

**IOWA STATE UNIVERSITY OF
SCIENCE AND TECHNOLOGY**

Measuring University Contributions
to Regional Economies:

A Discussion of Guidelines for
Enhancing Credibility

Dave Swenson
8/1/2011

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Measuring University Contributions to Regional Economies: A Discussion of Guidelines for Enhancing Credibility

Dave Swenson
Iowa State University
August 2011

Overview of Basic Guidelines and Considerations

In light of tight state fiscal accounts, increased competition among all government service providers for scarce resources, and a poorly performing national economy, public universities are under increasing pressure to demonstrate their worth to regional or statewide economies. This has resulted in a proliferation of university economic impact studies.

This paper is not a primer on the nuts and bolts of input-output analysis or economic impact analysis in general, nor does it evaluate specific university impact studies. Instead, it is a guide to assist public university economic impact practitioners plan, structure, evaluate, and disseminate higher education economic information that can be used for policy development, general planning, and overall university relations. It provides some basic considerations, cautions, and checks that university economic impact studies should keep in mind when engaging in this activity. The foundations for these items of concern or caution are more fully developed in the paper. It begins with a check-list that universities may wish to use to ensure that valid and methodologically sound approaches are employed when describing university economic contributions to regional and state economies.

When Measuring University Economic Contributions and Economic Impacts:

1. Any study of university economic contributions to a regional or a statewide economy must employ proper and up-to-date modeling systems.
 - Are the analysts using a current input output (IO) modeling system like Implan or its structural equivalent, or a current table of RIMS II multipliers, and
 - Have the models or the multiplier tables been specified for the appropriate region of analysis?
2. The ability of the analyst is of primary importance in conducting university economic impact reports as the quality of the research will directly reflect on the higher institution at large:
 - Do the analysts demonstrate a solid and thorough understanding of IO methods and procedures, and
 - Can the analysts adequately explain and defend findings to the public, policy makers, or the media with the kind of confidence and authority that universities expect from all of their scholars?

3. A clear understanding of regional economic accounts, for example, to include the ability to differentiate between economic activity that is intrinsic to a state or regional economy versus that which would be considered net new regional or statewide productivity, is essential to producing credible studies of overall university economic contributions and economic impacts.
 - Are the analysts able to clearly describe and distinguish economic activity that has occurred in the state or region “but-for” the presence of the university from the activity that would have occurred nonetheless by virtue of expected state service delivery, and
 - Have the analysts carefully segregated their evaluation so that it is clear to readers which components of regional or statewide economic contribution and impact are attributable to university activities and which are attributable to the activities of students and visitors?
4. Extra-university spending can constitute a sizable component of the direct and indirect contribution universities make to regional economies.
 - Have the researchers employed procedures that distinguish between student on-campus and off-campus spending,
 - Have researchers controlled for student spending in a manner that does not double count student spending with all university spending, and
 - Have researchers used defensible and statistically reliable methods to estimate the economic value of non-student visitorship to the region?
5. When measuring a university’s activities, it is useful to differentiate among its core educational activities, research and public service, its revenue-generating enterprises, and its health care or veterinary services (if appropriate) in order to properly allocate regional economic contributions and labor-related outcomes to specific university functions.
 - Have researchers adequately described university expenditures in manners that suggest an awareness of the range of activities universities are engaged in, and
 - Have researchers allocated university faculty and staff across those many functions to describe where the job and income-related outcomes of university spending are located?

When Reporting Economic Contribution Outcomes:

1. Clear and concise reporting of IO modeling or other estimation procedures is critical to conveying an accurate understanding of the economic contribution of universities to regional or state accounts.
 - Are the findings presented in a manner that allows a reader to distinguish among the components of economic activity attributable to the university, and
 - Do the results and the resulting implicit or declared multipliers make sense in general?

2. Economic contribution analysis should use standard and straightforward language to describe the findings, and should forgo the use of private investment jargon when describing university values.
 - Do the consultants lapse into discussing the return on investment or the leveraging value of state spending,
 - Do the results improperly claim that state taxpayers, in essence, have been made whole in that university relative economic impacts generate more than enough tax revenues to cover state support, or
 - Are annual economic outcomes described in a manner as to inappropriately imply net-beneficial gains to social welfare?

3. There are knowledge and other intangible spillovers emanating from all universities. Universities may create the conditions for entrepreneurship and enhanced regional productivity; however, measuring those regional gains or the lifetime worth of university attendance is difficult and highly imprecise as is apportioning such measurements to particular institutions.
 - Has the study attempted to impute “downstream” economic activity with the assumption that there is clear and convincing causality between university activities and spillover regional growth, or
 - Have university researchers attempted via measures of lifetime earnings and other measures to differentiate themselves from some alternative?

4. University-linked incubators and business development centers are private ventures that tap into university services, talent, or knowledge spillovers. Similarly, university staff entrepreneurship produces a wide array of products, services, and contributions to regional economies.
 - Have universities attempted to fold in private economic gains into their declarations of regional economic worth, or
 - Have universities attempted to appropriate the value of staff entrepreneurship as a tangible output of the university?

I contend that university economic impact studies can be improved by paying attention to these guidelines and considerations. These types of studies should reflect the high standards that universities insist of their faculty and scientists and should not, as will be developed in this paper, inflate university economic contributions by mischaracterizing the value of a university to a region or to society at large.

