

THE UNIVERSITY OF ARIZONA®
An Investment in Arizona's and
Pima County's Future

Economic & Revenue
IMPACT
Analysis
1997-98

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Economic & Revenue **IMPACT** Analysis 1997-98



THE UNIVERSITY OF ARIZONA

The University of Arizona is a public, land-grant, research institution. It was established in 1885 by the 13th Territorial Legislature. The University of Arizona is dedicated to preparing students for an increasingly diverse and technological world and to improving the quality of life for the people of Arizona and the nation.

Today, The University of Arizona is one of the top 20 research universities in the nation, with a student enrollment of 35,000, including more than 2,500 students from 122 countries, a faculty and staff of 12,500 and a 351-acre campus.

ACKNOWLEDGEMENTS

This study could not have been completed without the assistance of many individuals across The University of Arizona campus. Mentioning everyone who contributed information used in preparing this report would require several pages.

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THE UNIVERSITY OF ARIZONA: AN INVESTMENT IN ARIZONA'S AND PIMA COUNTY'S FUTURE

Summary*

By nearly any academic measure, the University of Arizona in Tucson rates as one of the finest scholarly institutions in the United States. The UA is both a land grant school and a Research I center. As such it plays a valuable role in training citizens and conducting advanced research in several valuable areas, such as astronomy, medicine and optics.

The University of Arizona is also a major generator of economic activity for Pima County and Arizona. More precisely, for every \$1 of state-appropriated funds, the university generates \$6.31. The annual economic effect of the university's presence is the generation of 42,500 jobs, \$896 million in wages and a total dollar impact on the state economy of more than \$1.9 billion.

In addition to its appropriation from the state, the university also attracts additional dollars to the local economy from several other sources that this report details. Essentially, for every dollar of state appropriated funds the UA generates another \$1.10 in grants, contracts and gifts, that also help to support teaching, research and public service programs. The university also generates indirect and induced jobs, wages and sales in various economic sectors. Thus, the total impact by far exceeds the initial investment.

REVENUES AND EXPENDITURES

Total UA expenditures, including payroll, fringe benefits and all other expenses, is \$886 million. The university draws \$306 million from

state-appropriated funds and \$141 million from student tuition and fees. Additionally, the combined income from grants, contracts and gifts totals approximately \$336 million, or close to 38 percent of total revenues.

EMPLOYEE SPENDING IMPACT

The 12,043 individuals employed by the UA in Pima County have an annual payroll of \$402 million. Their spending generates an additional economic impact in Pima County of almost 5,950 jobs and \$98 million in wages.

CONSTRUCTION EXPENDITURES IMPACT

The university spent close to \$25 million on construction programs, creating 463 jobs in construction and other industries. This construction activity contributed \$10 million in wages to the Pima County economy.

PURCHASES AND OPERATING EXPENDITURES IMPACT

The university buys goods and services in the form of, for example, equipment, professional services, repair and maintenance services and office supplies. The economic impact of these purchases is over 2,000 jobs and \$45 million in payroll.

STUDENT SPENDING IMPACT

Not counting tuition, UA student spending injects \$732 million per year into the local economy. This generates 17,000 jobs and \$273 million in local wages.

VISITORS SPENDING

The university attracts more than one million visitor days to Pima County each year, generating about 2,850 jobs and \$37 million in wages.

TAX REVENUE IMPACT

The university generates tax revenues directly through purchases of goods and services and indirectly through taxes paid by UA employees. In addition, employees of businesses that sell to the university, students and visitors pay taxes to all levels of governments. The total revenue impact is almost \$96 million, including \$57 million to state government, the \$17 million to City of Tucson, \$12 million to Pima County, and more than \$100,000 to the Pima Association of Governments.

TOTAL IMPACT ON PIMA COUNTY ECONOMY

Summing up direct, indirect and induced jobs, the total impact of the university is 40,911 jobs, which accounts for more than 11 percent of total employment in Pima County. The combined wage impact is \$865 million. The total dollar impact (including wages and tax revenues) is over \$1.86 billion.

IMPACTS OUTSIDE PIMA COUNTY

Through such programs as the College of Agriculture and the Arizona Health Science Center, the university's economic and revenue impact extends to every county in the state. More than 1,600 jobs, \$31.1 million in wages and \$9 million in tax revenues are generated in Arizona counties other than Pima. Total dollar impact outside Pima County is \$67 million (including wages and tax revenues).

TOTAL IMPACT ON ARIZONA ECONOMY

Combining the impacts in Pima County with those in all other Arizona counties, the University of Arizona generates more than 42,500 jobs with \$896 million in wages. The total dollar impact on the state economy is over \$1.9 billion.

*Please note: Figures in this summary may differ from those in tables due to rounding.

Introduction

Most people associate a university with learning, research and innovation. Regional economic developers see universities as producers of highly skilled, highly educated human resources and as centers of innovation and technological change — factors that are becoming increasingly important in a globalized economy. Indeed, knowledge is increasingly considered the most important factor that distinguishes individuals, communities and regions from one another. Communities and regions with the capability to produce knowledge have much better chances for growth and development in a global economy.

Aside from their primary role as education and research facilities, universities also are powerful forces in local economies. The University of Arizona employs thousands of people — faculty, administrators and support staff — making it the largest employer in Pima County. To keep this large organization running, the university supports numerous local vendors through its spending. Employee and student spending also supports several thousand jobs in the community, while visitors attending various programs and activities bring extra dollars into the local economy. The University of Arizona provides not only direct employment, but, through a multiplier effect, supports additional indirect and induced jobs in the community. Through a variety of taxes, tax revenues are generated for local and state governments.

As a state institution, the University of Arizona is partly funded by taxpayer dollars. Nationally and internationally known programs and the expertise of individual faculty

members attract additional funds in the form of research grants and gifts. Impact analyses have consistently shown that the university-generated economic return to the State of Arizona by far exceeds the state's initial investment. The scope of this study is limited to economic and tax revenue impacts only. For the first time, an effort is made to assess the university's economic impact on Arizona counties other than Pima County.

RESEARCH METHOD

In order to assess the economic impacts of the University of Arizona on Pima County, detailed data on university and related expenditures were run through an input-output (I-O) model of Pima County. The model provides estimates of direct, indirect and induced jobs and associated wages, as well as the total dollar impact on the local economy. (Description of the I-O model and definition of economic impacts are provided in the Appendix.)

County-specific I-O models were used to estimate the economic impacts of university programs and expenditures in other counties in Arizona, including Maricopa County.

In addition to economic impacts, tax revenues were estimated by means of Pima County and Arizona revenue models. (More information is provided in the Appendix.)

Data on university expenditures were obtained from the Office of Financial Services and the Office of Procurement and Contracting Services. The estimates of visitor spending were based on information obtained through questionnaires sent to each of the university's various colleges and individual offices that deal with the public.

Student expenditure data were updated from the 1994-95 study¹ by using appropriate consumer price indices to recalculate expenditures. Student expenditure data were also adjusted for the decline in enrollment between the 1994-95 study and the present update.

