

ARIZONA'S ECONOMY

MAY 1996

SPRING ISSUE

OUTLOOK FOR METRO PHOENIX REMAINS BRIGHT

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April 1, 1996

The Phoenix-Mesa metro area continues to amaze. Last year matched, and in some cases surpassed, boom conditions of 1994. Population growth exploded and, after a lull in the first half of 1995, housing markets accelerated once again. Recent slowing in sales and employment growth suggest that a more normal-paced expansion will become established during 1996. We review the results below, but first, a look at recent revisions to the employment estimates.

EMPLOYMENT ESTIMATES REVISED UPWARD

In its annual revisiting of previously-published estimates, the Arizona Department of Economic Security significantly boosted its estimates for the total number of jobs for the past two years. These revisions show that Arizona's economy remains one of the fastest-growing states in the nation. Some 22,400 additional jobs were added state-wide to the preliminary 1995 estimate. That boosts the number of jobs created last year to nearly 91,000. Instead of the 4.5% increase originally reported, the revised gain is now 5.4%.

Prior to the revision, Arizona ranked fourth among all states for job creation during 1995 with its preliminary 4.5% gain. Nevada led the nation with a 6.2% gain. Utah was second with a 5.6% and New Mexico was

third with a 5.1% gain. After the revisions, Arizona moved up a notch to third place, ahead of New Mexico.¹

In addition, some 7,000 jobs were added to 1994. When combined with last year's out-sized revisions, 1994's boost of 53,500 over the initial estimate is the largest upward revision ever. That puts the number of new jobs created during 1994 at 106,300, a percentage gain of 6.7%. That is the largest number of jobs ever created in Arizona in a single year. During this business expansion, which began five years ago, almost 300,000 jobs have been created.

In its first revision to the 1995 estimates, DES found nearly 14,600 additional jobs in trade, 10,500 in services, and 2,700 in construction. Gains for all other major employment groups were revised downward. Manufacturing jobs, for example, instead of increasing by 8,400 as originally reported, are now estimated to have increased by only 2,600. That's 5,800 fewer jobs. Likewise for finance, insurance and real estate (FIRE), which is now estimated to have lost 2,400 jobs last year (**Exhibit 1**).

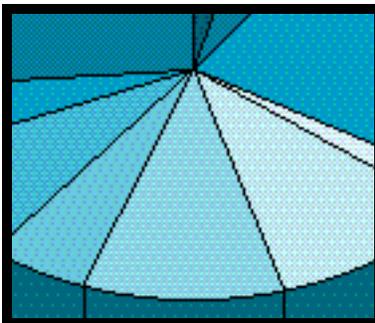
Government payrolls increased by a whopping 12,100 in 1995. But that reflects a return to "normal" after an abnormally low estimate for 1994. In our analysis one year ago we stated, "Unbelievably, 10,000 jobs were subtracted from government. Federal government payrolls ... declined by

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roughly 3000, [and] education employment during June and July of 1994 was significantly below normal seasonal levels, suggesting either a glitch or a change in the way teachers were counted during the summer recess. All of the problems occurred in the Phoenix-Mesa metro area and are reflected in the state-wide estimates." In the newly revised numbers, the glitch for 1994 remains, but the 1995 numbers appear back to normal, which explains the large increase.

Estimates for Arizona's two largest metro areas also were revised – Phoenix-Mesa metro estimates were pushed higher, while

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EXHIBIT 1
ARIZONA EMPLOYMENT
CHANGES, 1995 VS 1994
(in thousands)

