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To: Dr. Evan Dobbelle, President and CEO, New England Board of Higher Education  
From: Matthew P. Nagowski, Research Assistant  
Date: February 22, 2006  
Re: Assessing the economic impact of higher education institutions in New England

The aim of any economic impact study is straightforward—to estimate the increase in a region's economic activity caused by the presence of a certain firm or entire industry. In most cases, this is a straightforward process using a regional input-output model to estimate both the additional spending the firm or industry creates in the local area and the ripple effects of that spending throughout the rest of the economy.

Measuring the economic impact of higher education institutions is not as simple, however, because universities and colleges produce spillover effects on the level of technology or human capital in a region. These effects increase worker productivity in a region, which subsequently increases income levels for workers—yielding a higher total amount of economic activity. Considering whether and how to account for these productivity increases is critical to any study estimating the impact of higher education on a region economy.

In this light, economists have developed two approaches to assessing the economic impact of institutions of higher education. The economic base approach measures the direct and indirect economic effects that the expenditures associated with higher education institutions infuse into a region's economy—essentially treating a college or university like any other firm and not looking at any spillover effects that higher education can have on a region. The second approach, as pioneered by Bluestone (1993) and Berger and Black (1993), establishes the economic base that a university contributes to the region's economy, but also considers the impact universities have on human capital and technology, and the related productivity increases in the regional economy. As this concept is most easily measured through the future wages of the skilled workers that the university produces, it is referred to here as the skills base approach. These two approaches supplement each other; a skills base analysis may be added to any economic base approach.

## Economic base approach

The economic base approach views an increase or decrease in expenditures associated with a university or college as analogous to the expansion or withdrawal of an industry from a region—affecting job creation and the overall economic activity in a region. Higher education institutions can

affect regional economies through their expenditures on payroll, supplies, and services (including construction and debt outlays), as well as through spending by out-of-region students and visitors to the institution and the in-kind and monetary donations that an institution may make to its surrounding community. Summing these expenditures and outlays provides a measure of the direct economic impact that an institution or firm(s) have on a region's economy.

A key tenet of this approach is that while expenditures have a direct economic impact on the people and firms receiving the outlays, they also have an indirect effect when this money is spent again in other sectors of the economy. Put another way, subsequent economic agents spend the same dollar put into the economy by the first agent. Accounting for both the direct and indirect impact of expenditures by using an expenditure multiplier allows a researcher to obtain a more realistic estimate of the total economic effect of a university.

Numerous universities and state systems of higher education have used an economic base approach to estimate their economic impact on a region or state. Duke University's study, Durham and Duke, is a good example of a study using the economic base methodology. The Duke study categorizes the university's economic impact into five broad divisions: employment; purchasing; institutional donations to the community; student and visitor spending; and services, taxes, and fees. Included across these divisions include such broad categories as research dollars, construction outlays, housing allowances for graduate students, etc. It then further disaggregates these divisions to demonstrate where, exactly, its expenditures are going (e.g. the amount of University expenditures to minority or women-owned vendors in the region, the amount of uncompensated costs the University health system incur by taking care of the county's residents, the amount of local expenditures that students make in an academic year, or the amount of earnings paid to non-academic staff). The study identifies all of the expenses that had been 'outsourced' to an out-of-region firm, but notes that these outlays might very well have found their way back into the region (e.g. an out-of-state construction contractor hiring local labor).

After summing up the university's annual economic outlays, the Duke study calculates the indirect effect that its outlays have on the Durham economy by applying an expenditure multiplier. Estimates for these multipliers vary; the Duke study uses a conservative multiplier—1:1 (that is, each dollar spent by the university is spent one more time by another agent), but other researchers have utilized multipliers ranging from 1:1.8 to 1:3.1 Most economic base studies also incorporate a jobs multiplier to estimate the number of jobs created outside of the university or college in response to an institution's expenditures. While the Duke study assumes 0.04 jobs are created per \$1,000 of expenditures, other studies (McFarland, 1997) offer a figure as high as 0.09 job creation per \$1,000 of expenditures.

There are several drawbacks to the economic base approach. First, the choice of the multiplier makes a big difference in the ultimate estimate of economic impact. Second, it answers the question of the total effect of universities on regional economies, but it does not estimate the net effect. If the

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<sup>1</sup> The Bureau of Economic Analysis of the U.S. Department of Commerce produces multiplier estimates for higher education, but these data are only available for purchase. See their regional economic modeling page at <http://www.bea.gov/bea/regional/rims/>

university did not exist, economic activity in a region wouldn't necessarily drop by the total amount universities expend, because while some resources (e.g. federal research funding) would have been lost by the region altogether, other resources would likely have been diverted to another industry or activity within the region. Determining how the resources would have been spent in the absence of a university or college is nearly impossible; this is why many studies do not attempt to account for this and instead simply measure the total, rather than net, economic impact of institutions of higher education.

Some academic researchers (Beck, et. al., 1995; Brown and Heaney, 1997) have proposed a method to assess a university's net effect on a region by focusing on the exogenous (or non-regional) funding sources that a university attracts. Under this methodology, only items like federal research funding and expenditures by out-of-state students spur a gain for a region's economy. The principal limitation to this approach is its assumption that an institution of higher education cannot have any intra-regional net positive impact on a region's economic base.

