



THE UNIVERSITY OF ARIZONA  
ECONOMIC AND TAX REVENUE IMPACTS  
FISCAL YEAR 2004

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THE UNIVERSITY OF ARIZONA®

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# THE UNIVERSITY OF ARIZONA®

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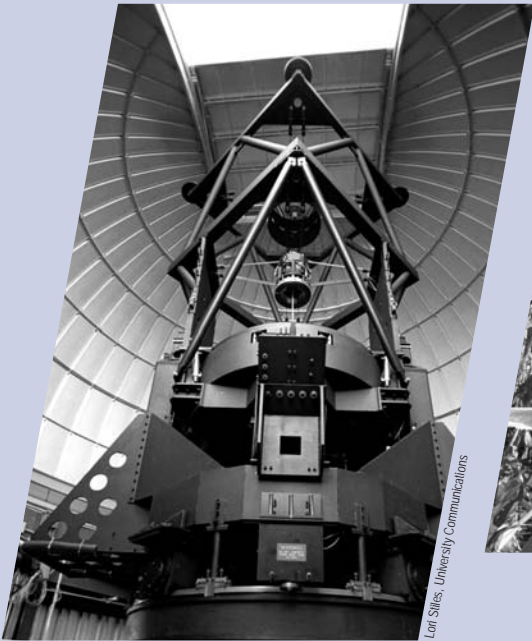
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# THE UNIVERSITY OF ARIZONA ECONOMIC AND TAX REVENUE IMPACTS FISCAL YEAR 2004

## EXECUTIVE SUMMARY

The University of Arizona is a land grant school and a Doctoral/Research University–Extensive<sup>1</sup>. As such it plays a valuable role in training citizens and conducting advanced research in important academic areas such as astronomy, medicine, optics and biosciences.

The University of Arizona also is a major generator of economic activity in Pima County and throughout Arizona. The annual economic impact of the University includes the creation of approximately 41,300 jobs, \$1.2 billion in earnings and a total dollar impact on the state's economy of \$2.3 billion in the fiscal year ending June 30, 2004.

In addition to the state appropriation funding, the University also attracts additional dollars to the local economy from several other sources. For every dollar of state appropriated funds, the University generated another \$3.50 in grants, contracts and gifts in support of teaching, research and public service. Federal grants and contracts were the largest source of University revenues accounting for more than \$346.3 million or 31 percent of all revenues in fiscal year 2004.

## UNIVERSITY IMPACT ON PIMA COUNTY ECONOMY

### **Impact of University purchases and operating expenditures**

The University buys from local businesses various goods and services such as equipment, office supplies and professional services. The economic impact of these purchases is almost 2,000 jobs and \$168.8 million in earnings in Pima County.

### **Impact of University capital investment (including construction)**

The University spent locally more than \$60 million in construction and acquisition of capital goods, creating 1,300 jobs in construction and other industries in Pima County. This activity contributed \$44.6 million in earnings to the local economy.

### **University employee spending impact**

The University employed 14,484 full- and part-time persons, including more than 3,000 graduate students. The total payroll, including benefits, was \$714.9 million. The local spending of University faculty and staff generated an economic impact in Pima County of 7,500 jobs and \$171.7 million in additional earnings.

## Student spending impact

Not counting tuition, University student spending injected \$704.3 million into the local economy. This generated 12,600 jobs and \$279 million in earnings in Pima County.

## University-related visitor spending impact

The University generated more than 809,000 visitor-days in Pima County, creating about 1,640 jobs and \$35.3 million in earnings.

## Total economic impact on Pima County

The total employment impact of the University was 39,500 jobs in Pima County. This included direct employment of 14,484 at the University and all other jobs generated by University-related activities. This represented 9.8 percent of total employment in Pima County. Thus, every 10<sup>th</sup> employed person in Pima County is directly or indirectly related to The University of Arizona.

The combined earnings impact was \$1.1 billion in Pima County. The total dollar impact (including earnings and tax revenues) was \$2.1 billion. **This means that \$7.13 is generated by University-related activities for every dollar of state appropriated funds.**

## IMPACT OUTSIDE PIMA COUNTY

The economic impact of The University of Arizona extends beyond the boundaries of Pima County. The University has a physical presence in every county of Arizona through its various programs and outreach centers. The University also purchases goods and services from other Arizona businesses outside of Pima County. More than 1,770 jobs and \$60.9 million in earnings were generated in Arizona counties other than Pima County. The total dollar impact was \$140.7 million.

## TOTAL IMPACT ON ARIZONA ECONOMY

Combining the impacts in Pima County with those in all other Arizona counties, The University of Arizona generated close to 41,300 jobs with \$1.2 billion in earnings. The total dollar impact on the state economy was an estimated \$2.3 billion.

## TAX REVENUE IMPACT

The University generates tax revenues directly through purchases of goods and services and indirectly through taxes paid by University employees. In addition, employees of businesses that sell to the University, students and visitors pay taxes to all levels of governments. The total tax revenue impact in fiscal year 2004 was \$98.1 million, including \$54.2 to state government, \$20.3 million to the City of Tucson, \$14 million to Pima County, \$9.5 million to other Arizona counties and cities, and about \$100,000 to the Pima Association of Governments.

This study evaluated four sources of economic and tax revenue impacts associated with The University of Arizona: (1) University purchases of goods and services (including construction), (2) spending by University employees, (3) student spending and (4) University-related visitors. Tax revenues generated by these activities are estimated to return \$17.10 to the state government for every \$100 of state appropriated funding received in fiscal year 2004.

#### IMPACT ON PIMA COUNTY

- 39,498 jobs
- \$1.1 billion in earnings
- \$20.3 million in tax revenues to the City of Tucson
- \$14 million in tax revenues to Pima County
- \$0.1 million to the Pima Association of Governments

**Total impact:** \$2.1 billion

Every 10<sup>th</sup> employed person directly or indirectly related to UA

#### IMPACT BEYOND PIMA COUNTY

- 1,774 jobs
- \$60.9 million in earnings
- \$9.5 million in tax revenues to county governments
- \$54.2 million in state tax revenues

**Total impact:** \$140.7 million

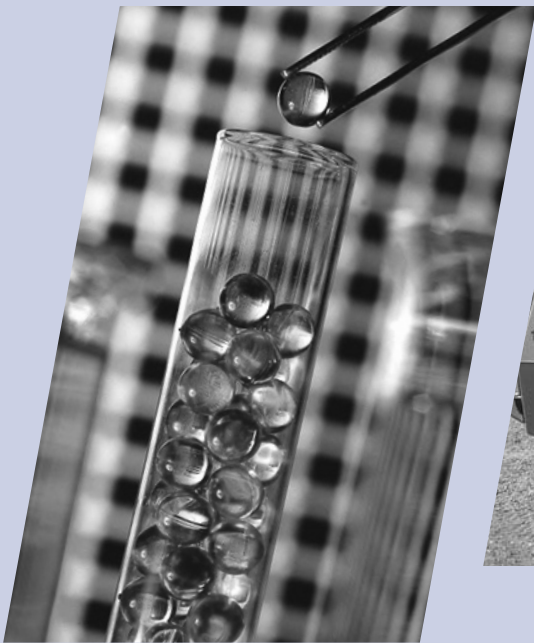
#### TOTAL IMPACT ON ARIZONA

- 41,272 jobs
- \$1.2 billion in earnings
- \$98.1 million in tax revenues

**Total impact:** \$2.3 billion

For every \$1 of state-appropriated funds in FY 2004, The University of Arizona attracted an additional \$1.45 in grants, contracts and gifts.

Including a multiplier effect, The University of Arizona generated \$7.13 for every \$1 of state-appropriated funds in FY 2004.



## INTRODUCTION

The role of universities in regional economies has been extensively studied during the last three decades. The findings demonstrate that universities contribute to regional economic development in a number of ways: enhancement of human capital through education, creation of new knowledge through research activity, development and transfer of new technology, and creation of favorable environments that attract innovative businesses and individuals (Goldstein, Maier and Luger 1995). Academic interest remains focused on the relationship between universities as major knowledge production institutions and the regional economic growth. In particular, attention has focused on university research and technology creation functions that generate knowledge transfer and result in enhanced regional economic development (Goldstein and Renault 2004, Keilbach 2000, Mansfield 1995).

Universities are often among the largest regional employers and support numerous local businesses through their spending on goods and services. Case studies focus on the contribution of universities to the regional economy primarily in terms of a region's output, earnings and employment (National Association of State Universities and Land Grant Colleges 2001, 1997).

Despite limitations in their ability to capture the full range of university activities that lead to regional economic development, economic impact studies provide valuable information about monetary and employment contributions of universities to the regional economy.<sup>2</sup>

Most impact studies evaluate contributions to the local economy by university expenditures on goods and services as well as spending of university employees and students. A smaller number of studies also include university-related visitor spending. Increasingly, universities are trying to measure the monetary impacts of graduates that stay in the area and thus contribute to higher earnings and spending. Case studies differ substantially in the scope and types of regional economic models applied and, consequently, are not easily compared.