All estimates in this study apply to fiscal year 1997-98, unless otherwise indicated.

UNIVERSITY REVENUES AND EXPENDITURES

Of the approximately \$885.6 million in total revenues, \$305.9 million (or 34.5 percent) come from state-appropriated funds (see Figure 1). Student tuition and fees account for another \$141.3 million (16 percent). Student fees include all forms of fees charged to students, including registration, late registration, laboratories, music, student activities, nursing, and graduation. Auxiliary enterprise operations (sales and services) bring in \$82.8 million. Approximately \$20 million are derived from interest and dividend income and net realized gains.

The remaining revenues to the University of Arizona are derived from federal grants and contracts (\$228.5 million) and private gifts, and non-federal grants and contracts (\$107.2 million). The combined gifts, grants and contracts total \$335.7 million (almost 38 percent of total revenues). Thus for every dollar of state-appropriated funds, the University of Arizona generates another \$1.10 in grants, contracts and gifts, which also help to support teaching, research and public service programs.

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FIGURE 1
UNIVERSITY REVENUES BY MAJOR FUNDING SOURCES

(in millions of dollars)

Auxiliary Enterprise Operations — 82.8 million

Interest and Dividend Income and
Realized Gains/Losses — 20.1 million

Private Gifts and Non-Federal
Grants & Contracts — 107.2 million

Total Revenues: \$885.6 million

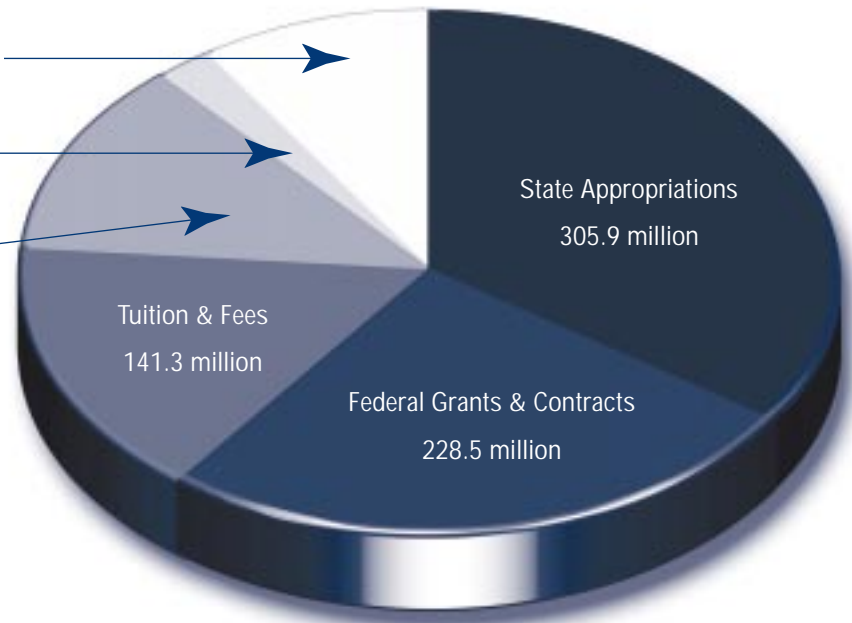


TABLE 1
TOTAL AWARDS/GRANTS BY COLLEGES AND DIVISIONS FY 98

	Total	Research	Non-research*
Agriculture	\$23,466,109	\$20,067,030	\$3,399,079
Business and Public Administration	5,276,852	3,147,521	2,129,331
Education	3,500,537	340,796	3,159,741
Engineering and Mines	23,857,723	21,966,721	1,891,002
Medicine	82,851,033	60,803,990	22,047,043
Nursing	2,430,148	1,748,129	682,019
Other Academic and Administrative	17,439,557	696,008	16,743,549
Optical Sciences	11,728,858	11,525,851	203,007
Pharmacy	8,839,041	7,313,757	1,525,284
Vice President for Research	16,369,905	10,938,264	5,431,641
Vice President for Student Affairs	15,345,006	310,558	15,034,448
Science	120,995,279	118,627,340	2,367,939
Social and Behavioral Sciences	13,025,165	10,519,984	2,505,181
Total:	\$345,125,213	\$268,005,949	\$77,119,264

*Note: Includes awards for Instruction, Public Service, Academic Support, Student Services and Institutional Support

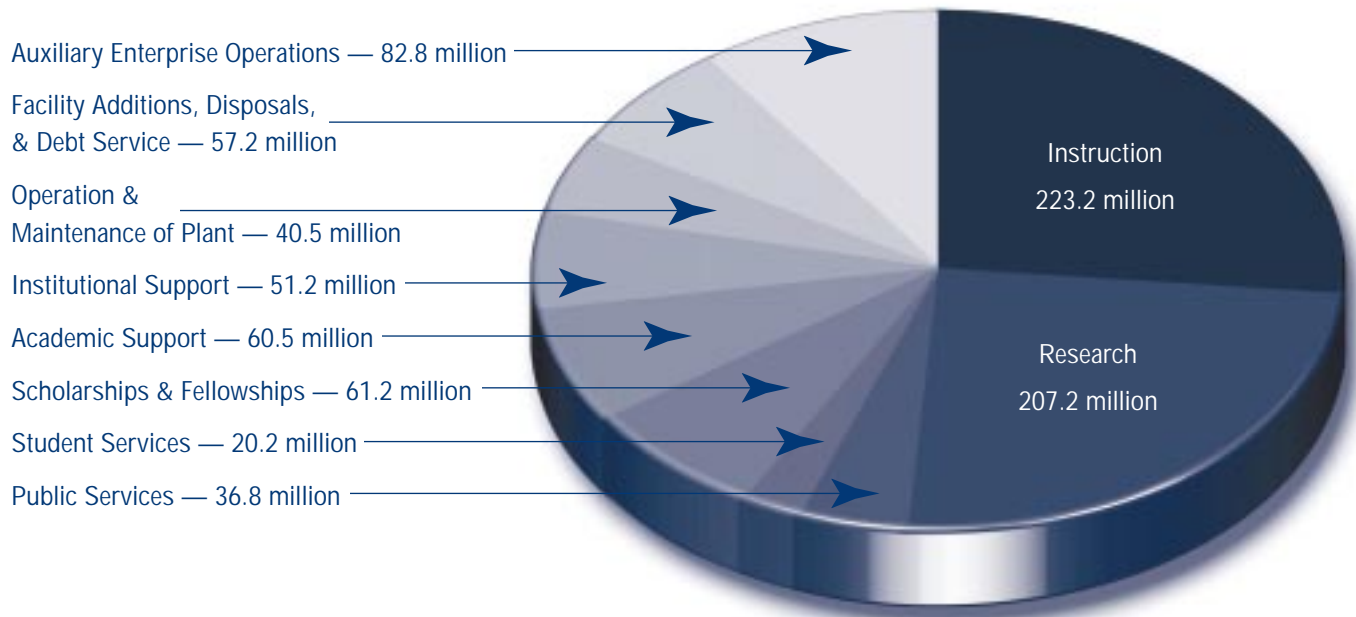
Source: Profile '98, Vice President for Research, The University of Arizona.