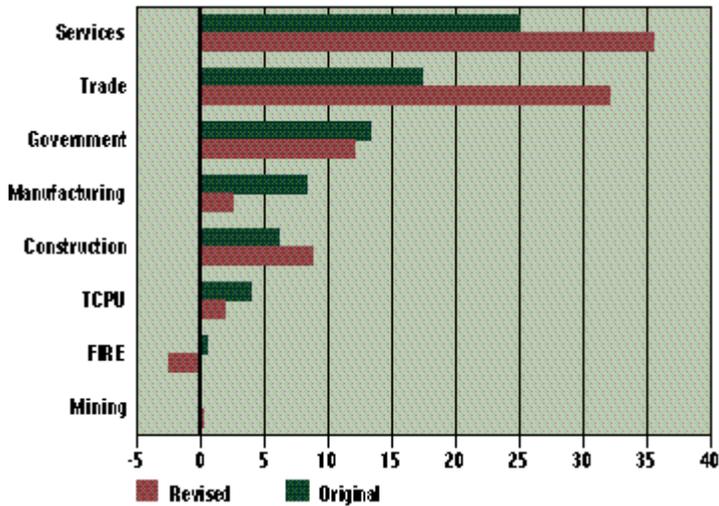
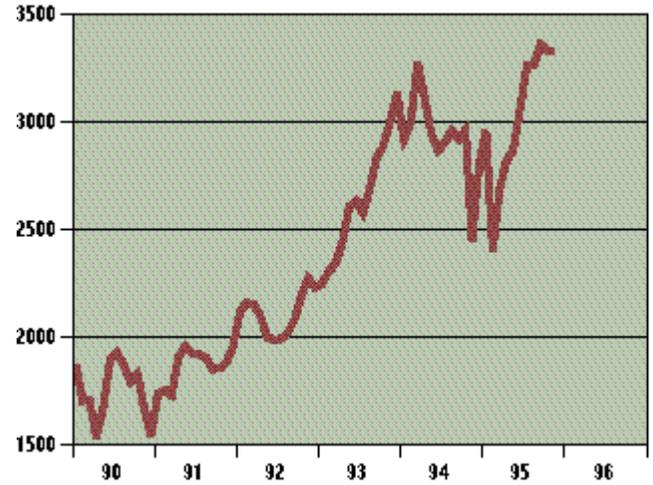


EXHIBIT 3
Help Wanted Index
Phoenix-Mesa Metro Area
(1987=100)



Tucson's were largely unchanged (**Exhibit 2**). Job growth in the Phoenix-Mesa Metro Area was a robust 6.4% rather than 5.3%, while growth in Tucson is a modest 2.3%, slightly less than the originally-reported 2.6% gain.

In the balance of the state, i.e., the areas outside of the two large metro areas, some 10,600 jobs were created last year, a gain of 4.1%. That compares to a 13,400, or 5.6%, increase in 1994.

**PHOENIX-MESA METRO AREA:
1995 IN REVIEW**

1995 was another banner year for the Phoenix-Mesa metro economy. It's amazing

EXHIBIT 2
Employment Increases
1994 to 1995

	Percent Increase	Absolute Increase
Arizona		
Revised	5.4	90,900
Original	4.5	75,600
Phoenix-Mesa MA		
Revised	6.4	73,500
Original	5.3	59,900
Tucson Metro Area		
Revised	2.3	6,800
Original	2.6	7,500
Balance of State		
Revised	4.1	10,600
Original	3.2	8,200

that an area with over 2.5 million people can grow so rapidly. Even more amazing is that the boom has continued for a second consecutive year. Among the highlights:

- Over 73,500 jobs were created during 1995, 300 more than during 1994's boom. 1984 is the only year with more – 78,700. As a percentage, 1995's increase is 6.4%, which ranks the Phoenix area fifth among some 300-plus metro areas, many of which are much smaller! After moving to lower levels in early 1995, the index of help wanted advertising for Metro Phoenix surged to record levels as the year came to a close and that portends continued growth of payrolls in the coming months (**Exhibit 3**). The size of the gains should moderate as the year unfolds, however. Another 50,000 jobs should be added in 1996, a 4.1% increase.
- Population increased by more than 105,000, the largest single-year gain ever recorded. Another 83,500 persons will be added in 1996.
- Retail sales increased by 9.7% during the year. After adjusting for inflation, the real gain was 6.7%. Other than the increases of 11.5% and 7.1% increases in 1994 and 1993, respectively, this is the largest real increase since 1985. Consumers will moderate their spending in 1996: look for a current-dollar increase in the five to six percent range.

- Residential building permits totaled 36,400, about 1,800 units more than the prior year.² That's the most since 1986, when 42,800 were issued (about 800 in Pinal County). Once again, Metro Phoenix was among the strongest new housing markets in the nation. Single family permits were a few hundred higher than the prior year, and that made 1995 the biggest year since 1978 (**Exhibit 4**). Going forward, one should look for 25,000 single family units to be built in 1996.
- Sales of resale housing broke the all-time record set one year earlier with 36,800 homes sold. Sales mirrored movements in interest rates: sales declined during 1994 as rates moved higher, then increased to new highs as rates fell in 1995 (**Exhibit 5**). The average price of homes sold increased by six percent. As population flows subside and affordability deteriorates, fewer sales should be expected.

