

ECONOMY OF TUCSON AND SOUTH TUCSON

(ZIP CODES 85641, 85701-34, 85740-41,
85744-51 and 85754-77)

June 2004



ARIZONA DEPARTMENT OF COMMERCE
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Prepared by

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ECONOMY OF TUCSON AND SOUTH TUCSON (ZIP CODES 85641, 85701-34, 85740-41, 85744-51 AND 85754-77)

A variety of activities drive the Tucson-South Tucson economy. Aerospace manufacturing, tourism, call centers, military operations, the University of Arizona, and software development are among the most important. By a wide margin, government provides the most employment of any sector in Tucson-South Tucson.

The availability of economic data by city and industrial sector is severely limited (see the “Data Sources” section on page 10). Zip codes 85641, 85701-34, 85740-41, 85744-51 and 85754-77 include Tucson, South Tucson, and a dozen Census Designated Places (CDPs). The two cities have to be combined because the City of South Tucson entirely is in zip code 85713, which consists primarily of Tucson. The 1,360-square-mile land area of the zip codes is more extensive than the combined 396 square miles of the City of Tucson (195 square miles), City of South Tucson (1 square mile), and the CDPs. The 2000 decennial census count of 700,178 residents in these zip codes was 3 percent more than the 679,424 combined population of the City of Tucson (486,699 residents), City of South Tucson (5,490 residents), and the CDPs.

This report presents the results of an “economic base study” for Tucson-South Tucson, using employment by industry as the primary measure of the economy. The purpose of this analysis is to identify the area's leading economic activities and to provide useful information for decision-making. Comparing the sectoral distribution of employment in the community to state or national averages helps determine how different or similar the local economy is to the norm, giving some insight into how dependent the community is on certain economic sectors for employment or income. When the economic forces that mold the local economy are understood, strategic decisions for the area's economic future can begin to be made.

BACKGROUND

An economic base study is a description of an economy's structure and composition. Regional economic theory states that a local economy is driven by economic activities that import money into the local area through the sales of goods and services to customers who do not live in the area. Tucson-South Tucson's leading economic activities are identified in the economic base study, which compares economic activity (as measured by employment) in the local area to that in broader areas: Arizona and the nation.

Because of the vast differences in size between Tucson-South Tucson, Arizona and the United States, employment is divided by the 2000 census population count for each area. This “**per capita employment**” is expressed as employment per 1,000 residents.

To create a comparative measure, per capita employment in the local area is divided by the national average per capita employment. The result is called a “**location quotient**” — a figure greater than 1 indicates that per capita employment in the local area is greater than the national average. For example, a location quotient of 1.32 indicates that per capita employment in the local area is 32 percent *higher* than the national average, while a location quotient of 0.68 shows that per capita employment is 32 percent *less* than the national average. The location quotient calculated relative to the Arizona average typically is similar to the location quotient calculated against the national average, but in some industries it can be considerably different.

When a location quotient is greater than 1, “extra” jobs are present in the local area. This “**excess employment**” is the difference between actual employment and the employment that would exist if employment per capita had equaled the national average. Excess employment is of

particular significance in industries that sell their goods and services to companies located outside the city or to individuals who are not residents of the city (nonresidents include tourists and seasonal residents).

“**Basic**” or “**export**” activities are those involving sales to nonlocal businesses and individuals. Such activities drive the local economy by bringing money into the community. Basic industries with excess employment are the primary forces driving the local economy. Mining, most types of manufacturing, most agriculture, and tourism are classic examples of basic activities.

In contrast, some economic activities primarily serve local residents. Retail trade and services such as health care, finance, and real estate are examples of largely nonbasic, local-support activities, since most sales are to local residents. Similarly, most construction work is purchased by local residents and local businesses. While important components of a local economy, such largely nonbasic activities do not directly bring much money into the community and thus do not drive the local economy.

Excess employment can exist in local-support activities. In some cases, the excess results from local purchasing preferences. For example, per capita sales of air conditioning units are above the national average in much of Arizona because of climatic conditions. In other cases, an excess exists because some cities function as regional trade and service centers. While sales to residents of neighboring communities might be considered to be basic in a particular city, such sales are not basic in the broader area and are not considered to be a driving economic activity in the same way as mining, for example.

Many economic activities, such as wholesale trade and transportation, are a mixture of basic and nonbasic components. If a community has a substantial number of tourists and/or seasonal residents, even retail trade and such services as health care have a basic component. A portion of the construction industry is basic if purchases are made by companies that sell to an external market and/or by individuals migrating to the area to take a job at a basic employer or to retire. Some federal government activities and certain other government activities can be considered to be basic in a city, but most state and local government employment supports the local community primarily with funds raised locally and thus do not qualify as basic activities.

