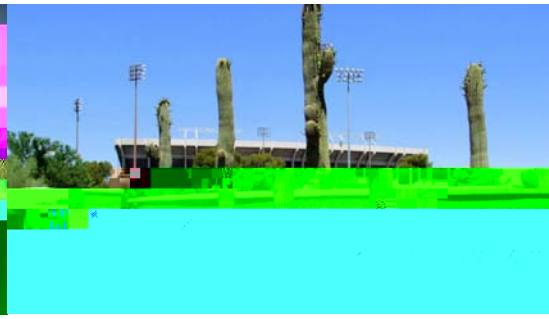
# Economic and Fiscal Impact of the Arizona Public University Enterprise





Prepared for:

ARIZONA BOARD OF REGENTS

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Prepared by:

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In addition to the activities and spending described above, the universities draw visitors to Arizona for sporting events, family weekend, commencement, conferences, campus tours, and various other university sponsored events. Out of state visitors at these events bring outside

During ongoing operations, the universities remitted an estimated $64.9

Incremental Economic and Fiscal Impact Driven by Out of State Funding Sources

This report further breaks down the total impact (described above) by estimating the *incremental* impact being generated by the three public universities in Arizona derived by spending and other economic activity funded only by monies from sources outside Arizona. This includes federal government sources, and other out of state sources such as out of state tuition, fees, scholarships grants, loan program revenues, private gifts, and contract revenue from out of state sources, including the federal government. This incremental analysis provides a defensible and conservative economic and fiscal impact estimate of the dollars imported into the state as a result of the Arizona Public University Enterprise operations. That is, the incremental impact represents the estimated share of the total impact that is generated by out of state dollars.

The incremental economic impact of the Arizona Public University Enterprise is estimated to have generated 31,760 jobs with $1.7 billion in wages, $2.2 billion in value added and $3.8 billion in economic output in FY17.

**Incremental Economid Impact Summary from Out of State Dollars**

(Fiscal Year 2017)

| | Employment | Labor Income ($mil) | Value Add ($ mil) | Economic Output ($ mil) |
|---|---|---|---|---|
| **Total Impact** | | | | |
| University Payroll & Employment | 13,230 | $931.0 | $1,030.2 | $1,584.6 |
| Non Payroll Operating Expenditures | 3,747 | $171.7 | $250.1 | $435.8 |
| University Construction | 1,465 | $76.1 | $114.1 | $206.9 |
| Spending by Faculty & Staff | 4,101 | $176.3 | $270.2 | $618.5 |
| Student Spending | 7,078 | $271.9 | $448.0 | $807.7 |
| Visitor Spending | 2,139 | $69.6 | $104.5 | $181.4 |
| Total | 31,760 | $1,696.6 | $2,217.1 | $3,834.9 |

1/ The total may not equal the sum of the < bŷd˜(&*FEI 2,SSh‘Æ b›% ,à²!L1æ8P—Ä7 &*ÐH,

Sources: ASU; NAU; UA; Elliott D. Pollack & Co.; IMPLAN

The related incremental fiscal impact of the three public universities is estimated to be $171.5 million for FY17. This includes primary revenues of $69.5 million and secondary revenues of $102.0 million.

Economic and Fiscal Impact

Economic and Fiscal Impact

| *Students* | ASU | NAU | UA | Total |
|---|---|---|---|---|
| In-State Undergrad | 40,405 | 15,433 | 19,617 | 75,455 |
| In-State Grad Student | 5,399 | 1,810 | 4,674 | 11,883 |
| Out-of-State Undergrad | 18,793 | 8,268 | 10,200 | 37,261 |
| Out-of-State Grad Student | 7,231 | 762 | 3,647 | 11,640 |
| Total Traditional Students | 71,828 | 26,273 | 38,138 | 136,239 |
| Online Students | 31,702 | 8,281 | 9,683 | 49,666 |
| Total Students | 103,530 | 34,554 | 47,821 | 185,905 |