The University of Arizona has measured its contribution to the local economy since 1974 in five-year intervals.<sup>3</sup> The last study, conducted for fiscal year 1998 estimated that The University of Arizona created more than 42,500 jobs with \$896 million in wages. The total dollar impact in Arizona was over \$1.9 billion.<sup>4</sup>

# THE UNIVERSITY OF ARIZONA

## INSTITUTIONAL PROFILE

The University of Arizona is a public, land-grant institution established in 1885 by the 13<sup>th</sup> Territorial Legislature as the first institution of higher education in Arizona. From 32 students in 1891 on a 40-acre campus, The University of Arizona has grown to be one of the top doctorate-granting institutions and research universities in the nation with a student enrollment of 37,000, including more than 2,900 foreign students from 135 countries.<sup>5</sup>

According to the *U.S. News & World Report*, The University of Arizona is ranked in the top 50 of all 612 public universities in the nation in 2004. Based on research and development expenditures, the National Science Foundation ranked The University of Arizona 22<sup>nd</sup> among all private and public institutions in fiscal year 2004. Considering only public universities in 2004, The University of Arizona ranked 17<sup>th</sup> among “*Top American Research Universities*” according to the Lombardi Program on Measuring University Performance.<sup>6</sup>

Individual departments and programs have achieved top rankings as well. In the *U.S. News & World Report*'s graduate rankings between 1997 and 2006, the following University of Arizona programs were ranked among the top ten: Hydrology (1<sup>st</sup> in 1999), Management Information Systems (4<sup>th</sup> in 2005), Pharmacy (4<sup>th</sup> in 2006), Sedimentology/Stratigraphy (4<sup>th</sup> in 1999), Tectonics/Structural geology (4<sup>th</sup> in 1999), Social Psychology (5<sup>th</sup> in 2006), Analytical Chemistry (6<sup>th</sup> in 2002), Astrophysics/Space (6<sup>th</sup> in 1999), Speech/Language Pathology (6<sup>th</sup> in 2004), Geology (7<sup>th</sup> in 1999), Audiology (8<sup>th</sup> in 2004), Creative Writing (9<sup>th</sup> in 1997) and Photography (9<sup>th</sup> in 2004).<sup>7</sup>

In addition to its 362-acre main campus,<sup>8</sup> located five miles from downtown Tucson, the University has a number of off-campus sites in Tucson and throughout Arizona. The off-campus sites in Tucson include four agricultural centers, Rural Health, Arizona Materials Laboratory<sup>9</sup>, and in its 11<sup>th</sup> year, the 1,345-acre Science and Technology Park.<sup>10</sup>

The University of Arizona has staff, facilities and programs in every county in Arizona. The Arizona Cooperative Extension is one of the oldest outreach arms of The University of Arizona College of Agriculture and Life Sciences with offices in each of Arizona's fifteen counties, including six Indian Reservations. In addition, the College has eleven agricultural centers (including an arboretum) of which seven are outside of Pima County in the counties of Maricopa, Pinal, Graham, Coconino, Yavapai and Yuma.<sup>11</sup>

The University of Arizona Health Sciences also has a growing presence in Maricopa County. The University's Phoenix Campus encompasses the Colleges of Medicine, Nursing, Pharmacy, Public Health and the School of Health Professionals.<sup>12</sup>

The University of Arizona South is located in Sierra Vista in Cochise County about 75 miles southeast from Tucson. The campus has about 600 students.<sup>13</sup>

## UNIVERSITY REVENUES

The University of Arizona revenues in fiscal year 2004 were \$1.1 billion (Table 1). Federal grants and contracts accounted for \$346.3 millions, the largest source of revenues and one third of the total. Combined with other (non-federal) grants and contracts and private gifts, the University attracted from other sources a total of \$461.1 million or 41.8 percent of total revenues. The University received \$317.3 million in state appropriations or 28.5 percent of total revenues. As stated by University President, Dr. Peter Likins, this represents “the transition from a state-financed institution to the new model of public higher education, financed by diverse revenue streams” (UA *Annual Financial Report* 2004).

**Table 1. UA Revenues by Source FY 2004**

(in thousands of dollars)

State appropriations	317,250
Federal grants and contracts	346,282
Non-federal grants and contracts	73,125
Student tuition and fees	172,529
Gifts	41,717
Auxiliary enterprise operations	112,087
Other*	48,617
Total	1,111,607

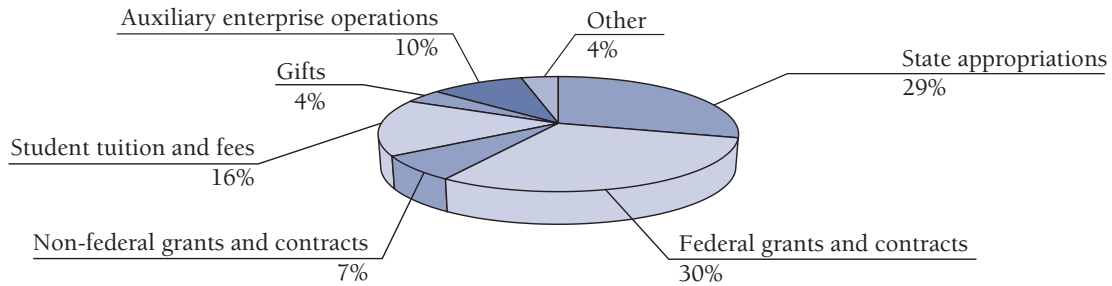
Source: UA *Annual Financial Report*, Year Ended June 30, 2004.

\* Includes share of state sales tax revenues, investment income (less interest expense on debt), and other revenues.

Tuition and fees brought in \$172.5 million or 15.5 percent of total revenues. Auxiliary enterprise operations such as the bookstore and food services accounted for 10.1 percent of total revenues (Figure 1).

A major change from the 1998 study is the increased significance of federal grants and contracts as major revenue sources. The share of federal grants and contracts increased from 25.8 percent in fiscal year 1998 to 31.2 percent in fiscal year 2004. The state appropriation's share declined from 34.5 percent to 28.5 percent. The share of tuition and fees declined slightly from 16.6 percent to 15.5 percent of total revenues.

**Figure 1. UA Revenues by Source FY 2004**

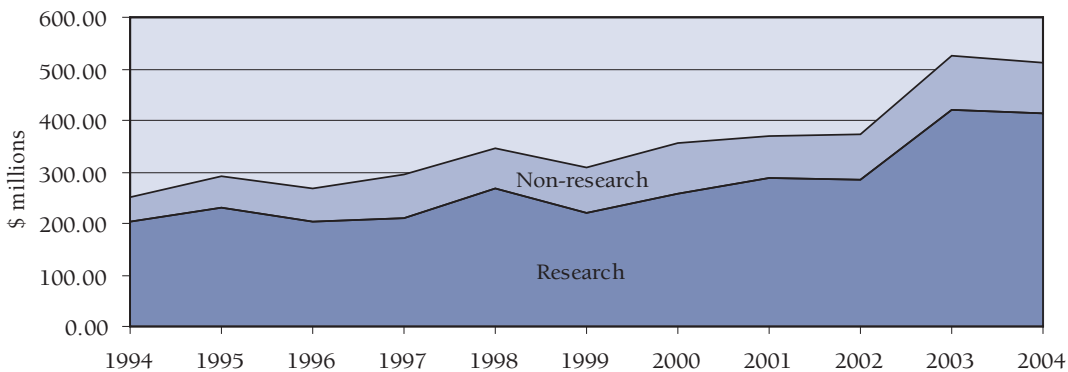


Source: UA Annual Financial Report, Year Ended June 30, 2004.

The dollar amount of grants received by the University in 2004 has more than doubled since 1994. During the 1994-2004 period the University received a total of \$3.9 billion in grants, out of which \$3.0 billion or 77 percent was for research, which in Dr. Likins' words is "the stunning success of the faculty in winning highly competitive grants and contracts."

Figure 2 illustrates the importance of research grants in the total amount of grants received during the last ten years. Non-research grants included awards for instruction, public service, academic support, student services and institutional support.

**Figure 2. Research and Non-research Grants 1994-2004**

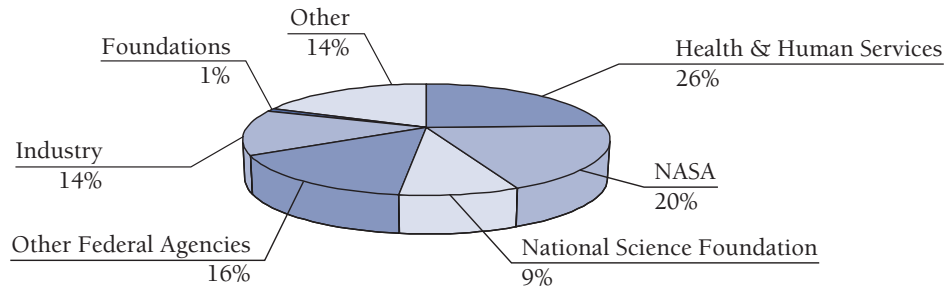


Source: UA Office of Vice President for Research, Graduate Studies and Economic Development.

Two colleges – Science and Medicine – are the prime recipients, accounting for 57.1 percent of all grants. Together with the College of Agriculture and Life Sciences, these three colleges lead the University in the ability to secure grants: 67.6 percent or two thirds of all awards and grants received by the University in 2004.<sup>14</sup>

Two federal agencies, the Department of Health and Human Services and NASA provided 46.3 percent of all grants to the University in 2004. The National Science Foundation contributed an additional 9.1 percent of all grants (Figure 3).

**Figure 3. Funding Sources of UA Grants FY 2004**



Source: UA Office of Research and Contract Analysis.

The share of federal grants and contracts increased from 63 percent in 1998 to 71.2 percent of all University grants in 2004. The share of grants funded by the private industry also increased from 8.8 percent to 14.2 percent.

## MEASURING THE ECONOMIC IMPACT OF THE UNIVERSITY OF ARIZONA

### RESEARCH METHOD

This study uses the conceptual approach originally developed for the fiscal year 1991 impact study,<sup>15</sup> which was subsequently applied in the studies for fiscal year 1995 and 1998.<sup>16</sup> However, a new model for estimating economic impacts, IMPLAN (IMPact Analysis for PLANning) input-output model<sup>17</sup> is used for the first time in this study. Like the input-output model used in the previous studies,<sup>18</sup> the IMPLAN model is based on regional purchase coefficients that control for leakages from the local economy and, thus, provides more conservative estimates. The IMPLAN model provides an up-to-date regional database, including the North American Industrial Classification System (NAICS), which was not available in the previous model.