Table 1 shows research and non-research awards by colleges and divisions for the fiscal year ending June 1998. The College of Science received almost \$121 million in awards and grants and the College of Medicine received almost \$83 million. Within the College of Science, the amount associated with astronomy in southern Arizona is approximately \$88 million. This includes grants to the Steward Observatory, the Multiple Mirror Telescope Observatory, and the Lunar and Planetary Laboratory. These same awards are shown by funding source in Table 2.

UNIVERSITY EXPENDITURES BY FUNDING USES

University expenditures can be addressed from two perspectives. First, as shown in Figure 2, expenditures can be analyzed by the uses of the funds. Instruction and research are the two main expenditures, accounting for \$223 million and \$207 million, respectively, or a total of 57

FIGURE 2
UNIVERSITY EXPENDITURES BY MAJOR FUNDING USES (in millions of dollars)



percent of non-auxiliary enterprise operations. Expenditures such as scholarships and fellowships, student and public services, and academic and institutional support account for approximately 30 percent of all non-auxiliary enterprise operations. The remaining 13 percent is spent on operations and maintenance, facility additions, disposals and debt servicing.

The auxiliary enterprise operations, which include the bookstore and food services, account for a relatively small portion of total expenditures, approximately \$83 million. These expenditures offset the revenues from auxiliary enterprises.

A second way of looking at university expenditures is by major spending category, as shown in Table 3. The University of Arizona spent approximately \$849 million during the fiscal year ending June 1998. Detailed data on University of Arizona

expenditures were obtained from the Office of Financial Services.²

As shown in Table 3, the major expenditure category is employee payroll, accounting for \$413 million³. In addition, the UA paid almost \$45 million to students in the form of wages, and another \$39 million in student support. Operation of the university creates direct demand for various services in the community. For example, the university spent about \$50 million on outside professional services, \$11 million on repair and maintenance, \$8 million on printing, photo reproduction and media, over \$35 million on operating supplies, and more than \$14 million on travel. The university purchased \$22 million worth of utilities and spent another \$12 million on communications.

²The computer run removed duplicate expenditures and allocated expenditures into more than 200 object codes. Removal of duplicates assured that transfers and purchases, that were internal to the University, were not double counted.

³Note, that this figure includes wages paid to faculty and staff outside Pima County.

University instruction and research activities require continuous upgrading of equipment. Over \$35 million were spent on equipment and \$9 million on library and museum acquisitions.

Construction is another important activity. During fiscal year 1997-98 approximately \$22 million were spent on construction and close to \$3 million on land and building improvements. Thus, the university operation requires various inputs from the local economy and, by purchasing locally, the UA generates indirect jobs and wages. Spending by university employees and students supports additional jobs in the local economy, as money is spent locally on housing, groceries, transportation, entertainment and other services.

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TABLE 2
FUNDING SOURCES OF
TOTAL AWARDS FY 98

Dept. of Health & Human Services	\$68,239,039	19.8%
NASA	67,439,765	19.5%
National Science Foundation	20,373,927	5.9%
Department of Education	18,067,041	5.2%
Department of Defense	17,887,494	5.2%
Other Federal	9,507,427	2.8%
Department of Agriculture	7,926,549	2.3%
Department of Energy	4,449,539	1.3%
Department of Interior	3,383,936	1.0%
<i>Total Federal</i>	217,274,717	63.0%
Other Non-federal	65,516,153	19.0%
Foundations	31,893,842	9.2%
Industry	30,440,501	8.8%
<i>Total Non-federal</i>	127,850,496	37.0%
TOTAL	\$345,125,213	100.0%

*Source: **Profile 98**, Vice President for Research, The University of Arizona.

ECONOMIC IMPACTS

The economic impacts of the university are computed in five broad categories. First is the impact of university employees who spend their money in the local community. Second is an assessment of the impact of the university's construction expenditures. Third, the impacts of all other university purchases and operations are computed. The fourth and fifth categories of economic impact relate to student spending in Pima County and visitor spending in the area. Each of these is discussed separately below. Finally, the impacts of the University of Arizona outside Pima County also are detailed.

UNIVERSITY FACULTY AND STAFF SPENDING IMPACT IN PIMA COUNTY

The university employed 12,043 individuals in various capacities in Pima County, including faculty, accountants, administrative assistants, groundskeepers, and other professionals and staff. Aggregate payroll figures for all employees total \$402 million. University faculty and staff have a large impact on the Pima County economy through the purchase of goods and services and the payment of local taxes. The majority of the \$402 million in wages paid to university employees is circulated back into the local economy. This

support of local industry and services creates additional jobs and income in Pima County.

It is estimated that the total impact of university faculty and staff spending is 5,947 additional local jobs with payrolls of \$98 million. Including all ripple effects, total sales volume in Pima County generated by university faculty and staff spending is \$699 million, including \$402 million in wages.

The impact figures estimated above result exclusively from faculty and staff spending. Some \$46 million in wages paid to university undergraduates and graduate students was

TABLE 3
TOTAL UNIVERSITY EXPENDITURES FOR FY98, By CATEGORY

(in dollars)

		Percent
Employee Wages and Salaries	\$412,977,769	48.7
Employee Related Expenses	83,755,186	9.9
Capital:	68,778,985	8.1
Equipment	35,229,191	
Construction in Progress	21,793,662	
Library and Museum Acquisitions	8,869,040	
Land, Buildings & Improvements	2,866,461	
Capital, Other	20,631	
Outside Professional Services	50,385,361	5.9
Student Support	39,332,456	4.6
Cost of Sales	36,158,778	4.3
Operating Supplies	35,539,189	4.2
Student Wages	44,558,063	3.1
Utilities	22,133,011	2.6
Communications	18,954,265	2.2
Travel	14,660,773	1.7
Miscellaneous	13,643,013	1.6
Miscellaneous Services	11,761,196	1.4
Repair and Maintenance Services	11,082,831	1.3
Licenses, Rentals & Royalties	10,731,672	1.3
Printing, Photography and Media	7,823,613	0.9
Intra-University Transfers	(33,720,560)	-4.0
Total	\$ 848,555,601	100.0

excluded from this analysis. It is implicitly assumed that student wages are included in the economic impact of student expenditures, which are assessed later. Further, employee-related expenses (including the employer's Social Security expenses and health insurance costs) are assumed to provide no immediate benefit to the Pima County economy and, consequently, are also excluded from the current analysis. While it is true that some of these employee-related expenses – such as Social Security payments to local retirees – may ultimately be channeled back into the local economy, their ultimate effect is so diluted as to justify exclusion from the current analysis. However, the monetary value of local health care expenses (including those paid by health insurance) have been included in the impact of university faculty and staff spending because of the immediate benefits to the local economy that these expenditures provide.