| *Employment* | ASU | NAU | UA | Total |
|---|---|---|---|---|
| Total | 24,212 | 9,771 | 21,993 | 55,976 |
| Student workers | 7,220 | 5,094 | 6,937 | 19,251 |
| Total less student worker | 16,992 | 4,677 | 15,056 | 36,725 |

| *Wages ($ mil)* | ASU | NAU | UA | Total |
|---|---|---|---|---|
| Total | $906.1 | $243.5 | $865.9 | $2,015.4 |
| Student workers | $72.9 | $14.9 | $24.5 | $112.3 |
| Total wages less student worker | $833.2 | $228.6 | $841.4 | $1,903.1 |
| Employee-related expense | $289.0 | $76.1 | $314.6 | $679.8 |
| Wages + employee related expense | $1,122.2 | $304.7 | $1,156.0 | $2,582.9 |

Surveys conducted by ASU and NAU (and extrapolated for UA) were used to estimate monthly student expenditures. Each category of student spending is then run through the model using the corresponding multiplier set to estimate total jobs and wages.

**Student Spending Assumptions**
**Arizona Public University Enterprise Impact**

| Average Monthly Spending | ASU | NAU | UA |
|---|---|---|---|
| Housing | $561 | $857 | $504 |
| Utilities | $159 | $156 | $143 |
| Telecommunications | $114 | $57 | $103 |
| Groceries | $221 | $347 | $250 |
| Eating Out | $132 | $124 | $150 |
| Entertainment | $85 | $47 | $63 |
| Non food retail | $107 | $88 | $79 |
| Personal services | $79 | $142 | $58 |
| Vehicle maintenance & repair | $123 | $137 | $150 |
| Total | $1,581 | $1,955 | $1,500 |

Sources Elliott D. Pollack & Co.; ASU; NAU; UA

To estimate the impact of visitor spending, the total number of out of state visitors was calculated based on information provided by each university regarding sporting event attendance, parent weekend visitors, campus tours, conferences, orientation, and other special visitor generating events. The project team then estimated the length of stay for each type of event to generate an estimate of total out of state visitor days. Data on spending per person per day as well as average daily room rates was then used to calculate total spending and run the data through the visitor spending model. The following table provides the estimated direct spending for each university.

| | ASU | NAU | UA |
|---|---|---|---|
| Total out of state visitors | 128,179 | 54,915 | 135,830 |
| Average length of stay | 2.0 | 1.9 | 1.8 |
| Persons per room | 2.5 | 2.5 | 2.5 |
| Percent of visitors | | | |

(4) Economic Output the economic output relates to the gross receipts for goods or services generated by the operations. It represents the total value of industry production.

Economic impacts are by their nature regional in character. The impact will be felt throughout all of Arizona.

## 2.3 Fiscal Impact Methodology

Fiscal impact analysis quantifies the public revenues associated with a particular economic activity. The primary revenue sources of local, county, and state governments (i.e. taxes) were analyzed to determine how an activity may affect the various jurisdictions. This report focuses on the taxes that will accrue to the State, counties, cities, and other local governments. Fiscal impact figures cited in this report have been generated from information provided by a variety of sources including the U.S. Bureau of the Census; the U.S. Department of Labor, the Internal Revenue Service; the State of Arizona, the Arizona Tax Research Association, and the U.S. Consumer Expenditure Survey. Elliott D. Pollack & Company relied upon data provided by each university for estimates of operations.

Fiscal impacts are categorized by type in this study, similar to the economic impact analysis. The major sources of revenue generation for governmental entities are related to ongoing impacts from the operations, faculty & staff spending, monthly student spending, and estimated visitor spending. Revenues were generated through sales tax, bed taxes, income tax and State shared revenue.

The following is a description of the applicable revenue sources that will be considered for this analysis.

Prime Contracting Tax

The State, counties, and cities levy a sales tax on materials used in the construction of buildings and land improvements. That tax is calculated by State law under the assumption that 65% of the construction cost of the facility and its land improvements are related to construction materials with the remaining 35% as a deduction for labor. The sales tax rate is then applied to the 65% materials figure.