RESULTS

Total employment in Tucson-South Tucson is estimated to have been approximately 340,950 in 2001. This is the sum of nonagriculture private-sector employment in 2001 (the latest data available) reported by the U.S. Census Bureau, an estimate of agriculture employment in 2001, and an estimate of government employment in 2001-02. Total employment was 487 per 1,000 residents — 4 percent less than the national average but 5 percent more than the Arizona average, and considerably higher than the median value of 82 Arizona cities. Excess employment was 16,550 relative to the Arizona average.

The relatively high per capita figure resulted from considerably more jobs being located in Tucson-South Tucson than the 318,925 employed Tucson-South Tucson residents counted in the 2000 census. Thus, many residents of communities such as Oro Valley and Marana commuted into Tucson to work.

Agriculture and Government

Employment data by community are not available for the agriculture and government sectors. Thus, the data discussed in this section are estimates with less reliability than the data in

the following section on the nonagriculture private sector. See the “Data Sources” section for details on how agriculture and government employment were estimated.

Agriculture largely is a basic activity that includes agricultural support activities as well as farming and ranching. Agriculture employment in the Tucson-South Tucson zip codes in 2001 is estimated to have been between 700 and 725. With employment per 1,000 residents a very low 1, agriculture’s location quotient was approximately 0.1 relative to the national and state averages.

The government sector represents a mix of basic and nonbasic activities. Government employment in Tucson-South Tucson in 2001-02 was approximately 67,475, by far the most of any sector. Government employment per 1,000 residents was a high 96 in Tucson-South Tucson — approximately 20 percent higher than the state and national averages. Excess employment was 9,850 relative to the national average and nearly 13,100 calculated against the Arizona average.

Federal government employment was approximately 14,850. Nearly half (7,150) were military personnel. According to the May 2002 report “Economic Impact of Arizona’s Principal Military Operations,” prepared by the Maguire Company, Davis-Monthan Air Force Base employed 6,625 active military and another 100 military students. The Air National Guard had 400 military employees. Civilian employment associated with the military operations also was substantial, with 2,575 working at Davis-Monthan and 825 working for the Air National Guard. Military operations are basic to Tucson, as are a portion of other federal government activities.

Higher education — the University of Arizona and Pima Community College — had slightly more employees (15,200) than the federal government. Since many of the students are not residents of Tucson, a portion of higher education is basic to Tucson. State government employment was about 5,000 and county government employment was substantial at 7,800 since Tucson is the Pima County seat. The City of Tucson employed around 6,675 and the City of South Tucson employed just more than 100. About 375 were employed by the Pascua Yaqui Tribe, not counting those working at the casinos. Six special districts had total employment of 275, with most working for the Northwest Fire District or the Drexel Heights Fire District. Eight school districts operating wholly or in part in Tucson-South Tucson — Amphitheatre Unified, Catalina Foothills, Flowing Wells, Marana Unified, Sunnyside Unified, Tanque Verde Unified, Tucson Unified, and Vail Unified — employed a total of 17,200. Several of these public-sector organizations were among the larger employers in Tucson-South Tucson, including the air force base, the national guard, the university, the community college, the state, the county, the City of Tucson, the Tucson Unified School District, and the Sunnyside Unified School District.

Nonagriculture Private-Sector Economy

Nonagriculture private-sector employment in Tucson-South Tucson was 272,750 in 2001. Among those not included in this number are the 750 employees of Union Pacific Railroad. Employment was 390 per 1,000 residents — 5 percent less than the national average but 3 percent above the state average. Excess employment was 8,025 relative to the state average.

Employment estimates for 2001 for the broad sectors of the Tucson-South Tucson economy are shown in Table 1. Other than government, the retail trade, health care and social assistance, accommodation and food services, manufacturing, and administrative support sectors employed the most, each with between 28,000 and 40,000 employees. Per capita employment was above the national average in eight of 20 sectors, with the highest figures in construction, administrative support, real estate and rental, and accommodation and food services (see the

“location quotient relative to nation” column of the table). In contrast, the location quotient was less than 0.5 in only three of the 20 sectors. Accommodation and food services, administrative support, and construction employed considerably more than if per capita employment in the sectors had been equal to the national per capita average (see the “excess employment relative to nation” column of the table). Lesser amounts of excess employment existed in the health care and social assistance, retail trade, real estate and rental, and arts, entertainment and recreation sectors.