TABLE 4 CONSTRUCTION PROJECTS FISCAL 1997-98

Agriculture Research Complex
Arizona Cancer Center Addition
Health & Wellness Commons
Integrated Learning Center
Life Science North Shell Space
Main Library Expansion
Sierra Vista Academic Building - Cochise County
Special Collections and Archives
Strength & Conditioning Facility
Student Union/Bookstore
University Heart Center
University Housing
Utilities Phase V

UNIVERSITY CONSTRUCTION EXPENDITURES IMPACT

Major construction projects commenced, completed or in progress by the university are listed in Table 4. The university spent almost \$25 million during the fiscal year on construction programs. This created additional Pima County jobs in construction and other industries. Local construction firms, primarily, built campus classrooms, laboratories and office space.

In sum, construction expenditures by the university created 463 jobs in the local economy. This includes 195 jobs in construction and 268 jobs in other sectors of the local economy. Construction activity contributed a total of \$10 million in wages to the Tucson area. Taking into account all of the multiplier effects, university construction expenditures generated a total of \$41 million in Pima County.

UNIVERSITY PURCHASES AND OPERATING EXPENDITURES IMPACT

University expenditures benefit Pima County in a variety of ways. The university purchases large volumes of local goods and services, including, but not limited to, computer components and other high-tech equipment, professional and maintenance services, printing and photographic services and operating supplies.

University of Arizona expenditures are categorized into over two hundred object codes. These codes were condensed to align with twenty of the economic divisions provided by the I-O (input-output) model. A

⁴Over \$120 million of university expenditures were removed from expenditures in the so-called "Other" category to avoid double counting. To illustrate, financial support for university students given in the form of scholarships and tuition waivers represents revenues foregone by the university and has no further impact beyond that calculated for the rest of the university. If, however, the support is in the form of living assistance, then the impact is measured as a part of the impact of student spending. An analysis of this is provided separately.

category "other" contains expenditures not elsewhere classified⁴. The UA purchasing department sorted purchasing orders by zip code to estimate dollars spent in Pima County, and those spent in other counties in Arizona. Dollars spent out of state are assumed to have no economic impact on Arizona. Further, dollars spent outside Pima County also are assumed to have no direct impact on Pima County. However, significant dollars are spent by the University of Arizona in other parts of the state and the geographic distribution of the impacts of those expenditures is analyzed later in this report.

The economic impact of expenditures associated with university operations (including purchases of equipment) is estimated to be 2,009 jobs, \$45 million in wages, and an additional \$101 million in sales. The total dollar impact of university operations and purchases is \$146 million in Pima County.

STUDENT SPENDING ECONOMIC IMPACT

During the 1997-1998 academic year, total university enrollment ranged from 31,570 to 33,737 students for a given semester. During the summer term, 9,409 students enrolled in the pre-session and/or first summer session, and 5,935 students attended the second summer session (Table 5).

Student spending propels an estimated \$732.7 million per year into Tucson's economy, not counting tuition fees paid to the university.

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TABLE 5
1997-1998 HEADCOUNT ENROLLMENT (STUDENTS)

	Fall 1997	Spring 1998	Pre-session and Summer Session I	Summer Session II
Undergraduate				
Freshmen	5,656	3,974		
Sophomores	4,897	4,624		
Juniors	5,588	5,464		
Seniors	8,620	8,787		
Unclassified	856	8		
Non-degree seeking		913		
<i>Sub Total</i>	<i>25,617</i>	<i>23,770</i>		
Graduate/Professional				
First Professional	1,094	1,072		
Graduate	7,026	6,728		
<i>Sub Total</i>	<i>8,120</i>	<i>7,800</i>		
Total	33,737	31,570	9,409	5,935

*Note: Total headcount for Spring 1998 includes 427 Sierra Vista students.

Source: Decision and Planning Support and Summer Session Office

The primary components of student expenditures, based on 1994-95 survey results, are detailed in Table 6. Each of these categories was entered into the Input-Output model to determine its impact on the Pima County economy.

According to the model, student expenditures on housing, food, books, cars, gasoline, utilities and other purchases in the community have the collective effect of creating an estimated 17,601 jobs and \$273 million in wages in Pima County. After all ripple effects, the total dollar impact due to student spending in the local economy approaches \$875 million per year.

VISITOR SPENDING ECONOMIC IMPACT

Thousands of visitors travel to Pima County every year to attend university athletic events, concerts, state and regional meetings, to interview students for jobs, to accompany students to school and attend graduation ceremonies, to visit students, faculty and staff, and for other university-sponsored activities.

Current figures indicate that the university attracts over one million visitor days to Pima County each year from outside the area. This estimate was generated from the results of a questionnaire sent to each of the university's various colleges. Colleges responded with information on visitors to the campus associated with conferences, meetings or other college programs. Individual offices that deal with the public, such as the intercolle-

giate athletics department and the Office of Admissions, were also contacted for information on visitors and campus activities that attract parents, alumni and potential students to the campus.

Results from these surveys show that two thirds of all university-related visitor days are due to parents and students. The purposes of these visits include orientation and student recruitment activities, parents accompanying students at the beginning and end of semesters, mid-semester visits by parents, families, and friends to students, and graduation (Table 7). Visitors to Pima County who come to meet with university faculty and staff are estimated to represent 235,000 visitor days and approximately \$14 million in local spending.

It is estimated that athletic and alumni activities generate 50,000 visitor days per year from sporting events, reunions, Homecoming and

TABLE 6
COMPONENTS OF STUDENT EXPENDITURES

	Percent
Rent/Mortgage	26
Dorm/Fraternity	8
Utilities/Cable	7
Groceries	6
Eating Out	4
Motor Vehicle Expenses	11
Public Trans. & Airfare	4
Books	3
Clothing & Personal Care	5
Entertainment & Recreation	7
Durable goods	7
Health Care	7
Other	3
Total	100

Source: *The University of Arizona, An Investment in Arizona's and Pima County's Future: Economic Impact 1994-95*, Office of Economic Development.

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TABLE 7
VISITOR DAYS AND ESTIMATED EXPENDITURES

	Visitor Days	Expenditures
Student Visitors and Parent Activities	680,000	\$34 million
Athletics and Alumni Activities	50,000	5 million
College and University Activities	35,000	5 million
Faculty and Staff Visitors	235,000	14 million
Total	1,000,000	\$58 million

other functions.⁵ An additional 35,000 visitor days are related to other university and college activities, such as conferences, workshops and recruitment efforts.

In terms of economic impact, university-affiliated visitors to Pima County spend an estimated \$58 million per year on local goods and services. This, in effect, creates 2,848 jobs and \$37 million in local wages. After the expenditures circulate through the local economy and create multiplier effects, university visitors bring in a total of \$102 million per year in Pima County sales.