Furthermore, a general standardization of university economic impact studies will allow for more reliable determinations of their worth, enable the legitimate comparison of institutions with one another, hopefully empower both producers and reviewers of such research, and should enhance public and lawmaker confidence in university promotional activities. All are worthy and necessary objectives.

Introduction

Public universities are complicated and diverse institutions. They provide a very wide range of services, and the users and providers of those services interact with one another and with society in very unique manners. Accordingly, their ostensible values to the economy and to society are both tangible, in that they can be quantified using a variety of conventional measures, and they are intangible in that they infuse and enhance a states' cultural, historical, and recreational heritage and identities.

A university's presence in a region or a university system in a state may exert considerable influence on educational opportunities, cultural options, recreational choices, and the tone and tenor of regional economic vitality. Universities are large, they employ many people, they serve even more people, and they are directly and indirectly responsible for large fractions of regional incomes. A university influences the types of businesses in an area, housing values, the availability of area goods and services, and private and public infrastructure investments. In short, most universities have large and lasting economic and social footprints.

Many public universities have found it necessary to measure and promote their regional or statewide economic values in recent years, especially in light of tight state fiscal accounts, keen competition among service providers for scarce dollars, and a poorly performing national economy. A review of a sample of those efforts will lead one to conclude that some are basic, straightforward, and reasonable, while others strain credulity as they seek unconventional ways to describe university contributions to regional economic well-being. As credibility is an important objective of university economic studies, a standardization of measurements and measurement procedures will allow policy makers and citizens to compare universities with other types of public and private services as well as compare institutions with one another.

This paper is not a primer on the nuts and bolts of input-output, benefit-cost, or any other type of conventional analysis of the near and long term worth of public institutions. It is instead a guide for public university economic impact practitioners for planning, structuring, evaluating, and distributing higher education economic information for use in policy development, planning, and university relations. This paper is also not a comprehensive evaluation of the range of studies that have been produced, though dozens have been perused over the years by this writer. It represents my sense as to the more appropriate and more credible approaches universities should take when documenting the economic potency of a university system. Infused within, therefore, are normative considerations in that there are several "oughts" and "ought nots" described.

The paper is motivated by and organized considering one over-riding premise: when measuring public universities and their contributions to regional or statewide economies and society at-large, do it right or don't do it at all. Universities are houses of high standards, and those high standards should apply to all university products. Economic impact summaries must not be an exception to that rule.

A. Measuring University Economic Contributions and Economic Impacts

1. Using Modeling Systems or Tables of Multipliers

U.S. public universities are a complicated amalgam of institutions that depend on taxpayer support, fees and charges, donations, and grants to provide

- Higher education services
- Medical or veterinary care
- Research, development, and technology transfer services
- Recreational, entertainment, and cultural activities

The degrees to which any given institution produces these services may vary widely, but in the main, the primary justification for our universities is to deliver higher education to in-state residents, and secondarily, to out-of-state students. They are a component of state government spending, and when state governments reconcile their annual accounts using Generally Accepted Accounting Principles, all of the revenues and outlays of our public higher education systems are properly documented as state general fund activities.

Like all categories of government services, public universities are distinct and easily measured subsets of state or regional economies. Their revenue sources and their spending decisions are a matter of public record, and it does not require much investigation to isolate any university's annual report of activities. When done, overall higher education outlays can be easily compared to other state government services, as can their sources of revenues. For a one year period or over time, this basic method of assessing public higher education spending can yield a wealth of useful information about public support, spending efficiencies, employment changes, and the range of services provided by our universities.

Over the years, however, there has been a growing emphasis on identifying the "economic impacts," or, perhaps more accurately, the economic "contributions" of our universities to regional or state economies. These kinds of measures take into account not only a university's actual direct spending for payroll, goods, and services, but also consider the indirect effects a university system has on in-state (or in-region) suppliers to the university, as well as all of the economic activity that emanates from university and supplying-sector employee spending as they convert their paychecks into household purchases.

Properly done, this estimation process identifies a multiplier effect attributable to university spending in terms of total regional (or statewide) business activity, incomes to workers, and jobs that is greater than the annual outlays of the university, its staffing, and payroll. It allows officials to claim a modicum of regional economic potency in excess of reported annual spending, along with regional economic importance extending beyond the normal boundaries of a university primary service and employment area. A university's multiplier effects for a region or a state are primarily determined through the use of two conventional mechanisms:

1. Researchers will construct a suitably detailed input-output (IO) model of the regional economy of scrutiny, or
2. Researchers will apply a set of higher education multipliers to total university outlays or, alternatively, it will apply a detailed schedule of multipliers to itemized university outlays that occur in the region.

A widely-used IO modeling system is distributed by Minnesota Implan Group, Inc (MIG). Their model structure allows skilled analysts to configure a study subject's industrial accounts, in this case a public university, in a manner that is generally consistent with IO measurement procedures. MIG has been supplying data for substate-level modeling for over 25 years, and is the most relied-upon source for IO data among academics and government agencies. Implan models have high industrial specificity, as well as high regional specificity. There are 440 industrial sectors in the national Implan model, and study regions can be a zip-code area, a county, a combination of contiguous counties, state, state combinations, or the nation.