Compared to the per capita Arizona average, location quotients and excess employment were somewhat different than those calculated against the national average. In particular, relative to the Arizona average, the location quotient exceeded 1 in the manufacturing, educational services, “other services” and utilities sectors, but was less than 1 in construction. Location quotients and excess employment were higher in health care and social assistance, but lower in the administrative support and real estate and rental sectors.

Tucson did not have excess employment relative to the U.S. average in any of the traditional largely basic sectors: agriculture, mining, manufacturing, wholesale trade, and transportation and warehousing. However, some of the excess employment in other sectors is basic. For example, tourism had a large presence in Tucson-South Tucson, with per capita employment 63 percent more than the U.S. average in the accommodation subsector and 19 percent higher in the food services subsector.

More sectorally detailed data show that 14 industries provided excess employment of at least 1,000 in Tucson-South Tucson in 2001, more than half of which have at least a moderate basic component (see Table 2). Providing by far the most excess employment (a little more than 10,000) was the guided missile and space vehicle industry, which according to the Census Bureau consisted of just one establishment of more than 1,000 employees in 2001. Local sources indicate that Raytheon currently employs nearly 10,200. Aircraft manufacturing, which consisted of one establishment of more than 1,000 workers and one of between 250 and 499, also is listed in Table 2, providing excess employment of 1,800. Local sources indicate that Bombardier Aerospace currently employs 1,350 — a smaller workforce than in prior years.

A few other manufacturing industries had excess employment in the several hundred range, including semiconductors (which included an establishment of more than 1,000 employees in 2001; Texas Instruments currently employs about 950), ready-mix concrete (which included an establishment of more than 1,000 employees in 2001), and the sum of three industries producing ornamental and architectural metals, which included an establishment of between 500 and 999 employees. Most of the manufacturing employment is basic in nature. Overall, the manufacturing sector had no excess employment versus the national average but an excess of 3,600 relative to Arizona.

Tourism, a basic activity, is represented on the list by three industries. The hotels and motels industry had excess employment of 2,500. It included one establishment of between 500 and 999 employees in 2001; local sources indicate that Canyon Ranch, Loew’s Ventana Canyon Resort, and the Westin La Paloma all employ more than 500 currently. Since some of the sales at restaurants are made to tourists and seasonal residents, these industries are partially basic. The two restaurants industries shown in Table 2 had combined excess employment of more than 3,600. The recreational vehicle parks industry and the recreational camps industry (which included an establishment with between 500 and 999 employees in 2001) combined to provide nearly 1,000 excess jobs. Overall, the accommodation and food services sector had excess employment of 6,600 relative to the national average.

TABLE 1
EMPLOYMENT BY SECTOR
Tucson and South Tucson (Zip Codes 85641, 85701-34, 85740-41, 85744-51 and 85754-77), 2001

Sector	Number of		Relative to Nation		Relative to Arizona	
	Establishments	Employment	Location Quotient	Excess Employment	Location Quotient	Excess Employment
TOTAL	17,167	340,949	0.96	0	1.05	16,547
AGRICULTURE	113	715	0.07	0	0.14	0
GOVERNMENT	22	67,484	1.17	9,852	1.24	13,088
TOTAL, NONAGRICULTURE PRIVATE SECTOR	17,032	272,750	0.95	0	1.03	8,029
Mining	28	145	0.12	0	0.11	0
Utilities	13	1,419	0.87	0	1.03	44
Construction	1,623	21,719	1.34	5,567	0.94	0
Manufacturing	688	30,080	0.76	0	1.13	3,575
Wholesale Trade	791	7,804	0.51	0	0.65	0
Retail Trade	2,606	39,800	1.07	2,753	1.10	3,525
Transportation and Warehousing	291	4,169	0.45	0	0.42	0
Information	317	7,458	0.80	0	0.94	0
Finance and Insurance	1,002	8,792	0.57	0	0.57	0
Real Estate and Rental and Leasing	972	6,361	1.27	1,350	1.12	680
Professional, Scientific and Technical Services	2,032	15,105	0.85	0	0.94	0
Management of Companies and Enterprises	94	5,154	0.72	0	0.90	0
Administrative, Support, Waste Management, Remediation Services	996	28,763	1.28	6,217	1.11	2,868
Educational Services	246	4,204	0.65	0	1.14	505
Health Care and Social Assistance	1,869	39,566	1.09	3,404	1.45	12,231
Arts, Entertainment and Recreation	213	5,132	1.16	702	1.07	353
Accommodation and Food Services	1,383	31,399	1.27	6,588	1.12	3,328
Other Services (except public administration)	1,626	12,837	0.96	0	1.16	1,809
Auxiliaries (except corporate, subsidiary and regional management)	34	2,636	1.04	93	1.10	241
Unclassified Establishments	208	208	0.79	0	0.93	0