Not all economic base studies focus on input-output modeling and multiplier effects; some are more interested in the explicit, direct economic effects that institutions of higher education bring to a region. A recent study by the Association of Independent Colleges and Universities of Pennsylvania (AICUP) took this approach, measuring the independent colleges' impact through disaggregated statistics on each college's importance in its region and in the state. For instance, the study reports that, in terms of payroll size, independent colleges and universities are the fourth-largest private sector employer in the state, infusing more than \$90 million in payroll benefits into the greater Erie region alone.

### **Skills base approach**

The skills base approach supplements the economic base approach by attempting to quantify the impact that higher education institutions' outputs have on the long-run course of a region's economy. Colleges and universities, through teaching and research, produce skilled workers and increases in technology, both of which can directly increase the effective wage rates in a region. Higher wage rates can benefit a region's economy through increased tax revenue for state and local governments, increased consumption, and higher rates of saving and investment. Researchers embracing this methodology argue that any measure of the economic impact of higher education should include the higher wages and salaries that college graduates earn in a region.

Bluestone (1993) and Berger and Black (1993) are two of the earliest studies to address this issue. Both use estimates of the potential future income stream of college graduates who stay to work in the region as the measure of the long-run economic impact of higher education, but they take slightly different methodological approaches. Bluestone's study of the impact of UMass Boston compares earnings figures (obtained from the Bureau of Labor Statistics' Current Population Survey) for various demographic groups within Massachusetts, an approach which assumes that UMass Boston's graduates will attain incomes similar to those of the college graduates already in the Greater Boston area. The Berger and Black study, by contrast, uses time series data to measure the actual income trajectories of public college graduates in Kentucky relative to graduates from other institutions in the

state. Both studies find significant positive economic effects to the region from the skills that a university imparts upon its graduates.

Researchers using the skills base approach must be careful of over inflating their estimates, a problem that can occur for several reasons. First, without being able to control for a worker's inherent ability, there is no way to know whether a worker earns higher wages because she attended an institution of higher education or because she was just intrinsically a better worker. Second, increases in wages might be attributable not to increases in worker productivity from education but rather to overarching trends in the wage and productivity growth (Beck, et. al. 1995). Finally, as Brown and Heaney (1997) argue, assuming that every graduate of a college or university stays within the region can also inflate estimates, as the greater geographic mobility of college graduates can lead to a "brain drain" of more educated workers out of the region's economy.

In addition to studies that look at the earnings impacts of higher education, other studies have attempted to directly quantify the effects of technology spillovers stemming from institutions of higher education. A 2002 economic impact assessment of The University System of Maryland reports the total number of research expenditures by the system, the total number of patent applications filed, gross income received from technology licenses and options, and the number of start-up companies formed by the university system. Other studies have highlighted the role that universities have played in the success of Boston's Route 128 region, looking at, for instance, the number of start-up companies that MIT has incubated (Rosengrant and Lampe, 1992; BankBoston, 1997).

Finally, some recent research has looked beyond the immediate effect of education on wages to consider the less tangible effects that universities have on their communities. For instance, researchers have established that college graduates are more likely to volunteer in their communities, vote and be aware of political events, require less health care, not smoke, experience lower rates and durations of unemployment, participate in the labor force, and not require public assistance at some point in their lives (Institute for Higher Education Policy, 2005). These secondary economic effects are also worth considering, although they are also subject to the same biases listed above.

## **Recommendations for NEBHE**

Assessing the economic impact of higher educations in New England presents some challenges to the researcher. The scope of the project—encompassing public and private institutions across six states—is of a level rarely conducted by researchers. However, NEBHE has a wealth of data, information, and connections at its disposal that should prove to be instrumental in completing its economic impact study—a study that should aim to include both the economic and skills base methodologies so that its audience will have the most comprehensive assessment of the economic impact of New England's institutions of higher education.

For the economic base portion, a good model to follow in handling the scale of this project would be the AICUP study of Pennsylvania's independent colleges and universities. The AICUP study is unique in that it goes beyond a regional approach, also analyzing economic impacts within smaller geographies. New England, roughly comparable in land size and population to Pennsylvania, could similarly be broken down into small, cohesive geographic units (e.g. the Connecticut River valley,

greater Boston, coastal Maine). NEBHE should be able to locate and identify the institutions of higher education within each geography and calculate the economic base that the institutions contribute to the area. Total expenditure outlays by all institutions within each area could then be disaggregated into narrower categories, similar to the Duke study. These totals may then be easily combined into a calculation of the total economic base that higher education institutions provide for the entire six states.

For the skills base portion, a cross-sectional approach would likely be the easiest approach because of the proposed scope of the study. Instead of obtaining different earnings trajectories for graduates of each and every institution, NEBHE should find the average premium in lifetime earnings that college-educated individuals across the region enjoy and apply this number to the number of graduates of New England's colleges and universities that stay within the region after graduating. Because of the high amount of internal migration within the region, especially among college graduates, it will be difficult to measure the impact of higher wages for the smaller geographies. As an alternative, NEBHE can assess the wage effects for the entire region as a whole, taking care to control for the out-migration of some of the region's college graduates. Coupled with results from an economic base study, a skills base measure would provide a more holistic understanding of the true economic impact of higher education in New England.

Finally, the New England region is ripe with academics in this field of study. It behooves NEBHE to get in touch with such leading researchers as Barry Bluestone at Northeastern and Claudia Goldin, Caroline Hoxby, and Bridget Long at Harvard University. These researchers might provide additional insights into assessing the economic impact of higher education across New England.

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