The prime contracting tax is a one time collection by the governmental entity. The State currently levies a 5.6% sales tax on construction activity (a portion of which is shared with local governments). Maricopa County's rate is 0.7%, Coconino's rate is 1.3% and Pima County's rate is 0.5%. The weighted average rate for [illegible] Maricopa

categories. The tax rate for the State is 5.6%. Portions of this tax are redistributed through revenue sharing to counties and cities throughout

# 3.0 Impact of Operations

Each year, operations of each university generate jobs and tax revenue. The impacts are generated by direct employment as well as the direct spending in the economy. Furthermore, the additional impacts are generated by the spending of the faculty & staff, the spending of the students who live in the area about nine months of the year, and the spending of visitors that spend out of state dollars in the local economy.

## 3.1 Economid mpact of Operations

The economic impact of operations of each university is outlined in the following tables.

Direct Employment and Wages

The universities directly affect the economy by employing 36,725 full and part time employees including faculty, faculty associates, graduate assistants, support staff, university administration and other workers (excluding students) as of FY17. Wages for these stus32014 Tces.00-5.4(e)]TJ /T

## Non-Payroll Operating Expenditures
## Arizona Public University Enterprise Economic Impact
(Fiscal Year 2017)

| Impact Type | Employment | Labor Income ($ mil) | Value Add ($ mil) | Economic Output ($ mil) |
|---|---|---|---|---|
| **Arizona State University** | | | | |
| Direct | 3,122 | $137.7 | $174.8 | $298.7 |
| Indirect | 796 | $40.8 | $66.1 | $120.2 |
| Induced | 1,206 | $56.4 | $101.1 | $177.2 |
| Total | 5,124 | $234.8 | $342.0 | $596.0 |
| **Northern Arizona University** | | | | |
| Direct | 751 | $33.1 | $42.0 | $71.8 |
| Indirect | 192 | $9.8 | $15.9 | $28.9 |
| Induced | 290 | $13.6 | $24.3 | $42.6 |
| Total | 1,233 | $56.5 | $82.3 | $143.4 |
| **University of Arizona** | | | | |
| Direct | 2,407 | $106.2 | $134.8 | $230.3 |
| Indirect | 614 | $31.4 | $51.0 | $92.7 |
| Induced | 930 | $43.5 | $77.9 | $136.6 |
| Total | 3,951 | $181.1 | $263.7 | $459.6 |
| **Total** | | | | |
| Direct | 6,280 | $277.0 | $351.6 | $600.8 |
| Indirect | 1,602 | $82.0 | $133.0 | $241.7 |
| Induced | 2,426 | $113.4 | $203.3 | $356.4 |
| Total | 10,308 | $472.4 | $688.0 | $1,198.9 |

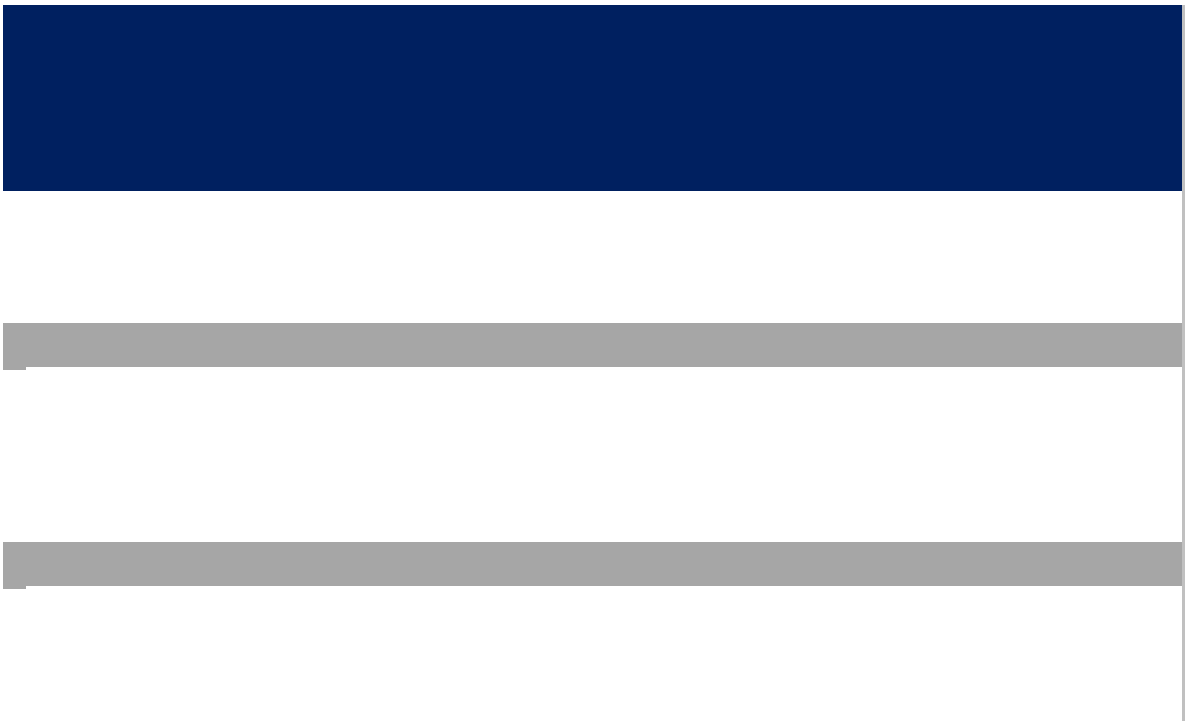
1/ The total may not equal the sum of the impacts due to rounding.