Source: Nonagriculture private sector estimated from U.S. Department of Commerce, Census Bureau, *Zip Business Patterns 2001*. Agricultural production employees, most government employees, railroad employees, self-employed individuals and employees of private households are not included in this data source. Government employment estimated from government agencies and local sources and may understate actual figures. Agriculture employment is a rough estimate — see the "Data Sources" section for details. The concept of establishment for government and agriculture differs from that used for the nonagriculture private sector.

TABLE 2
INDUSTRIES WITH EXCESS EMPLOYMENT OF AT LEAST 1,000*
Tucson and South Tucson (Zip Codes 85641, 85701-34, 85740-41, 85744-51 and 85754-77), 2001

Industry	Number of Establishments Employment		Relative to Nation		Relative to Arizona	
			Location Quotient	Excess Employment	Location Quotient	Excess Employment
Guided missile & space vehicle manufacturing	1	10,351	88.13	10,234	6.86	8,843
Telemarketing bureaus	12	3,697	5.28	2,997	2.83	2,392
Temporary help services	82	9,291	1.40	2,633	1.24	1,797
Hotels(except casino hotels) & motels	103	5,918	1.73	2,492	1.09	512
Full-service restaurants	472	11,913	1.21	2,053	1.06	649
Telephone answering services	5	1,971	12.75	1,816	5.95	1,639
Aircraft manufacturing	2	2,240	4.93	1,786	2.60	1,380
Limited-service restaurants	484	9,020	1.21	1,563	1.18	1,349
Drywall, acoustical & insulation contractors	74	2,111	2.82	1,362	0.86	0
Vocational rehabilitation services	37	2,111	2.60	1,298	3.78	1,553
General medical & surgical hospitals	11	12,792	1.10	1,146	1.53	4,451
Concrete contractors	76	1,772	2.41	1,037	1.07	111
Software publishers	31	1,876	2.13	997	2.33	1,071
Offices of physicians (except mental health)	578	5,349	1.19	854	1.43	1,614

* Relative to either the national or Arizona average

Note: Those entries in bold with a gray background have a high proportion of sales to customers outside the region and are considered basic (export) economic activities. Those not in bold with a gray background have a moderate proportion of sales to non-residents. Other industries largely serve local residents.

Source: Estimated from U.S. Department of Commerce, Census Bureau, *Zip Business Patterns 2001*. Agricultural production employees, most government employees, railroad employees, self-employed individuals and employees of private households are not included in this data source.

Like the two restaurants industries, the casinos industry (which consisted of three establishments in 2001, two with employment of between 500 and 999) has a basic component due to sales made to tourists and seasonal residents. The Pascua Yaqui Tribe currently employs about 1,775 at two casinos and in other tribal functions, but only one of the casinos was open in March 2001, the date of the Census Bureau data. Similarly, the Tohono O'odham Nation currently operates two casinos in Tucson zip codes, but one of these was not open in March 2001. The casinos industry was one of the largest industries in the arts, entertainment and recreation sector in 2001, with excess employment of nearly 1,000; the impact is larger today. Overall, the arts, entertainment, and recreation sector had excess employment of 700. Other industries with excess employment in this sector were fitness and recreational sports centers (excess employment of several hundred) and theater companies, which had a lesser amount of excess employment.

The administrative support sector had excess employment of 6,200 in 2001. Two call centers industries — telemarketing bureaus and telephone answering services — provided a combined 4,800 excess jobs in 2001. Some of their activities are basic. Two establishments employed more than 1,000 each in 2001 and two others employed between 500 and 999. Currently, local sources identify Afni, Convergys, and APAC Customer Service to be major employers. The other major source of employment in the administrative support sector was employment services, consisting of the temporary help, employee leasing, and employment placement industries. The temporary help industry had 2,600 excess employees and included one establishment with more than 1,000 workers and two others with between 500 and 999. An employee leasing establishment also employed more than 500. Currently, major employment services employers include Remedy Intelligent Staffing and Checkmate, each with more than 1,000 employees. Depending on the assignment of temporary workers and leased employees, some of the employment may be considered to be basic.