A common source for industrial multipliers is the RIMS II system of the U.S. Bureau of Economic Development. RIMS II is not an IO model; instead, the service produces for-a-fee regionally-specific multipliers from IO models managed internally at BEA. Analysts then apply the multipliers to their scenario of interest. As the BEA is the U.S.'s chief agency for compiling national industrial information, the agency periodically produces benchmark input output accounts at the national level, which serve as the technical foundation for most IO systems used in the U.S.

Whether analysts use an input-output model or a table of multipliers, it is essential they utilize coefficients that are appropriate to the region of analysis. A researcher studying a statewide university system would use an IO model or table of multipliers specified for that particular state. It is inappropriate to use multipliers from another state or from the nation. There is wide variance in multipliers across states owing to their sizes and the overall mix of industries that might be found in, say, a South Dakota versus an Oregon. The use of state multipliers to estimate a much smaller sub-region, or the use of national multipliers to measure a state both have the effects of minimizing trade leakages and over-describing economic activity. It is also inappropriate to use some sort of single, trans-university multiplier for institutions in different states.

Last, there are continuous transformations in regional and state economies. It is preferred that analysts use modeling systems or multipliers that are as recent as possible. Implan modeling for 2011 relies on industrial estimates for 2009. The current RIMS II multipliers are based on 2007 industrial estimates.

Any study of university economic contributions to a regional or a statewide economy must employ proper and up-to-date modeling systems.

- **Are the analysts using a current IO modeling system like Implan or its structural equivalent, or a current table of RIMS II multipliers, and**
- **Have the models or the multiplier tables been specified for the appropriate region of analysis?**

2. The Estimation Process and Reliable Reporting

Using a table of industrial multipliers or analyzing a university using an input-output (IO) model requires education, topical aptitude, and experience. IO industrial accounting systems have inherent strengths and weaknesses, and practiced analysts are mindful of those attributes when utilizing either IO models or tables of multipliers. The core ability to operate a modeling software system or use a spreadsheet to apply RIMS II multipliers is not in and of itself sufficient to engender confidence in measurement results. In addition, most university graduate economic programs do not provide course work on input-output systems development beyond the introductory level, so even economists are to be scrutinized carefully.

There are, in short, a range of competencies and perspectives that should be evidenced when conducting IO or multiplier analysis. Among common the competencies might include:

- An ability to modify a study region's social accounts in an IO system so that, for example, the higher education sector contained the actual labor costs, jobs, and major expenditure categories of the entity being studied.
- An understanding of the probability that procured goods or services are purchased from within-region suppliers, and an understanding of how to estimate and adjust for the likelihood of a regional purchase.
- A demonstrated understanding, whether using an IO model or a table of multipliers method, of the special treatment one must afford trade and transportation margins.
- An understanding of the temporal limits to IO model or table of multiplier projections.
- A demonstrated understanding of the elements of output, in particular the value added components of the results.
- An ability to explain to the taxpaying public what the findings mean and how they were arrived at.

Importantly, analysts conducting IO or table of multiplier analyses should be able to discuss the underlying structures of all IO models and tables of multipliers, to include all of the elements and steps of a standard multiplier-producing process, known academically as the Leontief input-output modeling technique. Analysts lacking this type of background are certainly capable of operating modeling systems or applying tables of multipliers correctly, but they may be unable to answer questions about the foundations of IO analysis and its inherent limits and strengths.

The ability of the analyst is of primary importance in conducting university economic impact reports as the quality of the research will directly reflect on the higher institution at large:

- **Do the analysts demonstrate a solid and thorough understanding of IO methods and procedures, and**
- **Can the analysts adequately explain and defend findings to the public, policy makers, or the media with the kind of confidence and authority that universities expect from all of their scholars?**

3. Describing Total Economic Contributions and Estimated Economic Impacts

State universities are an intrinsic component of any state's economy. They have evolved over time to satisfy resident population needs, and while many states have one or two dominant institutions, they also have many smaller technical and four year colleges distributed on a regional basis or that have evolved as population changes have demanded. A state's university system typically can be seen as a regular component of state public service delivery that satisfies educational, health care, cultural, and recreational demands. Accordingly, state universities contribute to the state's economy in important, measurable, and expected ways.

The degree to which a university constitutes a regional or statewide economic impact, however, is some subset of its overall economic contribution. Regular university education, health care, cultural, or recreational services that have evolved to satisfy current in-state population demands are intrinsic and long-standing components of the economy. One does not realistically talk about a "with or without" situation as public higher education and all of the concomitant activities normally associated with university systems would unarguably exist somewhere in the state. But universities do engage in service exports in that they host out-of-state students or they otherwise attract visitors to their educational, health care, cultural, or recreational activities who otherwise might not have done so "but-for" the presence of the university. Universities also export research and technical transfer services, most especially in the cases where research is sponsored by federal sources, foundations, or directly by private industries.

Student spending in the broader economy outside of the college also constitutes an important contribution to regional economic accounts, but in-state student spending, again, would have occurred somewhere within the state and thus should initially be measured in terms of its localized contribution to regional economic activity. Like university operations in general, however, off-campus spending by out-of-state students and visitors in fact represents net additions to regional and statewide consumption. That subset of regional spending will also constitute an economic impact, and can be segregated to make that point.

A clear understanding of regional economic accounts, for example, to include the ability to differentiate between economic activity that is intrinsic to a state or regional economy versus that which would be considered net new regional or statewide productivity, is essential to producing credible studies of overall university economic contributions and economic impacts.