Sources: ASU; NAU; UA; Elliott D. Pollack & Co.; IMPLAN

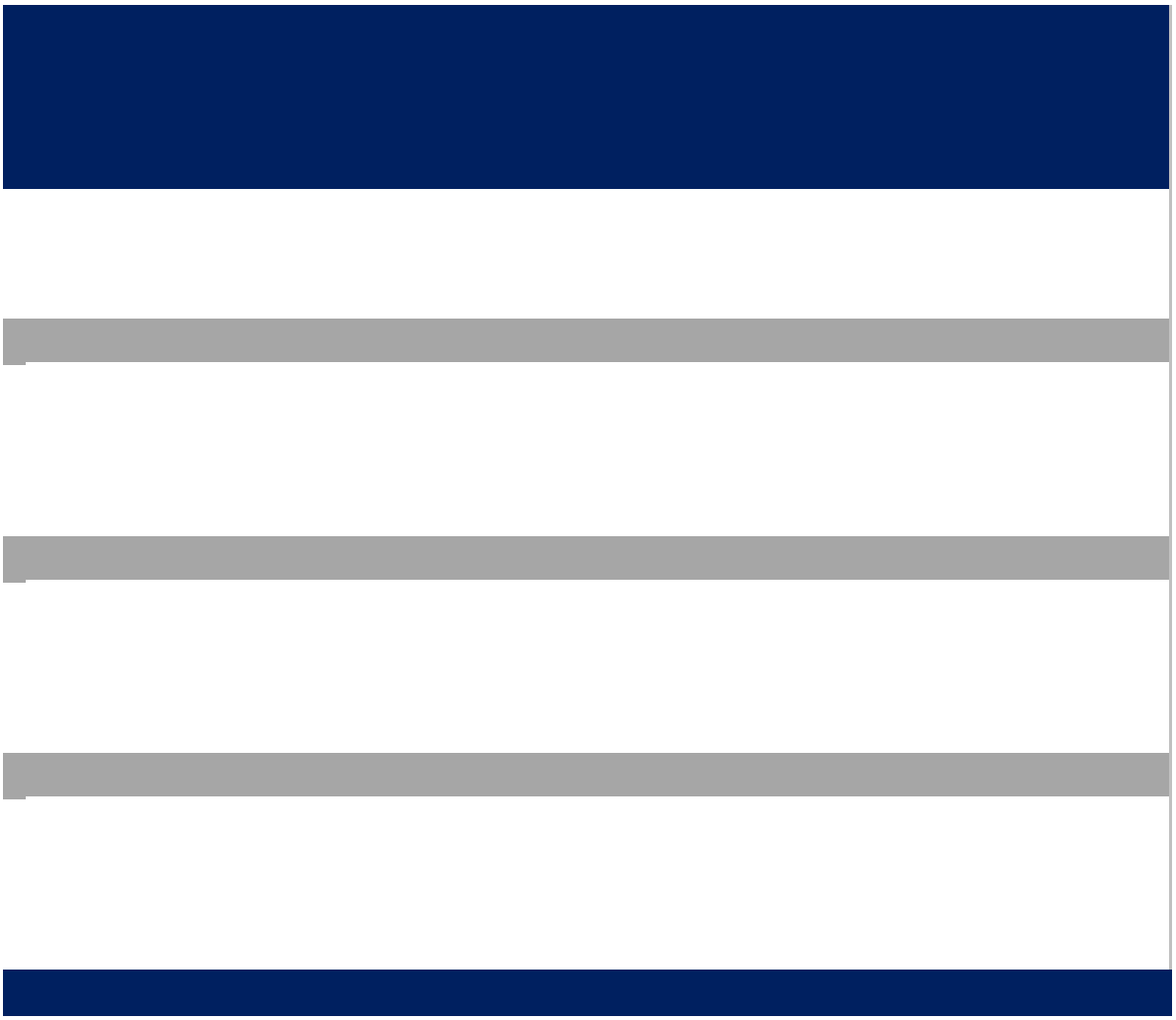
Construction

University construction outlays can vary from year to year. For this analysis, a five year average was used to smooth out the varying annual outlays. The five year average construction spending for all three public universities was $373.0 million. Of this amount, $49.3 million was estimated as soft costs such as legal fees and design fees that are captured in the indirect construction impact and, thus, excluded from the calculation of direct jobs. The $323.7 million of hard costs generated an estimated 2,506 direct construction jobs in Arizona. The ripple effect from this activity generated an additional 1,541 jobs for a total of 4,047 direct, indirect

and induced jobs with $210.2 million in wages, $315.4 million in value added and $571.7 million in economic output.



Over $1.0 billion in spending by faculty & staff generated an estimated 7,242 direct jobs in FY17. Ripple effects of this spending generated an additional 4,151 indirect and induced jobs throughout Arizona with wages of $489.6 million, value added of $750.5 million, and $1.7 billion in total economic output.



The student spending impact takes into account that some students live on campus and, thus, their housing impact is accounted for in university operations. In addition, the spending on housing is further reduced by a factor to consider the share of rental income spent on labor and other direct community operations.