Among other sizable industries in the administrative support sector were repossession services (with an establishment employing between 500 and 999) and landscaping services (also with an establishment of between 500 and 999). These generally are not basic activities. One establishment in the office administrative services industry employed between 500 and 999 in 2001. TeleTech currently employs more than 900.

Software publishers, with excess employment of 1,000, are part of the information sector, which overall did not have excess employment in 2001. One software establishment employed more than 1,000 in 2001; Intuit employs 1,300 currently and IBM's employment exceeds 1,600. The online services industry also had some excess employment in 2001. America Online currently employs nearly 1,400, according to local sources. Also included in this sector are newspaper publishers, one of which employed between 500 and 999 in 2001.

Two of the industries in Table 2 are in the construction sector, which had excess employment of more than 5,500 relative to the national average, but no excess employment compared to the Arizona average. Generally, little of the construction sector can be considered basic. Sales made to seasonal residents and in-migrating retirees are basic, but Tucson's proportions of seasonal residents and senior citizens were average according to the 2000 census. Most construction industries had some excess employment. One establishment in the commercial and industrial building industry employed between 500 and 999.

The health care and social assistance sector, which had excess employment of 3,400 in 2001, is another economic activity that generally has little of a basic component. Three of its industries are included in Table 2. The hospitals industry was the major employer in this sector

in 2001, with six hospitals having more than 1,000 employees and two others with between 500 and 999 workers. Excess employment was more than 1,000. Five hospitals currently employ more than 1,500 according to local sources: University Medical Center, Carondelet Health, TMC Healthcare, Southern Arizona Veterans Administration, and the Northwest Medical Center. Vocational rehabilitation services, which included an establishment with between 500 and 999 employees, and the physicians industry also had excess employment of more than 1,000. The outpatient care centers, homes for the elderly, child and youth services, and child day care industries had lesser amounts of excess employment.

Several other sectors had excess employment and/or large employers that primarily are not basic in nature. In the utilities sector, Tucson Electric Power is one of the community's larger employers, with more than 1,500 workers currently. The real estate and rental sector had excess employment of 1,300, with the residential property managers industry having the most excess employment. Retail trade had overall excess employment of more than 2,700, with excess employment in many industries. The largest figures were in the used merchandise stores, recreational vehicle dealers, and electronics stores industries. A department store and an electronic shopping establishment each employed between 500 and 999. The finance and insurance sector included a health insurance carrier employing between 500 and 999; local sources state that First Health currently employs just over 1,000.

A variety of basic activities drive the Tucson-South Tucson economy. Several manufacturing activities (most notably aerospace), tourism, call centers, and software are among the most important. Military operations and the University of Arizona are important public-sector contributors.

Tucson-South Tucson v. Comparison Cities

Tucson and South Tucson combined are one of four incorporated cities in the southern region of Arizona (Pima County). Per capita employment in Tucson-South Tucson in 2001 — overall, in the nonagriculture private sector, and in government — was the highest in the region by a wide margin (see Chart 1).

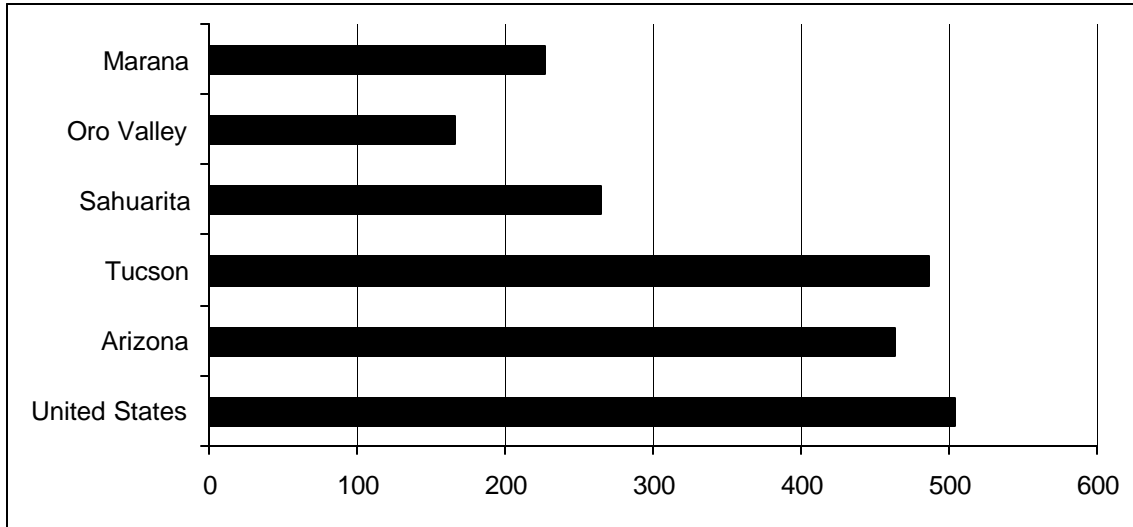
Average nonfarm private-sector payroll per employee in Tucson-South Tucson in 2001 had to be estimated because the data were withheld by the Census Bureau to maintain employer confidentiality in several zip codes that had only a few establishments. The estimate of \$25,400 was 28 percent less than the national average and 17 percent less than the Arizona average, but more than \$4,000 higher than the median value of Arizona cities. Tucson-South Tucson's figure was the lowest in the region (see Chart 2).