Four types of economic impacts by The University of Arizona were identified: (1) University expenditures associated with daily operations; (2) spending by the University employees; (3) student spending, and (4) spending by University-related visitors.

Data on University expenditures were obtained from the Office of Financial Services. These data, available by object code,<sup>19</sup> were matched with University expenditures by object code in zip code groups obtained from the Office of Procurement and Contracting Services.

By combining the two sets of data it was possible to distinguish money spent locally from purchases made outside of Pima County, thus assuring that only local expenditures were included in the estimation of economic and tax revenue impacts.

Data on University employee and student spending were obtained through a survey conducted during April and May 2004. These surveys also provided information about

visitors related to University employees and students. Additional information about University-related visitors was obtained through questionnaires sent to each college and non-academic unit involved with research and outreach activities as well as art performances and sport events.

Economic impact was measured in three steps. First, the Pima County input-output (I-O) model was used to estimate impacts generated by direct spending in Pima County. Secondly, because the University purchases considerable amounts of goods and services from businesses outside of Pima County, additional impacts from University spending are generated in other Arizona counties. Impacts of this spending were estimated by the Arizona I-O model, which excluded Pima County. Finally, county specific I-O models were applied to measure the impacts of University spending associated with its various extension and outreach programs located throughout Arizona.

The total economic impact of The University Arizona, *i.e.*, the sum of the results from each of the described steps, however, represents an underestimation of economic and tax revenue impacts on Arizona's economy. Spending in counties outside of Pima County included University purchases and employee payroll, but no data were available on student and visitor spending in those counties. Additional indirect impacts due to purchases among counties also have not been accounted for in this study.

The I-O models provided estimates of direct, indirect and induced jobs and associated earnings as well as the total output. For simplicity, this study refers to output as "dollar impact."

Tax revenue impacts were estimated by means of Pima County and Arizona revenue models.

More information about the I-O and tax revenue models as well as the methodology applied in this study is provided in the Appendix.

Data used in this analysis were available for fiscal year 2004, starting on July 1, 2003 and ending on June 30, 2004. Monetary impacts (earnings and total dollar impact) are reported in 2004 dollars.

## ECONOMIC IMPACT OF UNIVERSITY EXPENDITURES

The University spent more than \$1.1 billion in fiscal year 2004. The largest expenditure category was employee payroll, accounting for \$714.9 million including benefits. This represented 65 percent of all operating expenditures (Table 2 and Figure 4).

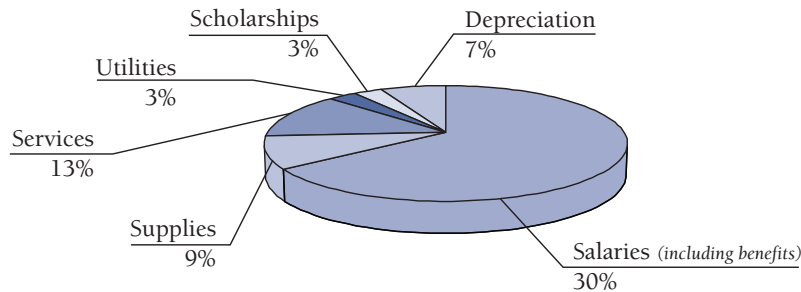
**Table 2. UA Operating Expenditures FY 2004**

(in thousands of dollars)

Salaries, wages and benefits	714,854
Supplies and materials	102,931
Services, including travel	145,176
Utilities	35,079
Scholarships and fellowships	37,686
Depreciation	74,205
Total	1,109,931

Source: UA Annual Financial Report, Year Ended June 30, 2004.

**Figure 4. UA Operating Expenditures FY 2004**



Source: UA Annual Financial Report, Year Ended June 30, 2004.

The University's daily operations create direct demand for supplies and services in the community. For example, the University spent \$145.1 million on professional services, including printing and travel. Another \$102.9 million was spent on supplies and materials, including \$29 million on equipment and \$11 million on library materials. Approximately \$35 million was spent on utilities.

It is customary to differentiate on-going expenditures such as utilities, supplies and materials associated with daily operations from one-time impacts such as construction and capital investment that are related to the University's long-term growth and which vary significantly from year to year.

## IMPACT OF OPERATIONS-RELATED EXPENDITURES

To measure the impact of University operations on the economy of Pima County, it was necessary to extract local purchases of goods and services from total expenditures. Only purchases from local businesses generate economic impacts in Pima County, *i.e.*, support local jobs and contribute to local household income.

Excluding construction and other capital investment, the University purchased \$60 million worth of goods and services directly from local businesses. In addition, the University contributed another \$48.6 million in health and dental benefits to University employees.<sup>20</sup> These University expenditures directly accounted for 1,253 jobs and \$42.3 million in earnings for Pima County businesses that supply goods and services to the University (Table 3).

**Table 3. Impact of UA Operations-Related Expenditures in Pima County FY 2004**

	UA local spending	Direct impact	Indirect impact	Induced impact	Total impact*
Jobs		1,253	297	446	1,996
Earnings (\$ 1,000)		42,367	9,089	6,737	58,193
Dollar impact (\$ 1,000)	108,581	96,015	24,406	35,862	168,848

Source: UA OEPA based on UA FSO and PCO data in combination with IMPLAN I-O model.

\*Total dollar impact includes local expenditures plus indirect and induced impacts generated through multiplier effects; direct dollar impact already is included in the “local spending” figure, and thus omitted from the row total.

Total earnings and taxes are included in total dollar impact.

University expenditures include portion of ERE spent on health and dental benefits.

University purchases induce additional impacts through a multiplier effect. First, indirect impacts occur when the University’s immediate suppliers purchase goods and services from other suppliers, and these firms in turn purchase from their suppliers. Indirect impacts were estimated to be 297 jobs and \$9.1 million in earnings.

Second, induced impacts occur when the employees of the suppliers make consumer purchases, thus supporting additional jobs and earnings in other businesses. The induced impacts of University expenditures were estimated to be 446 jobs and \$6.7 million in earnings.

The total impact of University purchases in Pima County was 1,996 jobs and earnings of \$58.2 million in fiscal year 2004.

Total dollar impact associated with University expenditures was \$168.8 million (Table 3).

The multiplier effect of University spending is 1.56. This means that for each \$100 spent by the University in Pima County an additional \$56 was spent in the local economy.

## IMPACT OF UNIVERSITY CAPITAL INVESTMENT (INCLUDING CONSTRUCTION)

The University’s construction activities also bring money into the local economy. During fiscal year 2004, the University invested more than \$80 million in various construction projects (Table 4). An additional \$51 million was spent on capital investments including land improvements, capital equipment and library and museum acquisitions.<sup>21</sup>

**Table 4: Recently Completed Construction Projects**

---

Apache/Santa Cruz Residence Hall renovation
Facilities Management AHSC Three Shops Building
Facilities Management Motor Pool Garage
Herring Hall renovation
Highland Commons-Campus Health Services and Disability Resource Center
Highland Housing Residence Hall renovation
McKale renovation and expansion
Park Student Union renovation and expansion
Shell Space completion
Sixth Street Office Building
Sixth Street Parking Garage
UA North Master Plan Phase I

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Source: UA Annual Financial Report, Year Ended June 30, 2004.

Close to 50 percent of all capital investment (including construction) in fiscal year 2004 benefited local businesses and accounted for an estimated 784 direct jobs and \$28.9 million in direct earnings. Additional indirect and induced jobs were generated through the multiplier effect, with 527 jobs and \$15.7 million in indirect and induced earnings.

The total impact of University capital investment (including construction) in Pima County was 1,311 jobs and earnings of \$44.6 million in fiscal year 2004 (Table 5).

The multiplier effect of University capital investment was 1.66. This means that each \$100 spent on capital investment (including construction) by the University in Pima County generates an additional \$66 in spending in the local economy.

**Table 5. Impact of UA Capital Investment in Pima County FY 2004**

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	UA local investment	Direct impact	Indirect impact	Induced impact	Total impact*
Jobs		784	213	314	1,311
Earnings (\$ 1,000)		28,9107	7,156	8,575	44,641
Dollar impact (\$ 1,000)	64,361	62,146	17,173	25,231	106,765

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Source: UA OEPA based on UA FSO and PCO data in combination with IMPLAN I-O model.

\*Total dollar impact includes local expenditures plus indirect and induced impacts generated through multiplier effects; direct dollar impact already is included in the "local investment" figure, and thus omitted from the row total. Total earnings and taxes are included in total dollar impact.

## IMPACT OF UNIVERSITY EMPLOYEE SPENDING

In the Fall of 2004, The University of Arizona employed close to 14,500 employees, of which more than 3,000 were graduate students. This translates in 11,708 full-time employees (FTE) as shown in Table 6.

**Table 6. UA Employees Fall 2004**

	Total	Full-Time	Full-Time equivalent
Administrators	265	260	263
Faculty*	2,523	1,947	2,178
Graduate Assistants and Associates**	3,029	0	1,360
Professional	2,531	2,266	2,421
Classified Staff	6,136	4,903	5,486
<b>Total</b>	<b>14,484</b>	<b>9,376</b>	<b>11,708</b>

*Source: UA Fact Book 2004-2005, based on UA Office of Institutional Research & Evaluation.*

*\*Includes regular tenured and tenure-track instructional faculty, permanent lecturers, and permanent faculty in the Arizona International College.*

*\*\*Includes graduate assistants in teaching, research as well as others, e.g., residence hall heads.*

In its annual ranking of top 200 employers by FTE employment in Southern Arizona, the *Arizona Daily Star* ranked the University as the third largest employer in Southern Arizona after Fort Huachuca in Sierra Vista and Raytheon Missiles Systems Company in Tucson.<sup>22</sup> If total employment (including full- and part-time employees) is considered, the University was the largest employer in Pima County.