In total an estimated 13,487 direct jobs are created in the State of Arizona from student spending. This spending created a ripple effect of 6,256 indirect and induced jobs. In total, an estimated 19,743 jobs were created in FY17 with wages of $758.2 million, value added of $1.2 billion and $3.0 billion.

| Impact Type | Employment | Labor Income ($ mil) | Value Add ($ mil) | Economic Output ($ mil) |
|---|---|---|---|---|
| **Arizona State University** | | | | |
| Direct | 7,007 | $236.9 | $364.6 | $1,022.0 |
| Indirect | 1,246 | $62.2 | $117.1 | $222.7 |
| Induced | 2,020 | $94.4 | $169.3 | $296.7 |
| Total | 10,274 | $393.6 | $651.0 | $1,541.4 |
| **Northern Arizona University** | | | | |
| Direct | 2,932 | $97.8 | $151.6 | $462.3 |
| Indirect | 500 | $24.4 | $46.8 | $86.6 |
| Induced | 825 | $38.5 | $69.1 | $121.1 |
| Total | 4,256 | $160.8 | $267.5 | $669.9 |
| **University of Arizona** | | | | |
| Direct | 3,547 | $124.0 | $184.9 | $514.9 |
| Indirect | 618 | $30.9 | $58.4 | $110.5 |
| Induced | 1,047 | $48.9 | $87.7 | $153.7 |
| Total | 5,212 | $203.9 | $331.0 | $779.1 |
| | | | | |
| Direct | 13,487 | $458.7 | $701.1 | $1,999.2 |
| Indirect | 2,364 | $117.5 | $222.3 | $419.8 |
| Induced | 3,892 | $181.9 | $326.1 | $571.5 |
| Total | 19,743 | $758.2 | $1,249.5 | $2,990.5 |