In most sectors, location quotients in Tucson-South Tucson were the highest in the region. Looking specifically at basic activities at the industry level, Tucson-South Tucson had a very high location quotient in the guided missiles industry.

Comparison cities were selected in four categories, based largely on population size and proximity though industrial mix also was considered:

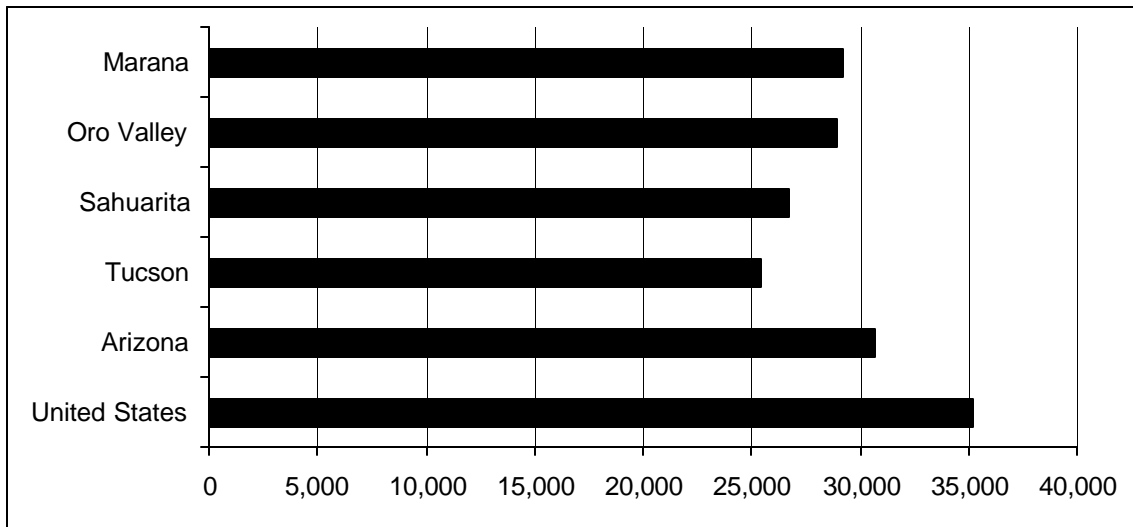
- Nearby city (within 50 miles) of similar size (a resident count between 50 and 150 percent of Tucson-South Tucson's population): No city meets these criteria.
- Nearby larger city (a population two-to-five times as large): No larger city is nearby; Phoenix is close to twice as populous.
- Other proximate cities: Nearby Oro Valley, Marana and Sahuarita are much smaller.
- Similarly sized city farther away: Mesa is closest in size.

CHART 1
TOTAL EMPLOYMENT PER 1,000 RESIDENTS
Cities in Southern Region



Source: Estimated from U.S. Department of Commerce, Census Bureau, *Zip Business Patterns 2001* and 2000 census, and estimates of agriculture and government employment.

CHART 2
AVERAGE NONFARM PRIVATE-SECTOR PAYROLL PER EMPLOYEE (\$) IN 2001
Cities in Southern Region



Note: The figures for Marana and Tucson-South Tucson are estimated.

Source: Estimated from U.S. Department of Commerce, Census Bureau, *Zip Business Patterns 2001*.

Per capita employment in Tucson-South Tucson, overall and in the nonfarm private sector, was second highest of the six cities in this comparison group, considerably lower than in Phoenix, but higher than in Mesa and much higher than in its three neighbors. Location quotients in Tucson-South Tucson were the highest or second highest of the group in each of the major sectors shown in Chart 3. Average nonfarm private-sector payroll per employee in Tucson-South Tucson was the lowest of this comparison group, though not much lower than in Mesa.