TOTAL ECONOMIC IMPACT

The total impact of university expenditures on employment and wages in the Pima County economy is enormous. The employment impact of the university is 40,911 jobs. As Table 8 reveals, this figure includes employees directly employed by the UA and also those jobs created by university expenditures in the community. This total employment figure for university employees and all jobs created by university expenditures represents over 11 percent of total employment in Pima County.

The combined wage impact of all university spending, student spending, and visitor spending associated with the university accounts for \$865 million in Pima County wages. The combined dollar impact is over \$1.86 billion for the fiscal year.

It is important to note that a significant portion of the measured impact on the Pima County economy does not originate as state appropriated funding, but rather as the result of gifts, contracts and grants, and student and visitor spending. In fact, the university generates \$6.31 in local sales revenue for every \$1 received of state-appropriated funding. Conversely, one new job is created for every \$7,470 the university receives in state appropriated funding, due to the additional revenue injected into the Pima County economy by grants and contracts, and student and visitor spending at the University.

COMPARISON OF UA 1997-98 IMPACTS WITH 1994-95 IMPACTS

Employment at the University of Arizona is marginally higher in 1997-98 than in 1994-95 (Table 9). The higher job impact associated with employee spending is primarily a result of wage and salary increases. Construction spending is lower in 1997-98 than in 1994-95, while other university purchases are higher. Student spending increased in the aggregate although enrollment has fallen since the 1994-95 study. The dollar impact of visitor spending increased to \$102 million (including wages) but the decline in jobs per \$1 million of visitor expenditures resulted in a slight decrease in visitor-related jobs. Overall, there are about 1,400 more jobs in Pima County that depend upon the university than there were in 1994-95.

TABLE 8
SUMMARY OF ECONOMIC IMPACTS OF THE UNIVERSITY OF ARIZONA ON PIMA COUNTY (1997-98)

Source of Impact	Jobs	Wages	Sales (including wages)
UA Employees	12,043	\$402 million	\$402 million
Employee Spending	5,947	98 million	297 million
Construction Spending	463	10 million	41 million
UA Purchases/Operations	2,009	45 million	146 million
Student Spending	17,601	273 million	874 million
Visitor Spending	2,848	37 million	102 million
Totals	40,911	\$865 million	\$1,862 million

Total impact 1,862,000,000 in Pima County

⁵ These figures are underestimated due to the lack of more specific data on attendance at sporting events and associated expenditure pattern.

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TABLE 9
COMPARISON OF UA 1997-98 PIMA COUNTY IMPACTS
WITH 1994-95 IMPACTS

Source of Impacts	(number of jobs)	
	1994-95	1997-98
UA Employees	12,033	12,043
Employee Spending	5,267	5,947
Construction Spending	689	463
UA Purchases	1,632	2,009
Student Spending	16,982	17,601
Visitor Spending	2,900	2,848
TOTALS	39,503	40,911

DIRECT AND INDIRECT TAX REVENUE IMPACTS

Tax revenue impacts are estimated for several different levels of government. In Arizona, several major sources of city and county government revenues are state-shared revenues. These are taxes imposed by the state, collected by the state and partially redistributed by the state to cities and counties. The primary state-shared taxes are:

- State-Shared Sales Revenues, which are distributions of state sales taxes;
- Highway User Revenue Fund Revenues, which are fuel tax collections, use fuel (primarily diesel) tax collections, truck fees and a variety of other highway-related tax and fee collections that are shared with counties and incorporated cities and towns; and
- Urban Revenue Sharing Fund, which distributes a portion of the state income tax to incorporated cities and towns.

Other revenue sources that may be less familiar include the Use Tax, which is paid on equipment and supplies purchased from out-of-state;

the Cactus League Surcharge, which is a \$3.50 tax on each rental car transaction in Pima County; and the City Bed Tax, which is a \$1 per-night room tax on hotel rooms in the City of Tucson; and the Vehicle License Tax, which is a property tax paid on the value of motor vehicles.

Direct revenue impacts, as shown in table 10, are those taxes paid concurrently as an expenditure is made. For example, the University of Arizona pays a contracting tax (a component of the sales tax) on its construction activity. Construction generates a total of \$1.1 million in revenues to state, county and city governments. Since the university does not pay property taxes, university construction generates only sales tax revenues to the city and state, with the state returning a portion back to cities and counties.

Other local university expenditures generate approximately \$7.6 million in revenue to state, county and city governments. Note that these 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 bookstore or Student Union restaurants). Pass through taxes are estimated as part of student and faculty/staff spending.

Student spending worth \$550 million generates \$18.6 million in state, county and city government revenues, and visitor spending generates \$4.2 million.

Additional revenues are generated by the \$402 million University of Arizona payroll in Pima County and by the additional \$463 million in wages created throughout the economy when the university buys locally and when students and visitors make local purchases (Table 11). The combined induced revenues derived from all wages are more than \$64 million to state, county and city governments.

TOTAL REVENUE IMPACT

Total revenue impacts are summarized in Table 12. The State of Arizona recoups over \$57 million, which is 18.6 percent of the state appropriation for the University of Arizona. In total, the university contributes close to \$96 million to state, county and city governments in tax revenues. Note that tax revenues that accrue to school districts or other special districts are excluded from this analysis.

THE UNIVERSITY OF ARIZONA ENRICHES EVERY COUNTY IN ARIZONA

Figure 3 indicates the number of University of Arizona programs, and the number of employees and students in all Arizona counties. Programs in other counties are part of the College of Agriculture, except for the presence of the Arizona Health Science Center in the Phoenix metropolitan area and UA South, the Sierra Vista campus in Cochise County. The UA has more than 500 employees in Arizona's other 14 counties.

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Assessing the economic impact in these various counties is more complex than simply examining the employees, wages and spending of each of these programs. Table 13 shows total economic impacts. The first column shows University of Arizona employment in each county. The second column shows employment associated with wages spent in those counties, purchases made by those county programs and purchases made by the University of Arizona

main campus in those counties. Figure 4 helps visualize the statewide impact of the University of Arizona based on data in Table 13. In total, 1,608 jobs are created in Arizona outside Pima County, paying over \$31 million in wages and representing over \$67 million in gross sales. The largest impacts are in Maricopa County, Arizona's most populous county. There, University of Arizona programs and main campus purchases result in over \$50 million in total

sales, after multiplier effects are taken into account.

The main university campus in Tucson makes many purchases outside of Pima County but within Arizona. Most of these purchases occur in Maricopa County. As a result, the total size of the economic impact in Maricopa County far exceeds what can be attributed to university programs in that county.