- **Are the analysts able to clearly describe and distinguish economic activity that has occurred in the state or region "but-for" the presence of the university from the activity that would have occurred nonetheless by virtue of expected state service delivery, and**
- **Have the analysts carefully segregated their evaluation so that it is clear to readers which components of regional or statewide economic contribution and impact are attributable to university activities and which are attributable to the activities of students and visitors?**

4. Identifying and Measuring Extra-University Economic Activity

Student and visitor spending levels along with their area spending preferences should be measured using reliable survey methods if possible. Reliable survey methods have sufficient survey sample sizes, are drawn properly from a pre-identified population, and can adequately describe the population's attributes in enough detail as to engender statistical confidence in the results. This is especially true for the range of non-student consumers of university activities as they are a very heterogeneous group. Surveys of all attendees to workshops, summer camps, cultural events, athletic activities, medical facilities, and regular university educational programming would have to encompass an entire year, would have to be of sufficient sample size so as to adequately characterize major classes of visitors, and would adequately differentiate among visitors whom were in-state versus those that were out of state for the purpose of isolating potential net regional productivity gains to accommodate their needs.

In lieu of a statistically valid sample, a satisfactory preliminary estimate of student off-campus spending might be obtained using university financial aid tables. In the table below, for example, university and non-university expected average costs for Iowa State University can be discerned for undergraduate and graduate students. Analysts can attribute room and board costs for off-campus students to the general economy. All students' other personal expenses can be allocated across retail, service, utility, transportation, and service sectors in proportions reflective of the spending of young adults. Those expected proportions might be obtained from, for example, recent Consumer Expenditure Surveys produced by the Bureau of Labor Statistics, which describe consumption patterns of householders under the age of 25. While the use of financial aid templates is not based on a survey, it is reasonable to assume that university financial aid officials have strong incentives to adequately represent typical college attendance costs.

ISU UNDERGRADUATE STUDENT COSTS

	Resident	Non-Resident
Year	'09-'10	'09-'10
Tuition & Fees	\$6,651	\$17,871
Room & Board	\$7,277	\$7,277
Books & Supplies	\$1,000	\$1,000
Total University Expenses	\$14,928	\$26,148
Other Personal Expenses	\$3,438	\$3,438
Total Expected Cost of Attendance	\$18,370	\$29,590

ISU GRADUATE STUDENT COSTS

	Resident	Non-Resident
Year	'09-'10	'09-'10
Tuition & Fees	\$7,565	\$18,665
Room & Board	\$8,550	\$8,550
Books & Supplies	\$1,000	\$1,000
Total University Expenses	\$17,115	\$28,215
Other Personal Expenses	\$4,175	\$5,561
Total Expected Cost of Attendance	\$21,290	\$33,780

There is, however, no reliable short-hand method for estimating within-university and extra-university spending by non-student visitors to universities. Most modern universities have scores of camps, workshops, seminars, conferences, cultural events, and athletic activities annually. The attendances at these events are extremely diverse and discriminate. One would not, for example, sample attendees at one conference or workshop, and a handful of athletic events to then infer to the larger population of university visitors, but owing to the high costs of a comprehensive annual survey, that is often the type of “snapshot” survey employed for estimating the regional value of visitor spending. Such shortcut measures cannot be generalized to other population groups, and should not be used to infer the economic impact of visitors.

Extra-university spending can constitute a sizable component of the direct and indirect contribution universities make to regional economies.

- **Have the researchers employed procedures that distinguish between student on-campus and off-campus spending,**
- **Have researchers controlled for student spending in a manner that does not double count student spending with all university spending, and**
- **Have researchers used defensible and statistically reliable methods to estimate the economic value of non-student visitorship to the region?**

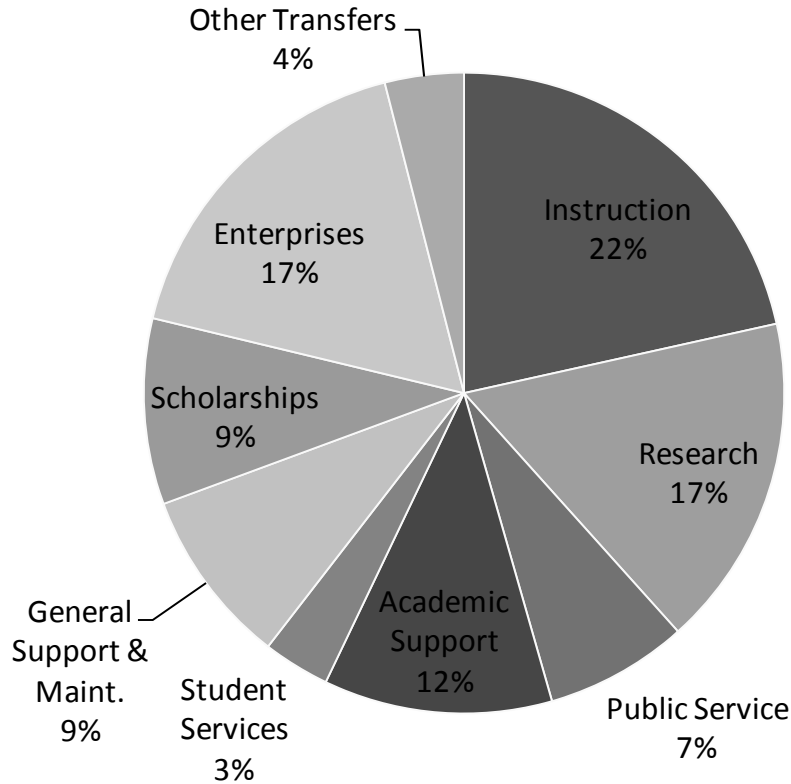
5. Allocating Spending and Personnel Across Different University Functions

Universities are complicated entities that have a variety of core missions. They exist primarily to educate students, as a venue in which scientific and social research take place, as an environment conducive to artistic and literary expression, and as service centers for communities and for states. Universities also operate enterprises like athletic programs, events centers, academic and sports camps, housing and food services for students, and retail and services geared towards student and staff needs.