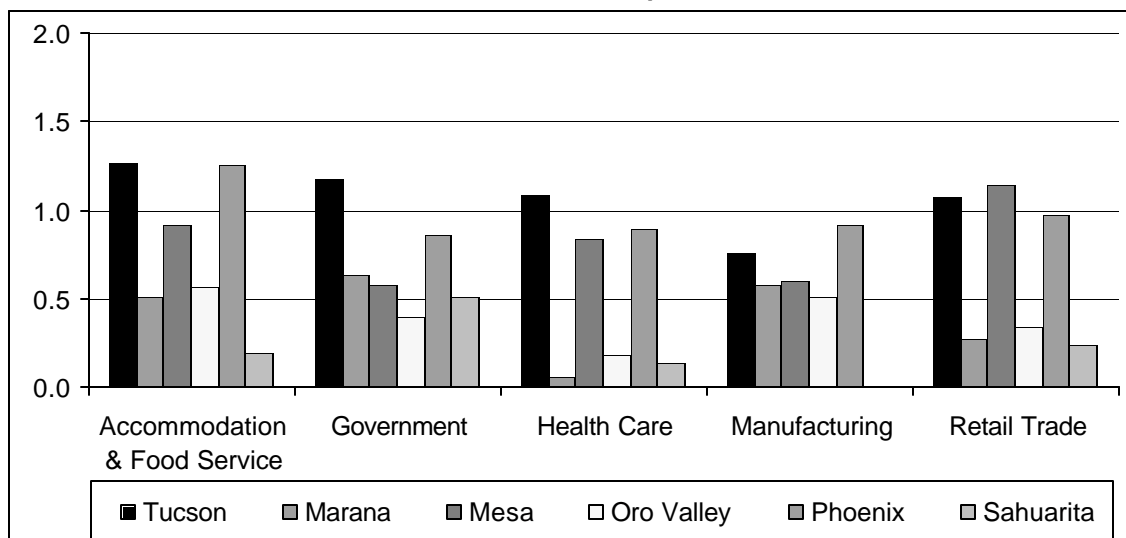
DATA SOURCES

National and state economic data were obtained from the latest edition (2001 data released in 2003) of *County Business Patterns*, which is produced annually by the U.S. Department of Commerce’s Census Bureau. Data for Tucson-South Tucson came from a companion product of the Census Bureau, *Zip Business Patterns*; many zip codes (85641, 85701-34, 85740-41, 85744-51 and 85754-77) were combined to approximate the cities.

County Business Patterns and *Zip Business Patterns* use the hierarchical North American Industry Classification System to provide data by industrial category: broad sectors, subsectors, industry groups, and specific industries. Agricultural production employees, most government employees, railroad employees, self-employed individuals, and employees of private households are not included in either Census Bureau report.

The number of establishments (by employment size: 1 to 4, 5 to 9, 10 to 19, etc.), employment, and payroll are reported in *County Business Patterns* by industrial category. An establishment is a physical location at which business is conducted; a company may consist of one or more establishments. When only a small number of establishments are present in an industrial category (particularly if one establishment within the category is dominant), the Census Bureau withholds the employment and payroll data to protect company confidentiality. Undisclosed data are most frequent at the industry level, but in less populous areas even sectoral

**CHART 3
LOCATION QUOTIENTS IN 2001
Selected Sectors in Comparison Cities**



Source: Estimated from U.S. Department of Commerce, Census Bureau, *Zip Business Patterns 2001* and 2000 census, and estimates of agriculture employment.

data may be withheld. Unlike *County Business Patterns*, employment and payroll data are released *only* for the zip code total in *Zip Business Patterns*.

For industrial categories for which data were not disclosed (including all categories at the city level), employment by sector, subsector, industry group, and industry had to be estimated. For Tucson-South Tucson, these estimates were made using the establishment by employment-size class data for each industrial category for each zip code and average employment per establishment by employment-size class by sector for the state. The estimates by industrial category for Tucson-South Tucson's zip codes then were forced to add to the total employment of the zip code.

The data from *Zip Business Patterns* were supplemented by *estimates* of employment in the agriculture and government sectors. No source of either agriculture or government employment by zip code or city exists.

The agriculture sector has two major parts: agricultural production (farms and ranches), and agricultural support, which consists of such activities as cotton ginning and crop harvesting. Forestry, logging, fishing, hunting and trapping activities also are included in the agriculture sector. *Zip Business Patterns* includes only a portion of the agricultural support category.