TABLE 10
DIRECT REVENUE IMPACTS FOR UA CONSTRUCTION AND OTHER EXPENDITURES, STUDENT EXPENDITURES AND VISITOR EXPENDITURES

	Direct UA Construction Exp.	Direct UA Other Local Exp.	Direct Student Spending	Direct Visitor Spending
STATE REVENUES				
Use Tax	-	938,929	-	-
Highway User Revenue Fund	-	-	724,590	55,126
Sales Tax	697,574	4,116,593	10,102,718	1,846,123
TOTAL	697,574	5,055,522	10,827,308	1,901,249
PIMA COUNTY REVENUES				
State Shared Sales Tax	37,130	254,887	1,140,431	257,080
State Shared Hwy User Rev. Fund	-	-	366,258	27,848
2% County Hotel/Motel Tax	-	-	-	59,547
Cactus League Surcharge	-	-	-	214,815
TOTAL	37,130	254,887	1,506,689	559,288
CITY OF TUCSON REVENUES				
State Shared Sales Tax	5,786	49,666	177,694	40,057
State Shared Hwy User Rev. Fund	-	-	445,976	33,992
City Sales Tax	321,100	1,680,281	3,741,429	1,008,029
City Bed Tax	-	-	-	229,026
TOTAL	326,886	1,729,947	4,365,099	1,311,104
PIMA ASSN. OF GOVERNMENTS REVENUES				
State Shared Hwy User Rev. Fund	-	-	-	1,987
TOTAL	-	-	-	1,987
REVENUES FOR OTHER ARIZONA COUNTIES				
State Shared Sales Tax	27,909	303,254	857,209	193,235
State Shared Hwy User Rev. Fund	-	-	(54,339)	(4,165)
TOTAL	27,909	303,254	802,870	189,070
REVENUES FOR OTHER ARIZONA CITIES AND TOWNS				
State Shared Sales Tax	34,352	294,904	1,055,112	237,847
State Shared Hwy User Rev. Fund	-	-	54,738	4,101
TOTAL	34,352	294,904	1,109,850	241,948
TOTAL	\$1,123,851	\$7,638,514	\$18,611,816	\$4,204,646

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CONCLUSION

This economic and tax revenue analysis has shown that the University of Arizona plays a major role in Pima County's economy, contributing 11 percent of the total employment. The total dollar impact in Pima County exceeds \$1.86 billion.

The university impact spills outside the boundaries of Pima County to every other county in Arizona. Total dollar impact in Arizona is more than \$1.9 billion and more than 42,500 jobs statewide. Estimates in this study are conservative in nature, however, reflecting both the type of modeling used in the

analysis and insufficient data to capture additional sources of economic and tax revenue impacts.

Impressive as they are, the estimated economic and tax revenue impacts should not obscure other important aspects of the university's presence. 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 revenue impacts need to be evaluated in the broader context, summarized below (economic and tax revenue impacts are highlighted):

Individuals receive a high rate of return from higher education:

- Higher earnings over the lifetime of university graduates
- University education provides the broad knowledge necessary for flexibility in job and career selection
- Higher job satisfaction for university graduates
- Higher quality of life for university graduates
- The university is a life enrichment experience
- University education broadens one's outlook, increasing tolerance and understanding of others
- Higher education creates enlightened citizens

State and local governments receive a high rate of return from higher education:

- **Government tax revenues from university expenditures**

TABLE 11
SUMMARY OF INDUCED REVENUE IMPACTS
OF THE UNIVERSITY OF ARIZONA

	Induced for \$402 M UA Wages	Induced for \$411 M Non-UA Wages
STATE OF ARIZONA		
Individual Income Tax	\$8,016,667	\$9,233,103
Sales Tax	7,719,024	8,890,295
Highway User Revenue Fund	1,522,550	1,753,579
Vehicle License Tax	414,525	477,425
Property Tax	266,069	306,443
TOTAL	17,938,835	20,660,845
PIMA COUNTY REVENUES		
State Shared Sales Tax	846,213	974,615
State Shared Hwy User Rev Fund	591,834	681,638
Vehicle License Tax	280,085	322,585
Property Tax	2,878,999	3,315,851
TOTAL	4,597,131	5,296,689
CITY OF TUCSON REVENUES		
Urban Revenue Sharing	181,890	209,491
State Shared Sales Tax	123,245	141,946
State Shared Hwy User Rev Fund	619,167	713,118
Vehicle License Tax	268,588	309,343
Property Tax	325,458	374,842
City Sales Tax	2,888,072	3,326,303
TOTAL	4,406,420	5,075,043
PIMA ASSN. OF GOVERNMENT REVENUES		
State Shared Hwy User Rev Fund	54,067	62,271
TOTAL	54,067	62,271
REVENUES FOR OTHER ARIZONA COUNTIES		
State Shared Sales Tax	539,317	621,152
State Shared Hwy User Rev Fund	121,164	139,549
TOTAL	660,481	760,701
REVENUES FOR OTHER ARIZONA CITIES AND TOWNS		
Urban Revenue Sharing	1,080,029	1,243,911
State Shared Sales Tax	731,809	842,852
State Shared Hwy User Rev Fund	417,477	480,824
Vehicle License Tax	11,497	13,242
TOTAL	2,240,812	2,580,829
TOTAL	\$29,897,746	\$34,434,378

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TABLE 12
SUMMARY OF REVENUE IMPACTS

	Direct	Induced	Total
State	\$18,481,653	\$38,599,680	\$57,081,333
Pima County	2,357,994	9,891,820	12,249,814
City of Tucson	7,733,036	9,481,463	17,214,499
Pima Assn. of Gov.	1,987	116,338	118,325
Other AZ Counties	1,323,103	1,421,182	2,744,285
Other AZ Cities	1,681,054	4,821,641	6,502,695
Total	\$31,578,827	\$64,332,124	\$95,910,951

- **Government tax revenues from university visitors**

- **Government tax revenues from university faculty/staff wages**

- **Government tax revenues from student expenditures**

- Tax revenues from relatively high wages for the working lifetime of alumni

- University graduates require less public spending than other residents for health and social services

- University graduates who enter government services bring new ideas and skills to government

- University graduates are informed citizens and voters

- University graduates provide an informed pool of candidates for public office

- University graduates and university employees are resources to our elected officials

State and local communities receive a high rate of return from higher education:

- **University State-funded jobs and wages in the community**

- **University research-funded jobs and wages in the community**

- **Jobs and wages associated with UA expenditures**

- **Jobs and wages associated with UA faculty and staff expenditures**

- **Jobs and wages associated with UA student expenditures**

- **Jobs and wages associated with UA visitor expenditures**

- Community receives recognition associated with university academics, research and athletics

- A quality university increases the attractiveness of the community to industry and entrepreneurs

- University research and technology transfers generate local job spin-offs

- Community has access to university educational facilities and programs, such as course work, research libraries, museums, and performances and presentations by students and faculty

- Community has access to university recreational facilities, athletic events, world class concerts and performances, museums, student and faculty art shows, music and dance performances, and drama productions.

- The University provides numerous services directly to the public, such as advice and expertise regarding gardening and plant diseases, information on the state and regional economy, and job outlook.