The accompanying graphic below displays Iowa State University spending proportions for the 2009 / 2010 academic year. With a budget of slightly more than \$1.0 billion, instruction and general academic support constituted a combined 34 percent of spending. Enterprises like student housing and other revenue-generating activities and research, which also generate revenues, likewise constituted 34 percent of spending. Scholarships, 9 percent of the total, are university expenditures that translate into student consumption of educational services; they can be considered university payments to students just as university instructors receive payments for their labor. Taken as a whole, analysts must be mindful that they properly classify university activities and consider a university as a multi-faceted organization with many different parts as opposed to an amorphous higher education or research entity.

It is often the case that general university operations for instruction, academic support, public service, research, and overall general support and maintenance are identified as the core educational activities of a university. All activities that support students, such as student housing, dining, and other student supports might be categorically separated. Finally, a third general breakdown could consider all other

revenue-producing enterprises, which would include athletics, university hospitals and clinics, and university centers for events and the performing arts.



Staff allocations across these categories can be problematical. University faculty members provide both instruction and research services. Scientists, service staff, and technicians may be engaged in university research or they may work in support of instructional activities. Non-faculty professionals may conduct both research and deliver public services as also may faculty, as would be the case with Cooperative Extension activities among the nation’s land grant institutions.

When measuring a university’s activities, it is useful to differentiate among its core educational activities, research and public service, its revenue-generating enterprises, and its health care or veterinary services (if appropriate) in order to properly allocate regional economic contributions and labor-related outcomes to specific university functions.

- **Have researchers adequately described university expenditures in manners that suggest an awareness of the range of activities universities are engaged in, and**
- **Have researchers allocated university faculty and staff across those many functions to describe where the job and income-related outcomes of university spending are located?**

B. Reporting Economic Contribution Outcomes

1. Standardizing the Reporting of Results

An IO modeling process or the application of a table of multipliers produces sets of tables, given the scenarios that were measured, that are not generally understood by the public at-large. University economic contribution analysts have two straightforward obligations in this regard:

1. They must present enough itemized detail so that the elements of the research can be scrutinized by reviewers, and
2. They must describe the findings in manners that align with conventional word usage for these practices, yet are done in ways that engender clear and common understandings of the results.

Impact modeling not only requires analytic deft, it requires linguistic precision. The total annual spending of a university, for example, constitutes the components of its output. Output is made up of all payments to suppliers of goods and services, whether procured within the study region or not, plus all payments to value added. Value added is mainly composed of payments to university employees or as payments in-kind in the case of scholarships to students, plus payments that take the form of profits to university enterprises, plus indirect tax payments that may occur as a result of university activities. Value added is a preferred method of reporting the net value of economic activity as it is exactly the same value as gross domestic product (GDP), which is the standard measure of total economic activity in a state on an annual basis.

At a minimum, reports of the findings should describe a university's direct economic activity, i.e., all university output, payments to labor income, and total jobs, as well as, via the modeling process employed, the total outcomes (or economic contributions) for output, value added, labor income, and jobs. Total economic contributions are compiled thus for every category measured, output, value added, labor income, and jobs in the form of:

- Direct activity (at the university level only)
Plus
- Indirect activity (purchases from regional suppliers)
Plus
- Induced activity (which occurs when workers spend their paychecks on household needs)
Equals
- Total economic value

The following table lists the components of a standard economic contribution analysis for all Iowa public universities and community colleges and its university hospitals and clinics. A straightforward explanation of the findings would read like this:

All publicly funded higher education and university health care spending in Iowa in fiscal 2010 was \$4.42 billion. In producing that output, 59,824 employees were paid \$2.48 billion in labor income. Higher education in Iowa required \$1.19 billion in Iowa-supplied inputs to occur, which in turn supported

10,288 jobs making \$415.7 million in labor income. When the workers in higher education and those in supplying sectors converted their labor incomes into household spending, they induced \$2.19 billion in additional output in the Iowa economy, which in turn required 21,793 jobs making \$717.2 million in labor income. Combined, Iowa higher education and health delivery explained \$7.8 billion in industrial output in the state, \$4.65 billion in value added, \$3.61 billion in labor income, and 91,906 total jobs.