Agriculture employment at the county level is available for 2001 from the U.S. Bureau of Economic Analysis (BEA), divided into the categories of farm proprietors, farm workers, and agricultural support and other agricultural employment. Some figures had to be estimated in some counties because of the federal government's disclosure restrictions. The county totals were allocated to cities and unincorporated areas within each county by a combination of methods.

To estimate farm and ranch employment in cities and unincorporated areas, the number of farms and ranches by zip code from the 1997 agricultural census (the 2002 census data are not yet available) of the U.S. Department of Agriculture were used. The zip code data were found to be incomplete, with some farms assigned to incorrect zip codes, when the sum of the zip code data by county was compared to the county total provided separately by the Department of Agriculture. Thus the zip code data were adjusted to sum to the county total. Only those farms and ranches with agricultural sales of at least \$10,000 in 1997 were included, but even some of these farming operations likely do not provide the main source of income for their owners, much less employ others. Thus, average employment (proprietors and farm laborers) per farm and ranch was only 6.6 in Arizona (calculated as 2001 employment divided by the number of farms and ranches in 1997). In each county, average employment per farm and ranch was multiplied by the number of farms and ranches in each city or unincorporated area. The city and unincorporated county estimates were adjusted in some counties if farming operations with significant employment were reported by local sources in particular communities.

County employment in agricultural support and other agricultural activities reported by the BEA were allocated to cities and unincorporated areas using the ratio of BEA agricultural support employment to the agricultural support employment included in *Zip Business Patterns*.

For this report, the government sector was divided into several levels of government: federal (including civilian and military), state, county, municipal or tribal government, school district, and special district (such as an irrigation or fire district). Universities and community colleges are shown as a separate category; depending on the source of government data, they may be included either in state government or as a school district. The inclusion of all or a portion of tribal operations in government varies by source of data.

Several methods had to be used to estimate government employment by city and unincorporated area. The 2002 Census of Governments provides employment by level of government, but does not allocate that employment by community if the government entity crosses jurisdictional boundaries. For example, it provides no indication of federal government employment in Arizona and provides only the overall state government figure (which includes universities). Community colleges are included as a school district and tribal government is not included.

The census figures were used as the starting point for school district employment, special district employment, municipal employment, and county employment. If a school district extends across city boundaries, Arizona Department of Education employment data by individual school were used to allocate the overall school district employment by city. Most of the community colleges have multiple campuses. Data on employment at each campus was collected from the community college district office, and used to allocate the overall community college employment by community.

While most county government employment is located within the boundaries of the county seat, county offices commonly are found in other communities as well. Generally, county governments in Arizona could not provide employment by location, so county offices outside the county seat were individually contacted to obtain employment. In most counties, employment in the county seat was calculated as the difference between the county total from the 2002 census and the number tallied in other locations. This process probably understates county government employment outside the county seat and overstates it at the seat.

State government employment figures by city also are not available. County totals for 2001 were obtained from the Arizona Department of Administration (DOA). State offices were contacted across the state to obtain employment, but in most counties it was not possible to identify all of the county employment reported by the DOA. In these counties, each community's estimate was increased so that the sum of state employment by community equaled the DOA county total.

Military employment figures at each of the major facilities were obtained from the May 2002 report "Economic Impact of Arizona's Principal Military Operations," prepared by the Maguire Company. Smaller military facilities were contacted directly. Similarly, federal civilian employment was collected directly from local federal offices. Like state government, it was not possible to identify all federal workers by this process. The community estimates were increased to sum to the 2001 BEA county totals.

Complete economic data for Tucson-South Tucson are available in an EXCEL file consisting of two spreadsheets. The first sheet provides the number of establishments by employment-size class for those sectors, subsectors, industry groups, and industries with at least one establishment in Tucson-South Tucson. Estimated employment also is shown.

The second spreadsheet compares employment in Tucson-South Tucson to that in Arizona and the nation. All sectors, subsectors, industry groups, and industries are included. For the United States, Arizona, and Tucson-South Tucson, per capita employment (expressed as employment per 1,000 residents) is calculated for each industrial category. The per capita figures for Tucson-South Tucson (and Arizona) are divided by the national average for each industrial category to create the location quotient. For industrial categories with location quotients greater than 1, excess employment in Tucson-South Tucson (and Arizona) is calculated from employment and the location quotient. For Tucson-South Tucson, the location quotient and excess employment by industrial category also is calculated relative to the Arizona average.