- University faculty conduct both funded and non-funded studies (as part of their research programs) that have direct relevance to issues affecting the state and local community

- University faculty, professionals and staff serve on numerous boards and committees for private, non-profit, public and service organizations, and state and local governments, offering their expertise free of charge

- Expertise of university faculty, professionals and staff is available to the state and local community

- The university attracts students and researchers from around the world, making Tucson, Pima County and the State of Arizona known worldwide

And, finally, Society at large receives a high return from higher education:

- University training provides the flexible work force necessary in today's changing world

- The University trains teachers from pre-school to the university level who pass on knowledge and new skills to future generations

Economic & Revenue IMPACT Analysis 1997-98

- University-trained individuals apply the latest in knowledge and technology to problems facing our world
- University research generates new knowledge and a better understanding of scientific, business and social issues
- University research develops new technology
- University-generated technology helps create new products, new methods of production and new jobs

- New technology increases worker productivity and, therefore, worker wages
- University research provides new organizational and management tools which increase economic efficiency
- University-educated workers and university research are necessary for Arizona and the United States to compete in today's global economy

- University-trained artists and musicians create beauty and enhance the quality of life
- The University attracts students and researchers from around the world, enhancing world communication, understanding and world peace
- University faculty play important ambassadorial roles when visiting colleagues and institutions abroad
- Our university education system is a model that is being emulated around the world, increasing our influence on other societies

TABLE 13
UNIVERSITY OF ARIZONA ECONOMIC IMPACTS
THROUGHOUT THE STATE OF ARIZONA

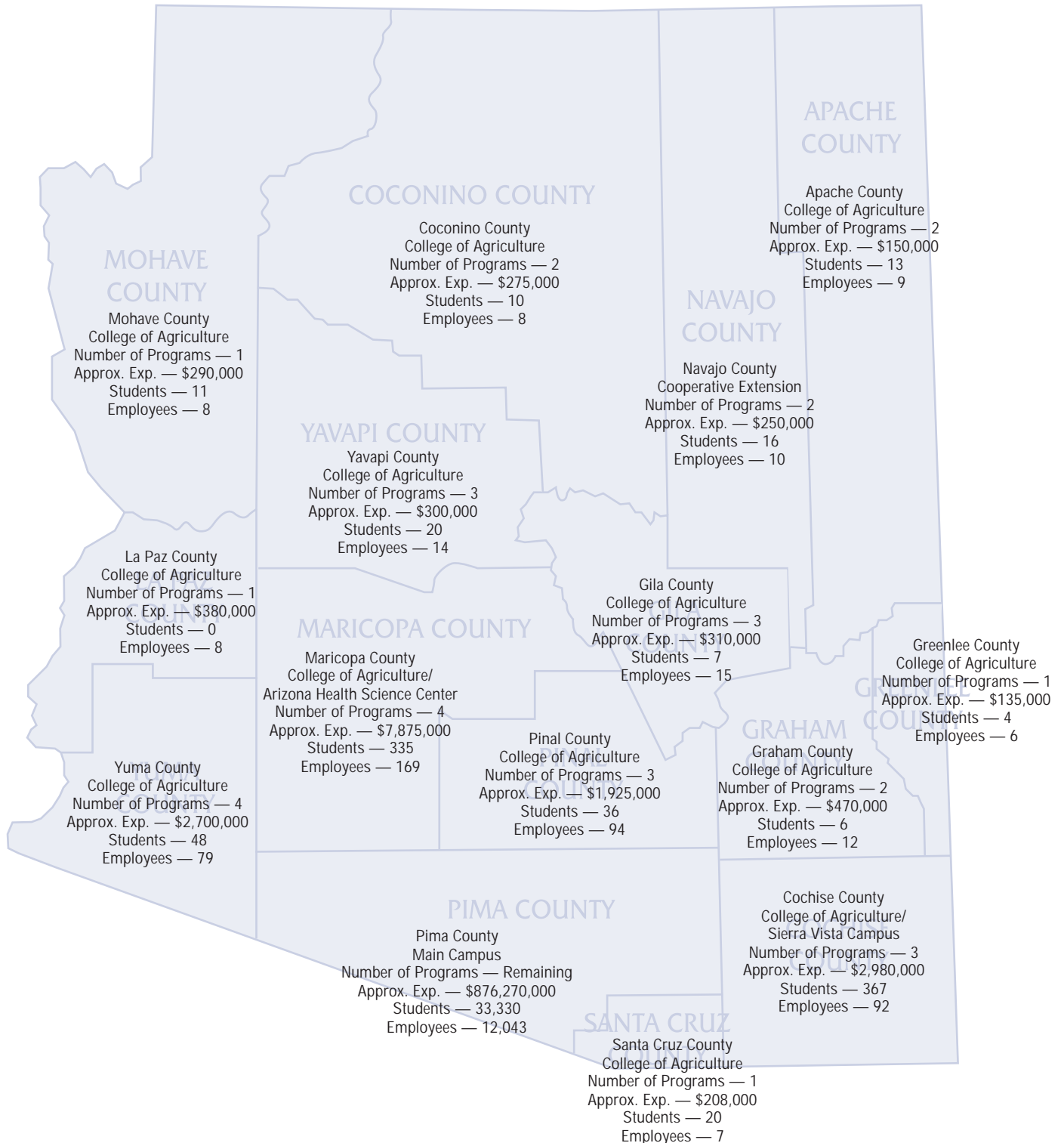
(in dollars)

County	University of Arizona Employment	Employment due to University and Employee Spending	Total Employment Impact	Total Sales Impact (\$1,000)	Total Wage Impact (\$1,000)
Apache	9	4	13	345	201
Cochise	92	42	134	4,050	2,740
Coconino	8	8	16	594	338
Gila	15	11	26	807	437
Graham	12	16	28	1,196	635
Greenlee	6	1	7	148	117
La Paz	8	4	12	453	328
Maricopa	169	875	1,044	50,050	20,711
Mohave	8	4	12	389	270
Navajo	10	7	17	505	300
Pima*	12,043	28,868	40,911	1,862,000	865,000
Pinal	94	45	139	3,251	1,939
Santa Cruz	7	17	24	1,166	522
Yavapai	14	5	19	459	279
Yuma	79	38	117	3,588	2,293
Outside of Pima	531	1,077	1,608	67,001	31,110
Arizona Total	12,574	29,945	42,519	\$1,929,001	\$896,110

*Impacts for Pima County also include visitor and student spending, which are not included in the impacts for other counties.

Economic & Revenue IMPACT Analysis 1997-98

FIGURE 3
THE UNIVERSITY OF ARIZONA AROUND THE STATE OF ARIZONA



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 (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 are also induced by households spending the additional wage income earned in direct and indirect production. These household expenditures create additional sales and production of goods and services, resulting in increased employment and wages from that production.

The Pima County I-O model portrays the economy in terms of a matrix of about 200 sectors that purchase and sell goods and services from and to each other. The Pima County model is based on the Arizona I-O model, developed by the Regional Science Research Institute. The state model was modified to reflect the county economy. Each activity associated with the university, such as maintenance and repair, purchase of professional services, and student spending on groceries, was identified in the model.