In addition to providing education and other academic services, The University of Arizona employees have a large impact on the Pima County economy through purchases of goods and services and the payment of local taxes. The aggregate payroll including benefits for all employees was \$714.9 million. The majority of the wages and salaries paid to University employees as well as a portion of the benefits are circulated back into the local economy.

Using Pima County's average of 74.9 percent for disposable income, it was estimated that the University faculty and staff spent \$412.7 million in total consumer expenditures in fiscal year 2004.<sup>23</sup> An electronic survey of University faculty and staff spending, administered in Spring 2004, provided information about major spending categories (Table 7).

**Table 7. UA Faculty and Staff Consumption Categories 2004**

	%
Housing	30.1
Groceries	9.3
Personal transportation	7.2
Utilities and communications	7.2
Insurance (excl. mortgage)	6.2
Retail	5.6
Eating out	5.4
Housing maintenance	5.4
Healthcare	4.2
Durable goods	3.8
Miscellaneous expenses	3.8
Entertainment and recreation	3.7
Local public transportation	1.7
Tuition and school fees paid in Arizona	1.6
Personal Care	1.4
Childcare and child activities	1.1
Leisure travel within Arizona	0.9
Personal services	0.8
Total	100.0

Source: UA Faculty/Staff Survey, Spring 2004.

After accounting for leakages, the Pima County I-O model estimated that \$351.8 million was spent on goods and services provided by local businesses. This spending was directly responsible for 5,218 jobs and \$108.5 million in earnings in Pima County (Table 8).

**Table 8. Impact of UA Faculty and Staff Spending in Pima County FY 2004**

	UA employee local spending	Direct impact	Indirect impact	Induced impact	Total impact*
Jobs		5,218	1,034	1,207	7,459
Earnings (\$ 1,000)		108,501	30,276	32,964	171,741
Dollar impact (\$ 1,000)	412,708	351,777	88,610	96,996	598,315

Source: UA OEPA based on UA Faculty/Staff Survey IMPLAN I-O model.

\*Total dollar impact includes local expenditures plus indirect and induced impacts generated through multiplier effects; direct dollar impact already is included in the "local spending" figure, and thus omitted from the row total.

Total earnings and taxes are included in total dollar impact.

Consumer spending generates indirect and induced impacts through a multiplier effect throughout the local economy. University employee spending had an additional impact of 2,241 jobs and \$63.2 million in earnings in fiscal year 2004.

As shown in Table 8, the total impact of University faculty and staff spending accounted for 7,459 jobs and earnings of \$171.7 million in Pima County. The total dollar impact amounted to an estimated \$598.3 million.

The multiplier effect related to faculty and staff spending was 1.45. This means that for each \$100 spent by University faculty and staff in Pima County an additional \$45 was spent in the local economy.

## IMPACT OF STUDENT SPENDING

An average of 35,735 students were enrolled at The University of Arizona during the Fall and Spring semesters of the 2003-2004 academic year (Table 9).

**Table 9. UA Enrollment Academic Year 2003-2004**

	Fall 2003	Spring 2004
Undergraduate enrollment	28,482	26,333
Graduate enrollment	8,601	8,054
<b>Total</b>	<b>37,083</b>	<b>34,387</b>

*Source: UA Fact Book 2003-2004, based on Office of Enrollment Research and Operations.*

Data collected through an electronically administered survey of University students in the Spring of 2004 indicated an average monthly expenditure per student of \$1,735.<sup>24</sup>

Based on survey data, student spending brings \$704.3 million annually into Tucson's economy, excluding tuition fees paid to the University.<sup>25</sup> The largest expenditure category was housing, accounting for 31.1 percent of annual expenditures (Table 10). In comparison to the last survey of student spending in 1995, the 2004 survey results indicate a relative decline in several categories, such as housing, transportation, health care and entertainment. Students now spend relatively more on groceries and eating out, retail, books and insurance than a decade ago.

**Table 10. UA Student Consumption Categories 2004**

	%
Housing	31.1
Groceries	8.6
Utilities and communications	8.2
Eating out	7.4
Retail	7.2
Personal transportation	6.9
Durable goods	6.7
Insurance	5.2
Books/supplies*	5.0
Entertainment and recreation	3.8
Healthcare	2.7
Personal Care	2.5
Miscellaneous expenses	2.1
Leisure travel within Arizona	1.7
Childcare and child activities	0.5
Local public transportation	0.4
Total	100.0

Source: UA Student survey Spring 2004.

\*UA 2005 estimate

According to the model, \$573.5 million was spent by students on locally produced goods and services. This had an impact of creating an estimated 9,073 direct jobs and \$179.4 million in direct earnings in Pima County. An additional 3,536 jobs and \$99.6 million in earnings were generated through the multiplier effect (Table 11).

**Table 11. Impact of UA Student Spending in Pima County FY 2004**

	UA student local spending	Direct impact	Indirect impact	Induced impact	Total impact*
Jobs		9,073	1,575	1,961	12,609
Earnings (\$ 1,000)		179,438	46,040	53,568	279,045
Dollar impact (\$ 1,000)	704,337	573,512	136,999	157,622	998,958

Source: UA OEPA based on Student Expenditure survey 2004 in combination with IMPLAN I-O model.

\*Total dollar impact includes local expenditures plus indirect and induced impacts generated through multiplier effects; direct dollar impact already is included in the "local spending" figure, and thus omitted from the row total.

Total earnings and taxes are included in total dollar impact.

The total economic impact of student spending was 12,609 jobs and \$279 million in earnings. The total dollar impact in Pima County was \$998.9 million (Table 11).

The multiplier effect related to student spending was 1.42. This means that for each \$100 spent by University students in Pima County an additional \$42 were spent in the local economy.

## IMPACT OF UA-RELATED VISITORS

Thousands of visitors travel every year to Pima County to attend University athletic events, concerts, art performances, homecoming and spring reunion, participate in enrollment programs and campus tours, accompany students to school and attend graduation ceremonies, interview students for jobs, visit students, faculty and staff, and attend conferences, outreach programs and other University-sponsored activities.

The University generated over 800,000 visitor days in Pima County from outside the area during fiscal year 2004. This estimate was calculated from responses obtained from four sets of questionnaires and surveys: (1) questionnaires sent to the University's colleges, departments and administrative offices, (2) questionnaires sent to departments involved in athletics, entertainment and amusement events, (3) survey of faculty and staff spending that included questions about out-of-town friends and family visitors and, (4) survey of student spending that included questions about out-of-town friends and family visitors.

Colleges, departments and administrative offices responded with information on visitors attending conferences and other activities in their departments or units that were not ticket-sales related and whose travel expenses were not covered by University funds.

Departments that attract visitors for athletics, entertainment and art performances through ticket sales responded with information on the number of visitors from outside of Pima County and Arizona that bought tickets to collegiate games, art performances at UApresents and Flandrau Science Center and Planetarium during fiscal year 2004. More information on the methodology for estimating visitor spending is provided in the Appendix.

The survey of students, and faculty and staff requested information on out-of-town friends and family visitors, their average length of stay and average daily expenditure.

**Table 12. UA-Related Visitor Days and Estimated Expenditures 2004**

	Visitor days	Expenditures (\$ thousands)
Student visitors and parent activities	426,290	41,037
Faculty and staff visitors	206,524	17,501
Athletics and alumni activities	83,558	8,210
College and University activities	93,112	10,401
<b>Total</b>	<b>809,484</b>	<b>77,149</b>

*Source: UA OEPA based on UA Student and Faculty/Staff Survey 2004; UA Colleges & Athletics Department survey 2004.*

Results from the questionnaires and surveys (Table 12) show that over three quarters of all University-related visitor days are due to students, faculty and staff. Student-related visitors accounted for the largest number of visitors. The purpose of these visits included orientation and recruitment activities, parents accompanying students to campus at the beginning and end of semesters, mid-semester visits by parents, family and friends and graduation ceremonies.

The estimated combined direct spending by all University-related visitors was \$77.1 million in Pima County<sup>26</sup> (Table 12).

**Table 13. Impact of UA-Related Visitor Spending in Pima County FY 2004**

	UA visitor local spending	Direct impact	Indirect impact	Induced impact	Total impact*
Jobs		1,226	166	247	1,639
Earnings( \$ 1,000)		23,722	4,838	6,752	35,311
Dollar impact (\$ 1,000)	77,1497	63,542	14,934	19,867	111,949

Source: UA OEPA based on UA survey and IMPLAN I-O model.

\*Total dollar impact includes local expenditures plus indirect and induced impacts generated through multiplier effects; direct dollar impact already is included in the "local spending" figure, and thus omitted from the row total. Total earnings and taxes are included in total dollar impact.

The impact of the \$77.1 million spent by University-affiliated visitors in Pima County was estimated to be 1,226 direct jobs and \$23.7 million in earnings. An additional 413 jobs and \$11.6 million in earnings were generated through the multiplier effect. Total spending in Pima County was \$111.9 million (Table 13).

The multiplier effect associated with University-related visitor spending was 1.45. This means that for each \$100 spent by University-related visitors in Pima County an additional \$45 was spent in the local economy.