Sources: ASU; NAU; UA; Elliott D. Pollack &

Economic and Fiscal Impact

| Impact Type | Employment | Labor Income ($ mil) | Value Add ($ mil) | Economic Output ($ mil) |
|---|---|---|---|---|
| **Arizona State University** | | | | |
| Direct | 754 | $20.1 | $26.0 | $44.3 |
| Indirect | 104 | $5.6 | $9.3 | $16.9 |
| Induced | 174 | $8.1 | $14.5 | $25.5 |
| Total | 1,031 | $33.8 | $49.8 | $86.7 |
| **Northern Arizona University** | | | | |

| | Arizona State University | Northern Arizona University | University of Arizona | Total |
|---|---|---|---|---|
| Direct Primary Taxes Paid by University | | | | |
| Sales, use and lease | | | | |

County governments received an estimated $59.6 million in tax revenues from the projected FY17 employee spending. Sales tax on local goods purchased was about $6.1 million. Estimated property tax collections on homes employee occupied homes totaled another $34.5 million and state shared revenues were about $19.1 million.

**Secondary Fiscal Impact**
**Arizona Public University Enterprise Impact**
**County Governments**
**(Fiscal Year 2017)**
**($ Millions)**

| Impact Type | Employee Spending Sales Tax | Employee Property Tax | State Shared Revenues | Total Revenues |
|---|---|---|---|---|
| Arizona State University | | | | |
| Direct | $1.9 | $13.4 | $7.0 | $22.3 |
| Indirect | $0.5 | $1.3 | $0.9 | $2.7 |
| Induced | $0.7 | $2.1 | $1.5 | $4.3 |
| Total | $3.1 | $16.8 | $9.4 | $29.2 |
| Northern Arizona University | | | | |
| Direct | $0.6 | $4.1 | $2.2 | $7.0 |
| Indirect | $0.1 | $0.4 | $0.3 | $0.9 |
| Induced | $0.2 | $0.7 | $0.5 | $1.4 |
| Total | $1.0 | $5.2 | $3.0 | $9.3 |
| University of Arizona | | | | |
| Direct | $1.2 | $10.2 | $5.1 | $16.5 |
| Indirect | $0.3 | $0.9 | $0.6 | $1.8 |
| Induced | $0.5 | $1.4 | $1.0 | $2.9 |
| Total | $2.0 | $12.4 | $6.7 | $21.1 |
| Total | | | | |
| Direct | $3.8 | $27.7 | $14.3 | $45.8 |
| Indirect | $0.9 | $2.6 | $1.9 | $5.3 |
| Induced | $1.4 | $4.2 | $2.9 | $8.5 |
| Total | $6.1 | $34.5 | $19.1 | $59.6 |

1/ The figures are intended only as a general guideline as to how the counties could be impacted. The above figures are based on the current economic structure and tax rates of the counties.

Source: ASU; NAU; UA; Elliott D. Pollack & Co.; IMPLAN; AZDOR

Cities, towns and other local governments collected an estimate $75.4

In total, the Arizona Public University Enterprise generated an estimated $451.7 million in primary and secondary revenues for the State of Arizona, county, city and other local governments in FY17.

## Fiscal Impact Summary
## Arizona Public University Enterprise Impact
(Fiscal Year 2017)
($ Millions)

| | Arizona State University | Northern Arizona University | University of Arizona | Total |
|---|---|---|---|---|
| Primary revenues | $84.5 | $25.8 | $70.6 | $180.8 |
| Secondary Revenues | $131.2 | $40.5 | $99.1 | $270.8 |
| Total Fiscal Impact | $215.7 | $66.3 | $169.7 | $451.7 |

NOTE: Impact includes State, County, City and other local government revenues.

Sources: ASU; NAU; UA; Elliott D. Pollack & Co.; IMPLAN

# 4.0 Incremental Economic and Fiscal Benefits

Section 3.0 of this report describes the ***total*** impact of the Arizona Public University Enterprise, including in state and out of state funding of university operations.