Total Economic Contributions of State of Iowa Institutions of Higher Education, 2009/2010

	Direct	Indirect	Induced	Total
Total Output \$	4,415,100,283	1,190,990,798	2,189,380,637	7,795,471,718
Value Added \$	2,738,575,793	616,840,939	1,292,962,847	4,648,379,579
Labor Income \$	2,477,488,034	415,733,756	717,160,910	3,610,382,700
Jobs	59,824	10,288	21,793	91,906

This table also allows us to discern line-item multipliers. Multipliers are simply the total value divided by the direct value. Higher education spending in Iowa has an output multiplier of 1.77 (\$7.795 billion ÷ \$4.415 billion = 1.77), which means that every \$1 of higher education direct spending links to \$.77 in indirect and induced activity statewide. The value added multiplier of 1.70 (\$4.65 billion ÷ \$2.74 billion = 1.70) means that every \$1 of value added paid by Iowa's higher education institutions results in \$.70 in value added accumulating in the rest of the economy. The labor income multiplier of 1.46 (\$3.61 billion ÷ \$2.48 billion = 1.46) means that for every \$1 in labor income that is paid to higher education employees, \$46 in labor income is supported in the rest of the Iowa economy. Finally, the jobs multiplier of 1.54 (91,906 ÷ 59,824 = 1.54) means that for every job in Iowa's higher education system, 54/100th of a job is supported in the rest of the economy.

These are all very typical multipliers for regional or statewide higher education activities. Reports of multipliers for output, labor income, or for jobs that are higher than, say, 2.0 are highly unlikely in most economic regions and should be scrutinized cautiously.

The previous table was produced from IO models for the state of Iowa that were built specifically to accommodate characteristics of its higher education institutions and health care delivery. It is frequently the case, as would happen when using RIMS II total multipliers, that only direct and total economic contributions will be described, where the difference between the two would equal the sum of indirect and induced activity. As an inherent limit to that type of modeling, reviewers must be satisfied with only that level of detail, but it must be noted that in so doing, one would not know how to divide up impacts between suppliers to the university, the indirect effects, and suppliers of household goods and services, the induced effects. Both pieces of information have policy relevance, and as is always the case with public policy-related research, more information is to be preferred to less.

Clear and concise reporting of IO modeling or other estimation procedures is critical to conveying an accurate understanding of the economic contribution of universities to regional or state accounts.

- **Are the findings presented in a manner that allows a reader to distinguish among the components of economic activity attributable to the university, and**
- **Do the results and the resulting implicit or declared multipliers make sense in general?**

2. Appropriate and Inappropriate Characterizations of the Findings

This paper has already discussed the difference between measuring the total economic contributions our universities make in our state or regional economies and the estimated economic impact our institutions make. The economic impact occurs as we segregate activity that is exogenously demanded or funded, and via the modeling process conclude that it explains net gains in our regional or statewide economic accounts – that “but-for” the activity described, the state or regional economy would have been smaller. It is therefore not correct to claim that the total economic contribution of a university constitutes its economic impact. As it is absurd to consider a university as a “with or without” element of one’s economy, it is just as erroneous to analytically pretend university economic activity is ostensibly in jeopardy of vaporizing when describing findings.

Analysts are also advised to not get caught up in the imprecise use of conventional social or financial measures that in fact have well defined and restrictive meanings in public and private finance. For example, some analysts have attempted to divide the total economic output of a university considering all linkages to suppliers and university staff’s household spending by the state funding to arrive at a gross “return on state investment” (ROI) ratio. These are to be frowned upon and are considered most vulgar in their application. Gross economic output is not a “return” in any respected sense of the word, it is simply and only the identified pattern and amount of spending directly and indirectly attributable to a university. Second, state funding is not an “investment,” in a financial sense; the term is used colloquially and often indiscriminately to infer robust returns to tax-payers.

General state funding is the use of tax-payer money to provide a wide array of public goods that have intrinsic social, economic, cultural, and human capital value. We do not invest in court services, law enforcement, prison guards, highway patrol officers, or clean air and water in hopes of a tangible financial return relative to outlays. Nonetheless, promoters of universities (and state legislative funders) have become fond of the “investment” term, despite its inaccurate application to the situation that was evaluated. An investment means that we expect a monetary return that can be utilized in lieu of our original payment. The ostensible return that is claimed, gross output, is not available for state government and its citizens to use to purchase an equivalent amount of public goods. Accordingly return on investment jargon distorts and misleads supporters, citizens, and legislators.

It is also the case that state support of higher education is said to be leveraging external funds. This claim is analogous to the ROI implication. For example, state support of higher education does not leverage tuitions or federal grants in that an increase in state funding, for example, would lead to an

increase in either. This causal characterization of state spending is fanciful and self-flattering, but inaccurate and should be avoided.

Here is another reason why: universities are staffed with economists and finance professors who teach students about markets, investments, risk, and returns. The profligate use of ROI-type descriptions undermines the credibility of universities, most especially regarding the ability of faculty to validate such assertions, in light of the content of instruction delivered to students, and in light of prevailing practices in the private sector.

Another common misuse, analogous to ROI, is to imply a benefit-to-cost outcome due to university activities or services. In conventional and well-established government evaluation language, benefits have a defined meaning as to costs. Economic benefits are agreed-upon, quantifiable, and tangible enhancements to general social well-being as a result of public spending over an extended period of time. By its very nature, there are enhancements to net social productivity attributable to institutions of higher education – education is positively and strongly correlated with higher lifetime earnings, high levels of productivity for longer periods of time, and far lower levels of lifetime social costs. By its very nature there are enhancements to net social productivity or well-being attributable to public health spending, as well – vaccinations, for example, are positively and strongly correlated to longer and healthier lives. Just as we can quantify the benefits of public health programs vis a vis the costs, we can do the same for higher education.