## SUMMARY OF ECONOMIC IMPACTS IN PIMA COUNTY

Exhibits 1, 2 and 3 summarize The University of Arizona impacts on employment, earnings and total spending (dollar impact) in Pima County during fiscal year 2004 (presented in more detail in Tables 3, 5, 8, 11 and 13).

**Exhibit 1. Impact of UA on Pima County Employment FY 2004**

	Direct jobs	Indirect & induced	Total jobs
<i>UA employment</i> was 14,484 full or part-time workers. Of these, 21% were students.	14,484		14,484
<i>Student spending</i> was directly responsible for 9,073 jobs in Pima County. An additional 3,536 jobs were generated through a multiplier effect.	9,073	3,536	12,609
<i>Faculty and staff spending</i> accounted for 5,218 jobs directly and 2,241 through a multiplier effect.	5,218	2,241	7,459
<i>University purchases</i> of locally produced goods and services, including health services, created 1,253 jobs directly and another 743 jobs through a multiplier effect.	1,253	743	1,996
<i>University capital investment</i> (including construction) generated directly 784 jobs and an additional 527 jobs through a multiplier effect.	784	527	1,311
<i>University-related visitor spending</i> accounted directly for 1,226 jobs and 413 jobs through a multiplier effect.	1,226	413	1,639
<b>Total job impact in Pima County</b>			<b>39,498</b>

*Source: UA OEPA based on various sources in combination with IMPLAN I-O model.*

The total employment impact, including University employees, was **39,498 jobs** in Pima County in fiscal year 2004 (Exhibit 1).

## Exhibit 2. Impact of UA on Pima County Earnings FY 2004

(in millions of dollars)

	Direct earnings	Indirect & induced	Total earnings
<i>University payroll</i> in FY 2004 was \$551.0 million including benefits.	551.0		551.0
<i>Student spending</i> accounted directly for \$179.4 million in earnings in Pima County and an additional \$99.6 million through a multiplier effect.	179.4	99.6	279.0
<i>Faculty and staff spending</i> was directly responsible for \$108.5 million in earnings in Pima County. An additional \$63.2 million was generated through a multiplier effect.	108.5	63.2	171.7
<i>University purchases</i> of local goods and services, including health services accounted for \$42.4 million in earnings directly and an additional \$15.8 million through a multiplier effect.	42.4	15.8	58.2
<i>University capital investment</i> (including construction) generated directly \$28.9 million in earnings and an additional \$15.7 million through a multiplier effect.	28.9	15.7	44.6
<i>University-related visitor spending</i> accounted directly for \$23.7 million in earnings and \$11.6 million through a multiplier effect.	23.7	11.6	35.3
Total earnings impact in Pima County			1,139.8

Source: UA OEPA based on various sources in combination with IMPLAN I-O model.

Total earnings associated with all these jobs, including University payroll, were an estimated **\$1.1 billion** (Exhibit 2).

### Exhibit 3. Total Dollar Impact of UA on Pima County Economy FY 2004

(in millions of dollars)

	Direct spending	Indirect & induced	Total impact
<i>University payroll</i> in FY 2004 was \$551.0 million including benefits.	551.0		551.0
<i>Student spending</i> in Pima County was \$704.3 million which generated an additional \$294.6 million through a multiplier effect.	704.3	294.6	999.0
<i>Spending by faculty and staff</i> generated an additional \$185.6 million in spending in Pima County through a multiplier effect.		185.6	185.6
<i>University purchases</i> were \$108.6 million worth of goods and services, including health services from local businesses and generated an additional \$60.3 million through a multiplier effect.	108.6	60.3	168.8
<i>University capital investment</i> (including construction) of \$64.4 million generated an additional \$42.4 million through a multiplier effect.	64.4	42.4	106.8
<i>University-related visitor spending</i> was an estimated \$77.1 million which generated an additional \$34.8 million in local spending through a multiplier effect.	77.1	34.8	111.9
Total dollar impact in Pima County			2,123.1

Source: UA OEPA based on various sources in combination with IMPLAN I-O model.

The total dollar impact of The University of Arizona on the Pima County economy was an estimated **\$2.1 billion** (Exhibit 3).

The total impacts of The University of Arizona on Pima County amounted to 39,498 jobs and \$1.1 billion in earnings. The total dollar amount was \$2.1 billion (Table 14).

**Table 14. Summary of UA Economic Impacts in Pima County FY 2004**

	Jobs	Earnings (\$ millions)	Total dollar impact (\$ millions)
UA employees*	14,484	551.0	551.0
Employee spending**	7,459	171.7	185.6
Construction	1,311	44.6	106.8
UA purchases	1,996	58.2	168.8
Student spending	12,609	279.0	999.0
Visitors spending	1,639	35.3	111.9
<b>Total</b>	<b>39,498</b>	<b>1,139.8</b>	<b>2,123.1</b>

Source: UA OEPA based on various sources in combination with IMPLAN I-O model.

\* UA earnings in 2004 include benefits (about \$148 million). Student earnings are excluded.

\*\* Total dollar impact excludes UA employee earnings, which are included in the "UA employees" row.

## BOLSTERING EVERY COUNTY IN ARIZONA

Economic impacts generated by The University of Arizona-related activities are felt beyond Pima County. The University purchases goods and services from businesses in the metropolitan Phoenix area as well as other places in Arizona. In fiscal year 2004, the University purchased \$43.4 million worth of goods and services and another \$26.5 million in capital investment (mostly equipment) from Arizona businesses outside of Pima County. The combined impact of this spending accounted for 1,102 jobs and \$41.4 million in earnings outside Pima County. The estimated dollar impact of these purchases was \$112.8 million. Most of these impacts occurred in Maricopa County.<sup>27</sup>

**Table 15. Impact of UA Expenditures in Arizona Outside Pima County FY 2004**

*Total impact of operation expenditures and capital investment*

	UA spending in rest of state	Direct impact	Indirect impact	Induced impact	Total impact*
Jobs		653	179	270	1,102
Earnings (\$ 1,000)		25,601	7,082	8,683	41,366
Dollar impact (\$ 1,000)	69,945	63,028	17,538	25,366	112,849

Source: UA OEPA based on UA FSO and PCO data in combination with IMPLAN I-O model.

\*Total dollar impact includes local expenditures plus indirect and induced impacts generated through multiplier effects; direct dollar impact is already included in the "local spending" figure, and thus omitted from the row total.

Total earnings and taxes are included in total dollar impact.

The University has offices, staff and programs in every county in Arizona through the Cooperative Extension and Agricultural Centers of the College of Agriculture and Life Sciences. The Arizona Health Sciences Center encompasses a number of programs in the Phoenix metropolitan area, while the UA South campus is located in Sierra Vista in Cochise County. Combined, these programs had 483 employees with \$14.5 million in earnings (excluding benefits) and operations-related expenditures of \$5.4 million in fiscal year 2004 (Table 16).

**Table 16. UA Programs in Other Arizona Counties:  
Employment and Expenditures FY 2004**

*(in thousands of dollars)*

County	UA employees	UA payroll (excl. benefits)	UA expenditures*
Cochise	103	3,917	1,119
Maricopa	111	4,586	1,548
Pinal	111	1,487	1,806
All other <i>(excluding Pima)</i>	158	4,518	927
<b>Total</b>	<b>483</b>	<b>14,508</b>	<b>5,400</b>

Source: UA OEPA survey of UA departments and UA FSO.

\*Including operation expenditures, capital investment and payroll.

The economic impact of all University programs in Arizona counties outside of Pima County was 672 jobs and \$19.5 million in earnings. The total impact was \$27.8 million (Table 17).

**Table 17. Impact of UA Programs in Other Arizona Counties FY 2004**

*(in thousands of dollars)*

	Jobs	Earnings	Dollar impact
UA employees	483	14,508	14,508
Employee spending	119	3,400	6,100
UA spending	70	1,600	7,200
<b>Total</b>	<b>672</b>	<b>19,508</b>	<b>27,808</b>

Source: UA OEPA based on various sources in combination with IMPLAN I-O model.

Table 18 summarizes University impacts by major source and combines impacts in Pima County with those in all other counties. The column showing “Impacts on the rest of Arizona” represents the sum of impacts due to University purchases outside of Pima County (from Table 15) and the impact of UA programs in other counties (from Table 17).

**Table 18. Summary of UA Impacts in Arizona, Including Pima County FY 2004**

	Impact on Pima County	Impact on rest of Arizona	Total impact in Arizona
<b>Employment</b>			
UA employees	14,484	483	14,967
Student spending	12,609	n.a.	12,609
Employee spending	7,459	119	7,578
UA purchases	1,996	679	2,675
Capital investment	1,311	493	1,804
Visitors spending	1,639	n.a.	1,639
Total	39,498	1,774	41,272
<b>Earnings (in millions of dollars)</b>			
UA employees	551.0	14.5	565.5
Student spending	279.0	n.a.	279.0
Employee spending	171.7	3.4	175.1
UA purchases	58.2	23.1	81.3
Capital investment	44.6	19.9	64.5
Visitors spending	35.3	n.a.	35.3
Total	1,139.8	60.9	1,200.7
<b>Dollar impact (in millions of dollars)</b>			
UA employees	551.0	14.5	565.5
Student spending	999.0	n.a.	999.0
Employee spending	185.6	6.1	191.7
UA purchases	168.8	72.7	241.5
Capital investment	106.8	47.4	154.2
Visitors spending	111.9	n.a.	111.9
Total	2,123.1	140.7	2,263.8

Source: UA OEPA based on various sources in combination with IMPLAN I-O model.

The total economic impact of The University of Arizona was 39,498 jobs in Pima County and an additional 1,774 jobs in other Arizona counties, or a total of 41,272 jobs statewide. The total earnings impact was more than \$1.1 billion in Pima County and an additional \$60.9 million in other counties or a total of \$1.2 billion statewide.