This section of the report further breaks the total impact down by estimating the ***incremental*** impact being generated by the three public universities in Arizona derived by spending and other economic activity funded

## Incremental Economic Impact Summary from Out of State Dollars

(Fiscal Year 2017)

| | Employment | Labor Income ($mil) | Value Add ($ mil) | Economic Output ($ mil) |
|---|---|---|---|---|
| **Arizona State University** | | | | |
| University Payroll & Employment | 6,156 | $406.6 | $449.9 | $692.0 |
| Non-Payroll Operating Expenditures | 1,871 | $85.7 | $124.9 | $217.6 |
| University Construction | 665 | $34.5 | $51.8 | $94.0 |
| Spending by Faculty & Staff | 2,127 | $87.8 | $133.9 | $288.6 |
| Student Spending | 3,722 | $142.6 | $235.9 | $427.1 |
| Visitor Spending | 1,031 | $33.8 | $49.8 | $86.7 |
| Total | 15,573 | $791.0 | $1,046.2 | $1,806.0 |
| **Northern Arizona University** | | | | |
| University Payroll & Employment | 1,607 | $104.7 | $115.9 | $178.2 |
| Non-Payroll Operating Expenditures | 404 | $18.5 | $27.0 | $47.0 |
| University Construction | 215 | $11.2 | $16.7 | $30.3 |
| Spending by Faculty & Staff | 554 | $22.9 | $34.9 | $75.2 |
| Student Spending | 1,463 | $55.3 | $91.9 | $160.6 |
| Visitor Spending | 409 | $13.4 | $19.7 | $34.2 |
| Total | 4,653 | $225.9 | $306.1 | $525.7 |
| **University of Arizona** | | | | |
| University Payroll & Employment | 5,466 | $419.7 | $464.4 | $714.3 |
| Non-Payroll Operating Expenditures | 1,472 | $67.4 | $98.2 | $171.2 |
| University Construction | 585 | $30.4 | $45.6 | $82.6 |
| Spending by Faculty & Staff | 1,419 | $65.7 | $101.4 | $254.6 |
| Student Spending | 1,893 | $74.0 | $120.2 | $220.0 |
| Visitor Spending | 699 | $22.4 | $35.1 | $60.5 |
| Total | 11,534 | $679.7 | $864.8 | $1,503.2 |
| **Total Impact** | | | | |
| University Payroll & Employment | 13,230 | $931.0 | $1,030.2 | $1,584.6 |
| Non-Payroll Operating Expenditures | 3,747 | $171.7 | $250.1 | $435.8 |
| University Construction | 1,465 | $76.1 | $114.1 | $206.9 |
| Spending by Faculty & Staff | 4,101 | $176.3 | $270.2 | $618.5 |
| Student Spending | 7,078 | $271.9 | $448.0 | $807.7 |
| Visitor Spending | 2,139 | $69.6 | $104.5 | $181.4 |
| Total | 31,760 | $1,696.6 | $2,217.1 | $3,834.9 |

Sources: ASU; NAU; UA; Elliott D. Pollack & Co.; IMPLAN

# 5.0 Benefits of Tier 1 Research Universities

Contemporary American universities have evolved over the last century to address multiple missions and, consequently, have taken on an enlarged role in civic and economic matters. The changes have been most dramatic for the large public, doctoral degree awarding universities with vigorous research activities. The most active of these research universities are often referred to as Research 1 institutions.

The 100 plus research universities designated as Research 1 award significant numbers of doctoral degrees annually and are engaged in significant research as measured by dollar value of research grants received. These generally include the largest universities in the country and include both public and private, non profit institutions. The designation is assigned as a part of the Carnegie Classification of Institutions of Higher Education which is currently administered by the Indiana University Center for Postsecondary Research. Generally, these institutions have varied and complex research missions in addition to their core mission of teaching and training students.