Benefit-cost analysis is, however, an activity that is completely distinct from economic impact assessment. Economic impact studies look at the value of sets of institutional, student, and visitor activities within a circumscribed economy on an annual basis. Benefit-cost analysis is much different. It measures the value of increments to consumer or producer surpluses (benefits) over a long period of time that are meaningfully linked to discrete sets of publicly funded activities (the costs). Generally, when we have a mature system of public goods delivery, we measure benefits and costs on the margins; i.e., changes in benefits attributable to changes in costs for a particular aspect of a new or revised programming.

Stated simply, benefit-costs analysis and economic impact or economic contribution analysis are two completely separate measures of the worth of institutions of higher education. The multiplied-through output, value added, labor income, and job outcomes are not benefits within the restricted meaning in government decision making, and characterizing them as such is inappropriate.

Finally, an ersatz benefit-cost conclusion is sometimes implied regarding fiscal outcomes associated with university economic contributions. Measures of university economic contributions will occasionally include estimates of state government tax revenues that would be associated with the incomes that are directly and indirectly supported by university operations and other activities. Next, analysts compare those gross state tax receipts to taxpayer support for the university, implying that the university and all of its related activities in fact fully or significantly reimburses the state for its support. The state taxes that householders contribute to state accounts pay for the entire range of state of state goods and services demanded by all citizens is the implication, so to infer full taxpayer repayment is misleading.

Economic contribution analysis should use standard and straightforward language to describe the findings, and should forgo the use of private investment jargon when describing university values.

- Do the consultants lapse into discussing the return on investment or the leveraging value of state spending,
- Do the results improperly claim that state taxpayers, in essence, have been made whole in that university relative economic impacts generate more than enough tax revenues to cover state support, or
- Are annual economic outcomes described in a manner as to inappropriately imply net-beneficial gains to social welfare?

3. Properly Conveying Spillovers and Other Beneficial Transfers

IO modeling and tables of multiplier analysis explain the value of all inputs into service delivery plus payments to labor, capital, and the rest of the world. The models and the multiplier coefficients explain economic activity from the university level through all of its backward linkages, or what is sometimes called up-stream activity.

IO models do not measure downstream activity or forward linkages, but it is frequently the case that universities attempt to justify their existence through such declarations. It may clearly be the case that university influences result in spinoff industries, research parks, enhanced regional entrepreneurship among faculty or graduates, or create the conditions for significant quality of life improvements within the primary region that they serve. Attributing those values to universities, however, is a dicey prospect no matter how well-connected universities are to their external economies.

How do you measure and quantify in income and job terms the spillover of R&D knowledge into other disciplines, the private sector, or the community at-large? Can you apply a “but-for” condition to declare with certainty that some economic activity would not exist were it not for its proximity to that specific university? And even if linkages are clear cut, a non-university enterprise is accounted for in the economy separately. If I am an entrepreneur and I am successful because of my education or some other creative interaction with a university, the success I have is mine, not the university’s. I realize the income, I realize the losses, and I pay the taxes on the profits. Furthermore, were it the case that two university engineering graduates started a solar film firm on the edge of the host community, for example, can a university claim any more credit for their success than their respective high school chemistry teachers who first excited their interests in applied science?

Measuring the lifetime benefits of higher education to individuals and society is a different story than the elementary quantification of basic economic activity supported regionally by a university, its students, and patrons. While there is ample scientific evidence of the importance of higher education and overall life quality, it is quite hard to pin a precise number on its value and then apportion values to specific levels or types of development. Much of the worth of a higher education is intangible. Absent other measures, economists occasionally measure individual, lifetime income additions from higher education. They approach the question by analyzing earnings differentials for individuals with a college

degree vs. no college degree, while trying to control for other factors that influence career path decisions and earnings over time such as choice of major and occupation, to name only two. Last, they discount the value of the lifetime earnings differential into present value terms to arrive at a total lifetime benefit assumption relative to costs, which are both summarized as present values.

But assigning some portion of the value of education to a single university can be problematical. Beyond the important scientific need to be able to control for earnings differentials explained by your personal characteristics and life choices after graduation is the added challenge of controlling for earnings differentials attributable to your choice of institution. In other words, we must consider the opportunity cost of not only not attending a college at all but also not attending a different college or university. In addition, how would we apportion the values to an undergraduate college and a graduate college? This is a very imprecise and vague process.

Properly done, these measures would require an experimental design that randomly assigned individuals to various educational “treatments,” which of course is impossible, or a massive random survey of the universe of college graduates (still living) with sample sizes sufficient to allow for controls across institutions, which would be cost-prohibitive. Without this information, any attempts to assign to a single institution a share of its graduates’ lifetime earnings differentials would be a highly subjective and dubious exercise. The potential for gross mis-measurement and misstatement makes the criticisms of traditional university economic impact studies pale by comparison.

An oft-stated objective of university administrators is to develop credible measures for their universities’ contributions to regional economies and its alumnus’ life-long prospects. If the value of higher education is not already obvious to the intended audiences for these measures, flimsy and credulity-stretching downstream or lifetime economic well-being arguments will not advance university public relations objectives.

There are knowledge and other intangible spillovers emanating from all universities. Universities may create the conditions for entrepreneurship and enhanced regional productivity; however, measuring those regional gains or the lifetime worth of university attendance is difficult and highly imprecise as is apportioning such measurements to particular institutions.