The total dollar impact was \$2.1 billion in Pima County and an additional \$140.7 million in other Arizona counties or a total of \$2.3 billion for the entire state.

# TAX REVENUE IMPACT

## STATE, COUNTY AND CITY REVENUES

Tax revenue impacts were estimated for several different levels of government. In Arizona, several major sources of city and county government tax revenues are state-shared revenues. These are taxes imposed and collected by the state and partially redistributed to cities and counties. The primary state-shared taxes are sales revenues, highway user revenue funds, vehicle license tax revenues and urban revenue sharing funds (shared state income tax revenues).

Other local tax revenue sources include the use tax, Cactus League surcharge and city bed tax. More information on each tax revenue source is provided in the Appendix.

Direct tax revenue impacts, as shown in Table 19, are those taxes paid concurrently as an expenditure is made. For example, the University pays a contracting tax (a component of the sales tax) on its construction activity and a retail tax for equipment purchased locally or the use tax for equipment purchased from out of state. Capital expenditures generated a total of \$3.2 million in tax revenues to state, county and city governments in fiscal year 2004. Since the University does not pay property taxes, University construction and other capital expenditures only generate sales tax revenues to the city and state, with the state returning a portion back to cities and counties.

Other local University spending generated \$3.4 million in tax revenue to state, county and city governments. These tax revenues exclude “pass through” taxes collected by the University and paid to the state for taxable sales to students, faculty and staff, *e.g.*, at the campus bookstore or Student Union restaurants. Pass through taxes were estimated as part of student, faculty and staff spending.

Estimated student spending of \$704.3 million generated \$14.9 million in state, county and city government tax revenues; University employee spending of \$551 million generated \$7.7 million in tax revenues; visitor spending of \$77.1 million generated \$6.4 million in tax revenues. Total direct tax revenues were estimated to be \$35.7 million in fiscal year 2004.

Not only do University operations, employees, students and visitors generate tax revenues as purchases are made throughout the region, employees who work in affected sectors also generate tax revenues as they spend their income locally. Additional tax revenues are generated by the \$551 million in earnings paid to University employees in Pima County and by an additional \$417.2 million in earnings created throughout the economy when the University buys locally and when students and visitors make local purchases (Table 20). The combined induced tax revenues derived from all earnings were \$62.5 million to state, county and city governments.

**Table 19. Direct Tax Revenue Impact of UA-Related Spending\* FY 2004***(in thousands of dollars)*

Direct Revenues	Direct UA Capital Exp	Direct UA Other Local Exp	Direct UA Emp Spending	Direct Student Spending	Direct Visitor Spending	Total
<b>State of Arizona</b>						
Use Tax	0	1,101	0	0	0	1,101
Hwy. User Revenue Fund	0	76	463	1,032	150	1,722
Sales Tax	2,125	1,099	3,675	6,160	2,134	15,194
Total	2,125	2,277	4,139	7,193	2,284	18,01
<b>Pima County</b>						
State Shared Sales Tax	98	115	260	484	281	1,237
State Shared Hwy. User Rev. Fund	0	30	255	568	83	936
2% County Hotel/Motel Tax	0	8	0	0	525	533
Cactus League Surcharge	0	1	13	41	50	104
Total	98	154	528	1,093	938	2,810
<b>City of Tucson</b>						
State Shared Sales Tax	15	25	35	64	37	176
State Shared Hwy. User Rev. Fund	0	37	296	660	96	1,089
City Sales Tax	760	501	2,170	4,872	689	8,992
City Bed Tax	0	22	0	0	1,822	1,844
Total	775	584	2,501	5,595	2,645	12,101
<b>Pima County Association of Governments</b>						
State Shared Hwy. User Rev. Fund	0	2	17	37	5	61
Total	0	2	17	37	5	61
<b>Maricopa Association of Governments</b>						
State Shared Hwy. User Rev. Fund	0	8	50	112	16	186
Total	0	8	50	112	16	186
<b>Other Arizona Counties</b>						
State shared sales tax	104	219	206	375	222	1,125
State Shared Hwy. User Rev. Fund	0	3	-6	-12	-18	-33
Total	104	222	200	362	204	1,092
<b>Other Arizona Cities and Towns</b>						
Shared Sales Tax	110	181	253	471	273	1,287
State Shared Hwy. User Rev. Fund	0	16	24	54	8	101
Total	110	197	277	524	281	1,389
Total	3,211	3,444	7,712	14,917	6,373	35,656

Source: UA Eller College of Management, Economic and Business Research Center, Revenue model.

\*Including construction, operation-related expenditures, employee, student and visitor spending.

**Table 20. Induced Tax Revenue Impact of UA-Related Spending FY 2004***(in thousands of dollars)*

	Induced Impacts for UA Wages	Induced Impacts for Non-UA Wages	Total
<b>State of Arizona</b>			
Individual Income Tax	6,527	7,467	13,994
Sales Tax	7,287	12,540	19,827
Hwy. User Rev. Fund	834	1,483	2,317
Vehicle License Tax	0	0	0
Property Tax	0	0	0
Total	14,648	21,490	36,138
<b>Pima County</b>			
State Shared Sales Tax	738	1,066	1,804
State Shared Hwy. User Rev. Fund	257	547	804
Vehicle License Tax	496	531	1,027
Property Tax	3,670	3,923	7,593
Total	5,161	6,067	11,228
<b>City of Tucson</b>			
Urban Revenue Sharing	138	148	286
State Shared Sales Tax	91	133	224
State Shared Hwy. User Rev. Fund	227	559	786
Vehicle License Tax	419	448	867
Property Tax	408	437	845
City Sales Tax	1,380	3,794	5,174
Total	2,664	5,520	8,184
<b>Pima Association of Governments</b>			
State Shared Hwy. User Rev. Fund	30	50	80
Total	30	50	80
<b>Maricopa Association of Governments</b>			
State Shared Hwy. User Rev. Fund	90	150	240
Total	90	150	240
<b>Other Arizona Counties</b>			
State Shared Sales Tax	485	814	1,299
State Shared Hwy. User Rev. Fund	192	238	430
Vehicle License Tax	78	120	198
Total	755	1,172	1,927
<b>Other Arizona Cities and Towns</b>			
Urban Revenue Sharing	1,014	1,094	2,107
State Shared Sales Tax	664	990	1,654
State Shared Hwy. User Rev. Fund	349	438	787
Vehicle License Tax	47	81	128
Total	2,074	2,603	4,676
Total	25,421	37,052	62,473

Source: UA Eller College of Management, Economic and Business Research Center, Revenue model.

## TOTAL REVENUE IMPACT

Total revenue impacts are summarized in Table 21. The State of Arizona recoups \$54.2 million, which is 17.1 percent of the state appropriation for The University of Arizona. In total, the University contributes close to \$98.1 million to state, county and city governments in tax revenues.<sup>28</sup>

**Table 21. Summary of Tax Revenue Impacts of UA-Related Spending in Arizona FY 2004**

*(in millions of dollars)*

	Direct	Induced	Total
State	18.0	36.1	54.2
Pima County	2.8	11.2	14.0
City of Tucson	12.1	8.2	20.3
Pima Assn. of Gov.	0.1	0.1	0.1
Maricopa Assn. of Gov.	0.2	0.2	0.4
Other AZ Counties	1.1	1.9	3.0
Other AZ Cities	1.4	4.7	6.1
Total	35.7	62.5	98.1

*Source: UA Eller College of Management, Economic and Business Research Center, Revenue model.*

## COMPARISON WITH PREVIOUS STUDIES

Table 22 compares the fiscal year 2004 economic impacts of The University of Arizona with the two previous studies in 1995 and 1998. The University employed about 2,400 more people at its main campus in fiscal year 2004 than a decade ago, with a major increase occurring after fiscal year 1998.

The University has continued to attract substantial support for research, instruction and outreach activities through grants, contracts and gifts. Moreover, the combined amount of grants, contracts and gifts surpassed the state appropriated funding in each of the fiscal years analyzed. For every dollar of state appropriated funding in fiscal year 2004, the University attracted an additional \$1.45 in grants, contracts and gifts, compared to \$1.12 in fiscal year 1995 and \$1.10 in fiscal year 1998.

**Table 22. UA Impact in Pima County: Comparison With Previous Studies***(dollars in millions)*

	FY 1995	FY 1998	FY 2004
State appropriations (\$)	261	306	317
Grants, contracts and gifts (\$)	293	336	461
UA employment	12,033	12,043	14,484
Total employment impact*	39,503	40,911	39,498
Total earnings impact (\$)	806	865	1,140
Tax revenue impact (\$)	88	96	98
Total dollar impact (\$)	1,769	1,862	2,123

Source: UA OEPA based on various sources in combination with IMPLAN I-O model; Eller College of Management, Economic and Business Research Center Revenue model.

\* Including direct employment at UA.

The estimated employment impact of 39,498 total jobs in Pima County in fiscal year 2004 shows a decline in comparison to an estimated 39,503 jobs in fiscal year 1995 and 40,911 in fiscal year 1998. There are a number of possible explanations for these differences.

The application of a new input-output model in the current study is one possible explanation. Although IMPLAN and RSRI input-output models<sup>29</sup> are similar in conceptual approach, the IMPLAN model incorporates more recent regional economic data and, thus, reflects changes that have occurred in the regional economy during the last decade, most notably productivity increases. This translates into higher outputs per worker, which also was followed by a general increase in earnings per worker.<sup>30</sup>

Increased research activity, primarily in basic research, may be another reason for a relatively smaller number of indirect and induced jobs in fiscal year 2004 compared to previous studies. These activities are generally associated with a relatively smaller number of highly paid professional personnel and services in comparison to regular operation and maintenance activities.