The I-O model estimates direct, indirect and induced effects in terms of jobs, wages and output (i.e., sales). Direct jobs refer to the jobs in a basic activity. Indirect jobs are generated through purchases of goods and services from various businesses in the local economy. Wages and salaries paid to employees in these supporting businesses are called indirect wages and salaries. The magnitude of indirect (i.e., interindustry)

impacts depends upon the percentage of locally produced goods and services, which is represented in the model as the regional purchase coefficient. The more locally produced goods and services used, the higher the indirect impacts. Conversely, the higher the percent of goods and services purchased from outside the region, the higher the leakage and the lower the indirect impacts to the region (county).

Induced jobs result as employees in both the basic activity and its supplying businesses spend their incomes in the community. This spending generates additional jobs and associated wages and salaries (induced wages and salaries). Typically, most induced jobs are generated in retail and services sectors, reflecting household expenditure patterns.

Total impacts include direct, indirect and induced effects.

Economic impacts on Arizona counties outside Pima County were estimated by I-O models for each county. These models were constructed from the Arizona I-O model in the same way as the Pima County model.

THE REVENUE IMPACT MODEL

The revenue impact model computes state, county and city 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 an 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 input data consists of community and tax variables, such as county, city and state property tax rates, net assessed valuations (by major category), taxable sales (by category), sales tax rates, population of counties, and incorporated population of cities.

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

obtained from an economic impact model (direct, indirect and induced); taxable expenditures (by category); construction costs; and for retail sales, the portion of sales spent in the city, the county and the state and outside the state.

The model computes direct and induced revenue impacts. Direct revenue impacts are generated by expenditures by the firm or business itself. In addition to paying workers, businesses make purchases and expenditures that generate revenue dollars to the cities, counties and State of Arizona.

Direct revenue impacts are computed for the following categories of revenues that are retained by the State of Arizona following distribution to cities, towns and counties:

- Use Tax
- Sales Taxes

Direct revenue impacts are computed for Pima County for the following categories:

- County Excise Taxes
- State Shared Sales Tax Revenues

Direct revenue impacts are computed for the City of Tucson for the following categories:

- City Sales Taxes
- State Shared Sales Tax Revenues

Induced revenues are those revenues that are generated when income or wages are spent in the local economy. When an industry hires additional workers, its payroll represents an increase in income to the area. As this money is respent, taxes are paid in the form of, for example, sales taxes, property taxes, vehicle license taxes. In addition, when a basic industry expands, the output and work force of other industries that sell to the basic industry also expand. Workers in these technically linked industries also respent their money in the community, generating revenues.

Induced revenue that is retained by the state (after sharing with the cities and counties) is computed for the following

five categories (definitions are provided at the end):

- Income Tax
- Sales Tax
- Fuel Tax and Highway User Revenue Fund
- Vehicle License Tax

Induced revenue impacts are computed for five revenue sources for county governments:

- County Excise Tax
- State Shared Sales Tax
- State Shared Fuel Tax and Highway User Revenue Fund
- Vehicle License Tax
- Property Tax

Induced revenue impacts are computed for six different revenue sources for the largest city in each county:

- Urban Revenue Sharing
- State Shared Sales Tax
- State Shared Fuel Tax and Highway User Revenue Fund
- Vehicle License Tax
- Property Tax
- City Sales Tax

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 revenues.

The following discussion summarizes most of the assumptions and computations that underlie estimation of induced revenues. Each county spreadsheet computes the change in taxable activity associated with a change in wages of SX in that county. Thus, for SX increase in wages, the spreadsheets compute the change in the taxable income (personal and corporate), taxable sales (retail, contracting, communications, utilities, restaurants and bars, personal and real property rentals, printing and publishing), fuel consumption (in gallons), motor carrier activity, vehicle license taxes and net assessed value.

The responsiveness of each taxable activity to a change in wages (or personal income) is referred to as income "elasticity," specifically defined as the percent of change in a taxable activity divided by the percent change in income. A very responsive taxable activity, i.e., one which grows faster than the growth in personal income, is known as an "elastic" revenue base. A taxable activity that grows less than proportionally to income is "inelastic," and a taxable activity that grows proportionally to income is said to have a "unitary" elasticity.

Elasticities for each of the taxable activities were either obtained from secondary sources or computed by the author. These elasticities were used in conjunction with existing tax laws in Arizona to compute total revenues generated from each taxable source. Then Arizona's revenue sharing formulas were applied to compute the induced revenue impacts for the state, counties and cities.

Note that there are substantial linkages among the revenue sources. For example, a change in taxable activity in a city is also a change in taxable activity in the county and state. The revenue sharing formulas create additional linkages, e.g., a change in net assessed valuation in a county affects not only that county's and the state's property tax collections, it can also affect the amount of state-shared sales taxes received by the county government because net assessed value appears in one version of the sales tax sharing formula. Similarly, a change in Vehicle License Tax collections changes the amount of vehicle license taxes collected by the city and the county, as well as affecting the Highway User Revenue Fund (HURF) distributions because a portion of the Vehicle License Tax is deposited in the HURF.

For a detailed description of Arizona's revenues and revenue sharing formulas and computation of income elasticities implicit in the Pima County revenue model, contact the authors.

DEFINITIONS OF SPECIFIC TAX CATEGORIES:

Property taxes are imposed in Arizona at many different levels of

government, including counties, cities, school districts and a variety of special districts, e.g., community colleges, fire districts, etc. Only property taxes that accrue to Pima County and the two cities are computed in this study.

The Vehicle License Tax is a tax imposed on the value of the car, currently set at a rate of \$4.00 per \$100 of value, where value is set at 60 percent of the manufacturer's base retail price for the first 12 months of vehicle life, and value is reduced by 15 percent in each 12 month period following the first 12 months of the vehicle's life.

The State-Shared Fuel Taxes and Highway User Revenue Funds (HURF) consists primarily of: gasoline tax collections, diesel fuel tax collections, a portion of the Vehicle License Tax, county registration collections (i.e., the charge paid at registration), and the motor carrier tax (imposed on trucks according to the miles driven, where the rate varies with the weight of the trucks).

State-Shared Sales Tax Collections consists of a state-imposed "sales" tax on 17 categories of taxable activities. The most important of these for the present analysis are utilities, communications, publishing, printing, restaurants and bars, rentals of real and personal property, contracting (materials only, or 65 percent of the contracting award), amusements, hotels/motels and retail. Each of these activities is taxed by the State at 5 percent, except hotels and motels which are currently taxed at 5.5 percent.

Urban Revenue Sharing - 13.6 percent of the proceeds of state income taxes (total net collections from the individual and corporate income taxes, less voluntary contributions) collected two fiscal years prior to the current fiscal year are credited to the Urban Revenue Sharing Fund. Each city and town receives its share of the fund according to its share of incorporated population based on the last U.S. decennial or special census, adjusted for changes in city or town boundaries.

THE UNIVERSITY OF
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TUCSON ARIZONA

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