- Has the study attempted to impute “downstream” economic activity with the assumption that there is clear and convincing causality between university activities and spillover regional growth, or
- Have university researchers attempted via measures of lifetime earnings and other measures to differentiate themselves from some alternative?

4. Measuring Clearly University-Linked Entrepreneurship

There are two other areas that represent “easy pickings” in terms of claimed economic development activity that attaches to a university. The first is the very popular business incubator components of many universities. Second, we must not overlook the tremendous productivity of university faculty and scientists as participants in the private sector.

Many universities have quasi-public attachments that interact continuously and meaningfully with their research staff, their student talent pool, and the overall economy. At ISU, for example, there is a research park that contains a wide array of both publicly funded and privately supported activities. Some of these may have just a couple of staff members and no discernible product line besides intellectual output. Others have distinct and valuable products or services. Still others are, for lack of a better term, incubating in hopes of developing marketable ideas, goods, or services in the future.

The value of that type of university-sponsored activity to the regional economy can certainly be measured using standard IO methods. One may discern the size of the firm in terms of workers, the levels of compensation, and the kind of economic activity in which they are involved. It is then possible to describe the firms as spatially linked, but not functionally integrated businesses and institutions, existing on the literal and figurative edges of the university. And it can be argued that “but-for” the university’s support and resources, the firms might not exist regionally or at all. The firms will have multiplied through impacts in the regional economy as they will require inputs, their workers will convert their earnings into household consumption, and there will be enhancements to the regional economy as a result. All of this can be measured using proper IO modeling procedures.

This is important, however: the firms are private operations. The profits return to the owners, and their annual operating expenses are distinct from the host university. Their values may be reported, but they must be reported separately from and not added to general university estimates.

In the long run, we would want to know how many succeeded, and in what forms, as well as how many failed. Ultimately, we would want to know where enhanced productivity in these firms accrued. If it started small in Iowa and became a giant in Portland, then the benefits of that economic activity get counted in Portland, not Iowa. Apportioning that growth back to the university is not only a stretch, it is simply inaccurate and misleading. But there is nothing at all wrong with well-documented that type of success as well as others as concise case examples of a university’s impact. In fact, well written case examples are far more likely to engender confidence in university activities than economic impact declarations.

Along similar lines, a large fraction of faculty and scientific staff at universities are consultants, sole business proprietors, or have significant ownership stakes in private businesses. Those enterprises constitute pure entrepreneurship, may involve a tremendous amount of university-related technology transfer, often contain the application of intellectual property that might have been nurtured and developed within the university, and may involve new product or service commercialization. The value of that tacit partnership of the university with its talented staff is something that has rarely been measured formally or reliably, and doing so would be difficult, as consulting activities are usually only monitored insofar as conflict of interest rules apply.

Still, a university could survey its faculty and staff to discern the range and value of their private enterprises, as well as the extent to which those enterprises were a direct offshoot of their university positions. A properly drawn sample could yield enough data to allow universities to document and describe the activities, and to even infer the total value of such sales on an annual basis. And where the

research conducted properly, it might be possible to produce a declaration of the economic impact of that entrepreneurship.

A better approach to dealing with all manner of spin-off, incubators, or staff entrepreneurship, however, would be a systematic investigation of the ranges and types of activities. A proper documentation of business or product development, consulting activities, or innovative applications using a case-study approach to investigate extra-university economic gains is likely to be much more preferable to an elementary declaration of economic contributions using modeling methods.

The upshot of such an approach is that it would allow investigators to document the depth and scope of activity and provide the public and policy makers with meaningful examples of university-linked regional successes. The downside, given modern policy making preferences, is that a case study approach does not provide the “large number” bottom line that many policy makers have become accustomed to.

University-linked incubators and business development centers are private ventures that tap into university services, talent, or knowledge spillovers. Similarly, university staff entrepreneurship produces a wide array of products, services, and contributions to regional economies.

- **Have universities attempted to fold in private economic gains into their declarations of regional economic worth, or**
- **Have universities attempted to appropriate the value of staff entrepreneurship as a tangible output of the university?**

Concluding Discussion

This report does not deal with all of the issues that may arise when compiling university economic impact analyses. University capital spending, for example, tends to be lumpy in nature, and begs consideration of how to treat periodic improvements and expansions of university capital stock when evaluating university economic contributions. Capital developments that are significantly underwritten by donations imply regional economic gains that are different than taxpayer funded development.

There are other tangible and intangible values of university activity that we do not measure, not because they are immaterial, but because the activity is simply difficult to account for. Students are incredibly energetic and engaged in their host communities, and student groups conduct a wide range of philanthropic activities. Students, staff, and faculty donate their time to a broad array of social needs. All of these examples are important, all are very valuable, and they should be described as well as they can, but they do not lend themselves well to economic impact evaluations.

A general standardization of university economic impact studies will allow for more reliable determinations of their worth, enable the legitimate comparison of institutions with one another, hopefully empower both producers and reviewers of such research, and should enhance public and lawmaker confidence in university promotional activities.

University economic contribution studies are not exotic or inherently difficult measures. There is a great body of literature describing proper procedures for conducting such studies. There are, however, many examples of studies that do not acknowledge those standard procedures or proceed in manners that discount or disregard established measurement protocols, to include the generally understood limits to this type of analysis. Re-attaching this university economic contribution research and evaluation to its academic and procedural heritage may help to re-establish a viable baseline from which all public higher education institutions can be properly evaluated and described in the future.

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