The combination of a new model and structural changes in the regional economy are reflected in higher estimates of both the earnings and total dollar impact in fiscal year 2004. The estimated earnings impact in fiscal year 2004 was \$1.1 billion, or 31.7 percent higher than in fiscal year 1998, and 41.4 percent larger than in fiscal year 1995. The total dollar impact of The University of Arizona in Pima County increased 14 percent from fiscal year 1998 and 20 percent from fiscal year 1995.

Table 23 compares estimates of impacts of The University of Arizona in Pima County and the rest of the state in fiscal year 1998 and 2004.<sup>31</sup>

**Table 23. Comparison of UA Impacts in FY 2004 and FY 1998***(dollars in millions)*

	Pima County FY 1998	Pima County FY 2004	Rest of Arizona FY 1998	Rest of Arizona FY 2004	Total impacts in Arizona FY 1998	Total impacts in Arizona FY 2004
Employment impact						
UA employees	12,043	14,484	531	483	12,574	14,967
Total employment impact*	40,911	39,498	1,608	1,774	42,519	41,272
Total earnings impact (\$)	896.1	1,139.8	31.1	64.8	927.2	1,204.6
Total dollar impact (\$)	1,929.0	2,123.2	67.0	140.7	1,996.0	2,263.8
Total tax revenue impact					95.9	98.1

Source: UA OEPA based on various sources in combination with IMPLAN I-O model; Eller College of Management, Economic and Business Research Center Revenue model.

\* Including direct employment at UA.

While direct employment declined from 531 in fiscal year 1998 to 483 in fiscal year 2004, both the earnings and total dollar impacts have increased. The total dollar impact of the University outside of Pima County more than doubled between fiscal year 1998 and fiscal year 2004. This reflects expansion of University programs in other Arizona counties as well as improved data on purchases of goods and services from Arizona businesses.

Tax revenues increased by only 2.3 percent despite robust growth in earnings and expenditures. This reflects a number of trends that affected various tax revenue components. Direct revenues declined from the 1998 study mainly because of a shift in spending patterns from taxable (primarily goods) to nontaxable (primarily services) items. Induced income tax collections declined from fiscal year 1998 because of a combination of lower tax rates and the relatively weak economy during fiscal year 2004. Also, highway-related tax revenues always grow much slower than income because gasoline taxes are based on gallons sold, and not on the value of the gasoline sold.

## IMPACTS OF OTHER ARIZONA UNIVERSITIES

Case studies of universities differ from one another in regard to regional models and, more importantly, the nature and number of economic sources considered in the analysis. Impact studies of the three Arizona public universities have been conducted for different fiscal years, using different regional I-O models and different sources of economic impacts. For that reason, a direct comparison of the economic impacts of the three universities is not attempted here. Rather, the results serve as an indication of the roles the three universities play in their respective regional economies and how they affect all of Arizona.

The Arizona State University Center for Business Research conducted an impact analysis for fiscal year 2002.<sup>32</sup> The study measured the economic impact of University expenditures, and employee and student spending. The economic impact was estimated to be 37,000 Arizona jobs, \$1.1 billion in earnings and a total impact of \$2.1 billion. The study also pointed out the significant effect of higher education on an individual's lifetime earnings and estimated that the total income in Arizona was \$1 billion higher because of the undergraduate education services provided by ASU over the past three decades.

The Northern Arizona University (NAU)<sup>33</sup> economic impact study for fiscal year 2003 considered six sources of impacts associated with the university activities. In addition to university expenditures, employee and student spending, the analysis included the impact of university-related visitor spending, the impact of NAU graduates and NAU retirees.<sup>34</sup> The total impact of all these activities was estimated to be 12,542 jobs (full-time equivalent) and total expenditures, *i.e.*, total dollar impact, in the amount of \$911 million. Of that amount, an estimated \$16.8 million was attributed to direct spending by NAU retirees residing in Arizona. The contribution of NAU alumni who continue to reside in Arizona after graduation was estimated to be in excess of \$28.6 million statewide on an annual basis. The lifelong earnings differential above a high school graduate for all NAU graduates living in Arizona was estimated to be \$22.4 billion.

## CONCLUSIONS

This economic and tax revenue analysis has shown that The University of Arizona plays a major role in Pima County's economy, contributing 9.8 percent of all local employment in fiscal year 2004.<sup>35</sup> Every tenth person employed in Pima County was related directly or indirectly to the University. The total dollar impact in Pima County was \$2.1 billion.<sup>36</sup>

The University impact extends beyond the boundaries of Pima County to every county in Arizona. Outside of Pima County, the University generated 1,774 jobs and \$60.9 million in earnings. The total dollar impact was \$140.7 million. The statewide impact of The University of Arizona was 41,272 jobs, more than \$1.2 billion in earnings and \$2.3 billion in total dollar impact.

Estimates in this study are conservative in nature, reflecting both the type of model used in the analysis and the lack of data to capture additional sources of economic and tax revenue impacts. Regional input-output models and other multiplier techniques do not take into account the unique qualities of knowledge that are a product of universities, essentially treating a university as no different than any other kind of organization that hires and pays labor and purchases supplies and equipment from both regional and outside sources. Treating the university as a business, however, helps draw attention to its enormous contribution to the local economy.

Impressive as they are, the estimated economic and tax revenue impacts should not obscure other important aspects of the University. Higher education is an investment that provides enormous returns to individuals, governments, the local community and society at large. Many of these larger impacts, however, are hard to quantify in terms of standard measures such as jobs and dollars. Thus, the narrowly defined economic and tax revenue impacts need to be evaluated in the broader context.



AHSC Biomedical Communications



## APPENDIX

### **Input-Output (I-O) Model**

An I-O model represents a regional economy in terms of transaction flows among economic sectors. For example, to produce \$1 worth of staplers, 20 cents worth of input is needed from fabricated metal products, 20 cents worth from business services, 30 cents worth of labor and about 30 cents worth of other value-added components, *e.g.*, rent, interest and profit. An increase in the production of staplers will cause an increase in the production of other directly related sectors in proportion to their inputs per \$1 of output in staplers. Because these directly related sectors also use inputs from other sectors, an increase in the production of staplers will indirectly affect many other sectors. Economic impacts also are induced through households' spending of earnings in direct and indirect production. These household expenditures create additional sales and production of goods and services, resulting in increased employment and earnings from that production.

A typical input-output model identifies three distinct effects on a region – direct, indirect and induced – and provides results in terms of output, earnings and employment. The specific models used in this study included input-output models developed by the Minnesota IMPLAN Group Inc. for Pima County, the State of Arizona and each of the remaining counties in Arizona. The IMPLAN (IMpact Analysis for PLANning) methodology, developed in 1985, has been widely used in similar studies.

IMPLAN provides great detail in terms of the number of economic sectors and also recognizes leakages to other regions. The main advantage of the IMPLAN model to the previously used RSRI model is the fact that it provides a more up-to-date version of the regional economy together with conversion from the old SIC (Standard Industrial Classification) to the NAICS (North American Industry Classification System) introduced in 1997.

One of the key features of both IMPLAN and RSRI methodologies is the regional purchase coefficient, which reflects the fact that a portion of the expenditures resulting from the changes in demand in any given region will occur outside the physical boundaries of that region. This is known as leakage and refers to impacts felt in areas outside the region being analyzed. Therefore, in order to provide an accurate measure of the total impact on the local economy, the model subtracts leakage from the initial spending.

The county and state input-output models estimated direct, indirect and induced effects in terms of jobs, associated earnings and output. For a less technical reader, the output in this study is referred to as “total dollar impact.”

Direct impact refers to jobs, earnings and output in a basic activity or activity that is the focus of analysis. For example, University employees represent direct jobs. By definition, the

jobs and associated earnings in local businesses from which the university purchases goods and services are also referred to as direct impacts. Output, in this case, is the dollar amount spent directly on these purchases.

Indirect impacts are generated through additional purchases of goods and services by those businesses who supply the university directly, but purchase inputs from other local businesses in order to satisfy increased demand for their products or services. The increase in demand for local inputs generates a ripple or multiplier effect in the local economy as each affected firm must also increase their purchases of inputs from other producers. The multiplier effect will eventually diminish and vanish after the last dollar is spent locally.

Induced impacts result as employees in both the basic activity and its supplying businesses spend their earnings in the local economy on housing, food, transportation, education, entertainment and other needs. This spending generates additional jobs and associated earnings. Typically, most induced jobs are generated in retail and services sectors, reflecting household expenditure patterns.

Total impacts represent the sum of direct, indirect and induced effects. By dividing total impact by direct impact, a total multiplier is obtained that shows additional jobs, earnings and output generated per each direct job, earnings and output respectively. In most cases, multipliers range between 1 and 2. For example, an earnings multiplier of 1.57 suggests that for every one dollar in direct wages, and additional 57 cents in earnings will be generated in the local economy through the ripple effect.

### **The Revenue Impact Model**

The revenue impact model computes state, county and city tax revenues associated with changes in business activity. The model is designed to be used in conjunction with other economic assessment information, *e.g.*, wage impact results obtained from the input-output model and other specific information about changes in business activity.

Two types of input data are required to run the model. The first type of data consists of community and tax information, such as county, city and state property tax rates, net assessed valuations, taxable sales, county and incorporated city population.

The second type of input is project specific information. The required input consists of the following types of data inputs: total wage impact of the project or activity obtained from the input-output model (direct, indirect and induced impacts), taxable expenditures by category, construction costs and, for the retail sales, the portion of sales spent in the city, the county and the state and outside the state.

