) and Bania, Ebert, and Fogarty (1983) provide some evidence supporting spillover effects onto the local economy, the amount of these effects is probably a small fraction of the total amount calcu-

lated by Bluestone and others. This is because the Beeson and Montgomery results show an effect on one sector (scientists and engineers), whereas Bluestone applies his method to all graduates. Even in the case of scientists and engineers, it would be reasonable to consider only a fraction of their increased income as an economic impact (since only a small percentage of those who stay near the university will do so primarily as a result of economic rigidities). Bania and colleagues show that research and development spending *may* matter to the concentration of firms near a university, but this is not a necessary effect, and is only likely to occur near major research institutions.

It is indisputable that universities affect the economy by imparting skills to students and through research and development activities. However, it is highly disputable as to whether states are able to “capture” these benefits by appropriating money to state institutions. More research is needed to explore the effects of universities on local economies. Unfortunately, the current state of knowledge in this area does not provide a clear justification or method for incorporating these effects into economic impact models. Without further empirical foundation, attempts to do so are likely to repeat the gross overestimates produced by the skill-base approach.

CONCLUSIONS

The economic impact study has become a standard tool used by universities to persuade state legislatures of the importance of expenditures on higher education. If this tool is to be used effectively, it must be applied with a methodological rigor that promotes the integrity of the process. Kubala and Butler (1980–81) emphasized that if impact studies report unreasonably high estimates, they are less likely to be believed by decision makers and more likely to undermine the credibility of all economic impact studies. Therefore, it is crucial that researchers follow the procedures outlined in Elliott, Levin, and Meisel and avoid using the skill-base or other ad hoc approaches.

If economic impact studies are to be used to justify expenditures on higher education, it is essential that these studies are conducted in an economically correct manner. Moral hazard is inherent in this process since those who conduct university economic impact studies (professors or staff at the university being evaluated) stand to benefit personally from a result favorable to the university (i.e., they may not lose their jobs, pay increases, or other benefits due to funding cuts by the legislature). Since economic impact studies become a political tool in the review of education appropriations, conservative assumptions and methods should be used to promote objectivity in the research process. Every effort should be made to produce results that are accurate, rather than just results that favor higher education.

The traditional economic-base approach recognizes the importance of univer-

sities to state economies. Universities bring new dollars to a state through research grants, federal financial aid, out-of-state student spending, and other sources. These dollars are multiplied throughout the state economy, creating effects that are significant to the state and should be considered by the legislature. However, counting the taxes paid on the increased income earned by college graduates, as suggested by the skill-base approach, substantially overestimates this effect. Higher education is a good enough investment and its effects need not be overstated.

Although the effects of education on the labor force should not be included in an economic impact study, they should nonetheless be included in the debate over appropriations to higher education. It must be remembered that all arguments in favor of funding higher education need not be couched in economic impact-maximizing terms. Parents want their children to receive affordable, high-quality education, regardless of whether they will ever become tax-paying residents in the state in which they attend college. Education is a gift from one generation to the next; it is a social function of the highest importance. Perhaps economists and other researchers should focus on emphasizing these justifications for spending, rather than economic impact.

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NOTES

1. References to a "university" throughout the paper are meant to be inclusive of all types of public institutions of higher education (e.g., state universities, community colleges, technical schools).
2. The authors thank an anonymous referee for bringing this issue to our attention.

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