Role of Research at Universities
As

Measurable impacts of research expenditures

Obviously, spending at universities on research related activities, most

The Enterprise's research expenditures include spending for personnel salaries and benefits as well as spending on equipment, supplies, contracts, and other spending. This spending impacts the region's and the state's economy. That spending, in turn, drives other economic activity in the state. In total, the statewide economic impact of the research expenditures of the Arizona Public University Enterprise exceed $2.0 billion dollars. The following table illustrates the overall economic output in the state as a result of the Enterprise's research expenditures by category direct and indirect & induced.

**Economid Impact of Research Expenditures**
**Arizona Public University Enterprise Impact**
**($ mil)**
(Fiscal Year 2017)

| Economic Output | Arizona State University | Northern Arizona University | University of Arizona | Total |
|---|---|---|---|---|
| Direct | $545.0 | $46.3 | $622.2 | $1,213.5 |
| Indirect & Induced | $341.5 | $44.0 | $444.5 | $830.1 |
| Total | $886.5 | $90.3 | $1,066.7 | $2,043.5 |

Sources: ASU; NAU; UA

The economic impacts of the research spending illustrated in the preceding tables

Finally, some university research activities may produce spinoff start ups and entrepreneurial

contribute importantly, if indirectly, to the vitality, growth, and development of the economy. That vitality, growth, and development in turn drives household incomes and higher living standards.

Knowledge transfer to key regional industries

The free movement of ideas, innovations, and findings back and forth between regional industries and research universities facilitates the efficient transfer of research findings to those regional industries. The resulting increase in the productivity of those industries stimulates local economic growth and development. These exchanges are far more valuable when the research areas are relevant to economically important regional and state industries and where is strong, joint collaboration.

In *The Fountain of Knowledge – The Role of Universities in Economic Development*, Breznitz also states: Today, universities around the world find themselves going beyond the traditional roles of research and teaching to drive the development of local economies through collaborations with industry. In the Conclusion to the of

research university to regional industry can be foundational to the success of both. They illustrate their point with a case study of the University of California Davis and the wine growing industry in that region of California.

For Kenney and Mowery, the free (unpatented) exchange of information, knowledge, and techniques between UC Davis and industry researchers and operators advanced the overall progress of research in both areas. Furthermore, while the entire winemaking industry across California benefitted from the work at UC Davis, the Napa Valley wineries enjoyed a greater advantage due their close proximity to the university. Much of the work at UC Davis came in response to the needs and challenges faced by the industry.

Importantly, the success of the Napa Valley wineries is ultimately predicated on the soils and growing climate of the region. Even the strongest university industry collaboration could not replace that those foundational circumstances, but the recognition of the region s comparative advantage by both the industry and the university along with a positive focus on maximizing that advantage fostered the effective collaboration.

It is important to note the broader point regarding the free movement of knowledge within the private economy as well as open regulatory and legal systems and as key factors in economic success, including the transfer to and adoption of university research by private industry. In *Barriers to Riches*, Nobel Prize winning economist Edward Prescott and his co author Stephen Parente demonstrate that only national economies that are open to the diffusion of knowledge and technology prosper, while those nations that restrict the production enhancing technologies lag. So too it must be with regional and state economies that are open to new productivity enhancing technologies and knowledge that promote increases in total factor production.

Thus, to fully benefit from the potential impetus to economic growth and prosperity from university research, regional and state economies must be properly positioned and free from restrictive regulations that inhibit the full utilization of such research. Said in another way, even the most potentially beneficial research findings will have little positive effect on total factor production and economic growth and vitality in the presence of monopoly practices, or regulatory schemes that constrain the dispersion and utilization of those findings.

Spin off start ups and entrepreneurial ventures

There are many anecdotal examples of ideas or innovation developed at a research university that spun out into p

unit of analysis people and examining how research funding builds public and private networks. The evidence is clear that people and networks are the drives of innovation. (emphasis added)

Finally, Husbands Fealing, et al. argue that there is no systematic answer to the very specific question of the link between federal R&D and economic growth. They continue Hitherto, the examination of the results of expenditures on scientific research has tied to directly link research grants to bibliometric measures like publications. Prior examinations have focused too heavily on the published records of research and insufficiently on the people . [S]uch an approach is the wrong framework to use:

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