Direct tax revenues are those associated with direct expenditures, *e.g.*, University purchases employee, student, or visitor purchases. Thus, when a visitor makes purchases locally, a portion of those purchases is taxable, and those taxes accrue to state and local governments. Direct tax revenue impacts computed for the state are revenues retained by the State of Arizona following distribution to cities, towns and counties.

Induced tax revenues are revenues that accrue to the state or local governments due to the spending of employees in the industries that are affected by the direct expenditures. When visitors spend money in a restaurant, more workers are required in the restaurant industry and when those workers spend their earnings, they generate induced tax revenues.

The same is true when the University, University employees and students spend locally.

Note that the revenue impact model does not estimate revenues that will be distributed to special districts or school districts. However, it should be recognized that these other government entities will receive a portion of induced tax revenues.

### **Data Collection**

Several sources were utilized to obtain data necessary to measure impacts of the University on Pima County and the rest of Arizona.

### **University Expenditures**

The UA *Annual Financial Report 2004*, prepared and printed by the University Financial Services Office, provided the University's expenditures by major categories, as reported in Table 2 of the text. The input-output model, however, required detailed information on expenditures by category. The University Financial Services Office (FSO) generated several detailed data sets showing University expenditures by approximately 100 object codes, *i.e.*, detailed category. These customized data reports included actual audited spending by object code in fiscal 2004 made by the main campus and for each department outside Pima County.

Data on expenditures made by the main campus needed further elaboration in order to separate local purchases from the rest. The UA Office of Procurement and Contracting Services created a list of University expenditures by object code and zip code groups, indicating the percent of all purchases made in Pima County, the rest of Arizona and outside Arizona. These percentages were applied to FSO data to estimate dollar amounts of local spending by category.

As a result, while total University expenditures on supplies, services and utilities were more than \$283 million (Table 2), only approximately \$60 million was spent on local goods and services. It is \$60 million and not \$283 million that generates economic impacts in the local economy and, consequently, only \$60 million were entered into the I-O model. Table 3 reports the impacts of this \$60 million in combination with employee benefits paid by the University.

These estimates of locally purchased goods and services were used with the Pima County input-output model by matching the original object codes with one of more of the 500 sectors in the IMPLAN model.

### **Survey of Faculty and Staff and Student Spending**

The Eller College of Management Marketing class designed and administered two survey instruments during the Spring semester of 2004 to collect data on faculty and staff and student spending for fiscal year 2004. For the purpose of comparability, the survey instruments in fiscal year 2004 followed the basic design of the surveys conducted a decade ago. Meetings with focus groups that included faculty, staff, and undergraduate and graduate students, were followed by two pilot studies with approximately 40 respondents from each group that provided suggestions for further refinement of survey questions.

The Eller College of Management Information Technology Office formatted the surveys for on-line access. With a letter from the President's Office, e-mails were sent to all college deans and heads of non-academic units of the University with a request to forward the survey instrument to the University employees in their units.<sup>37</sup> The entire student population was accessed by e-mail using the student listserve. Both surveys were anonymous and were available on the internet. Copies of the survey instruments are available upon request. A total of 1,377 faculty and staff and 1,171 students responded to the survey.

### **University-Related Visitors**

Three categories of visitors to The University of Arizona were identified: (1) visitors associated with faculty and staff, and students, (2) visitors associated with colleges and university programs, and (3) visitors associated with ticket-sale related university activities.

A section of the faculty, staff and student surveys queried the respondents about the number of visitors they received annually, their length of stay and estimated daily expenditures. The average daily expenditures included lodging, transportation, food, retail and miscellaneous expenses.

The two questionnaires used to collect data about expenditures of visitors attending university events and activities in the fiscal year 1998 were revised and improved. A first set of questionnaires was sent to all colleges, departments and their units, requesting an estimate of the number of visitor-days (number of visitors multiplied by the number of days) and average daily expenditures of faculty visiting on sabbatical, conference participants and other visitors.

The second set of questionnaires was sent to departments or units that generate revenues through sale of tickets such as the Athletics department, Flandrau Science Center and Planetarium and UApresents. The responses provided an estimate of the number of out-of-Pima County and out-of-state visitors attending university games or entertainment events as represented by each ticket. Revenues from the sale of tickets were not recorded in the questionnaire since they were accounted for as part of University revenues and expenditures.

Average expenditures per person per day (excluding room rates) for visitors attending ticket-sales related events and activities were obtained from the *2003 Arizona Tourism Statistical Report*. An average expenditure per person per room for resident leisure visitor profile was used for out-of-Pima County visitors while an average expenditure per person per room for non-resident leisure visitor profile was used with out-of-state visitors. For each of the visitor profiles, hotel rates per person per day were extracted from the average expenditures per person per day including hotel costs reported in the *2003 Arizona Tourism Statistical Report*.

The primary components of visitor expenditures were based on the Bureau of Economic Analysis Travel and Tourism Satellite Accounts categorization of *Tourism Demand for Commodities, 2003*. Further sub-categorization of retail expenditures by sector was based on the *2003 Arizona County Business Patterns*.

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## Notes

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- <sup>1</sup> Formerly called Research I institutions.
- <sup>2</sup> See for example Felsenstein's (1994) review of economic impact studies conducted in the U.S.
- <sup>3</sup> De Gennaro, Nat and Terrence B. O'Keefe (1974).
- <sup>4</sup> Charney and Pavlakovich (1999).
- <sup>5</sup> Source: <http://www.arizona.edu/home/history.shtml>.
- <sup>6</sup> Source: <http://uaadvancement.arizona.edu/highlights/ranking-summary.html>.
- <sup>7</sup> Source: same as footnote 5.
- <sup>8</sup> Including The University of Arizona Health Sciences Center.
- <sup>9</sup> Source: [http://www.mse.arizona.edu/gen\\_info.index.html](http://www.mse.arizona.edu/gen_info.index.html).
- <sup>10</sup> Source: <http://uatechpark.org>. Although a part of The University of Arizona, the Science and Technology Park is not included in the scope of this impact analysis. A separate impact study by Pavlakovich-Kochi and Charney (2005) is available at <http://oed.arizona.edu>.
- <sup>11</sup> Source: <http://cals.arizona.edu>.
- <sup>12</sup> Source: <http://128.196.111.75/AHSCP>.
- <sup>13</sup> Source: <http://uas.arizona.edu>.
- <sup>14</sup> Source: UA Office of the Vice President for Research, Graduate Studies and Economic Development.
- <sup>15</sup> Charney, Pavlakovich and Nakamoto (1992).
- <sup>16</sup> Charney, Pavlakovich and Kopalle (1996), Charney and Pavlakovich (1999).
- <sup>17</sup> Developed by the Minnesota Group.
- <sup>18</sup> Developed originally by the Regional Science Research Institute.
- <sup>19</sup> Detailed expenditure categories.
- <sup>20</sup> University contributions to health and dental benefits were not included in previous studies. However, because the majority of health and dental services are consumed locally, it is appropriate to include them.
- <sup>21</sup> UA Financial Services Office. Actual fiscal year expenditures by object code.
- <sup>22</sup> Fewer than 100 employees separated second ranked Raytheon from the University.
- <sup>23</sup> This excludes wages and salaries paid to graduate students and employee benefits. These impacts were estimated separately under student spending and the University expenditures, respectively.
- <sup>24</sup> According to Arizona State University Center for Business Research, average monthly expenditure per ASU student in 2002 was \$1,650.
- <sup>25</sup> This figure is based on an average of 11.3 months that students stay in Tucson. The information was obtained from the survey.
- <sup>26</sup> Although the estimated visitor days are lower in fiscal year 2004 than in fiscal 1998, the absolute dollar amount of local spending has increased from \$58 million in fiscal year 1998 to a total of \$77.1 million in fiscal year 2004. Survey-based data indicated that the number of visitor days associated with faculty, staff and students have declined in fiscal year 2004 compared to the estimate of visitor days in fiscal year 1998, while visitor days associated with all other activities have increased.
- <sup>27</sup> Detailed data were not available, but the sheer size of Maricopa County economy suggests this conclusion.
- <sup>28</sup> There are other taxes that accrue to school districts and other special districts, but they are not estimated by the existing models.
- <sup>29</sup> Used in fiscal year 1995 and 1998 study.
- <sup>30</sup> This means that \$1 million of spending in fiscal year 2004 generated less jobs than \$1 million spent five or ten years ago.
- <sup>31</sup> Fiscal year 1995 study only provides estimates for Pima County.
- <sup>32</sup> Arizona State University had an average of 51,370 students during academic year 2001-2002, 16,150 faculty, staff and students and a total payroll of \$504 million in fiscal year 2002.
- <sup>33</sup> Northern Arizona University had approximately 19,000 students during academic year 2002-2003, and 4,443 full-time equivalent faculty, staff and students in fiscal year 2003.
- <sup>34</sup> Gunderson, Eastwood and Wayne (2003).
- <sup>35</sup> Based on an average number of nonfarm employees of 353,500 during the 12-month period from July 2003 to June 2004. Source: Arizona Department of Economic Security. Tucson Metropolitan Area Labor Force and Nonfarm Employment 2003 and 2004, accessed at [http://www.workforce.az.gov/admin/uploadedPublications/636\\_tucnaics.xls](http://www.workforce.az.gov/admin/uploadedPublications/636_tucnaics.xls) on 8/12/2005.
- <sup>36</sup> This study excludes impacts of The University of Arizona Science and Technology Park that generated an additional 13,305 jobs and \$631.6 million in earnings in Pima County in fiscal year 2004. The Park activities contributed \$43.7 million in tax revenues to the local and state government. The total dollar impact was \$1.9 billion in Pima County.
- <sup>37</sup> There is no single listserve to access all University employees.



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