OUTLOOK FOR THE PHOENIX-MESA METRO AREA

The Metro Phoenix economy has just experienced two back-to-back years of explosive growth. For rapid growth to continue for a third year would be unprecedented. So, in 1996, the Phoenix growth machine will cool, and rates of growth will return to more normal levels.

EXHIBIT 4
Permits: Single Family Units

Phoenix-Mesa Metro Area



EXHIBIT 5
Multiple Listing Unit Sales

Phoenix-Mesa Metro Area



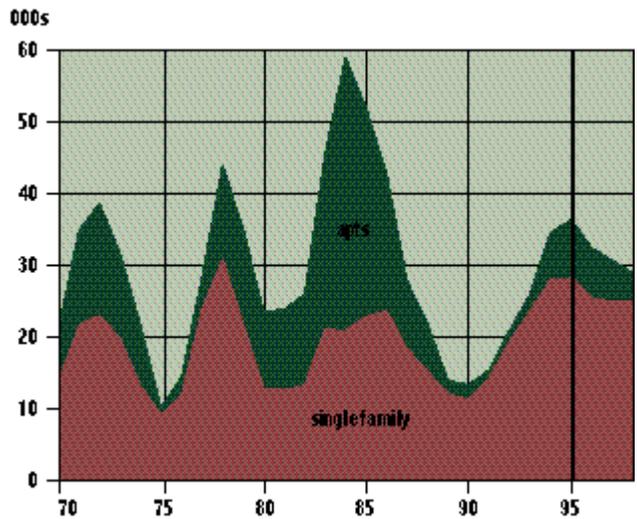
EXHIBIT 6
Wage & Salary Jobs

Phoenix-Mesa Metro Area
(seasonally adjusted)



EXHIBIT 7
Total Housing Unit Permits

Phoenix-Mesa Metro Area



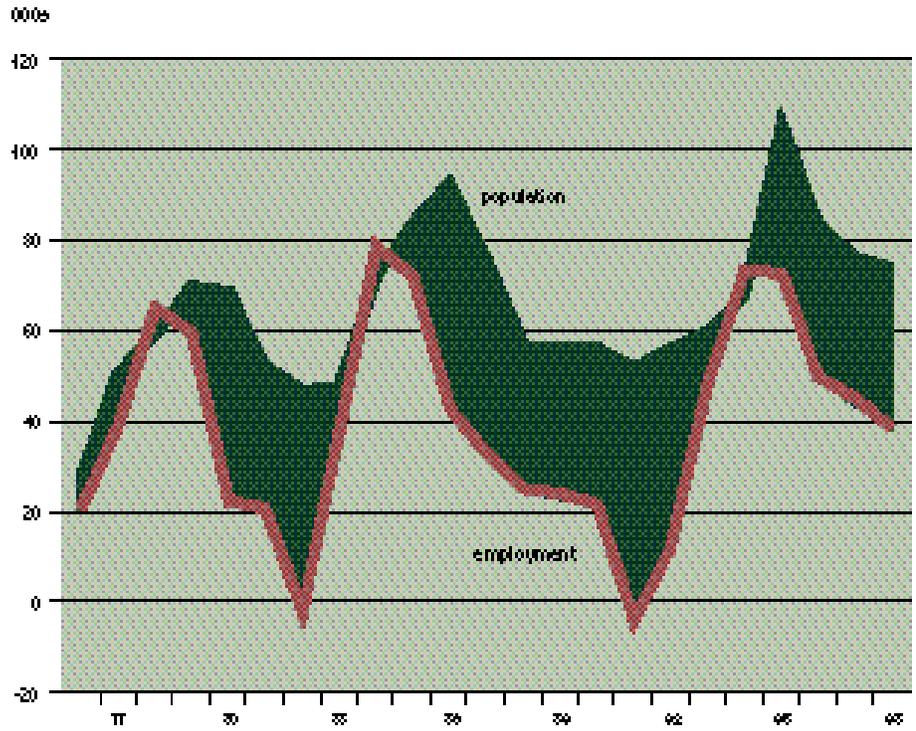
The manufacturing and construction industries (the two most volatile over the business cycle) will slow significantly. Population growth will also recede. Consumers are still optimistic about the future but they will be unable to maintain their spending spree of the last two years, and retail sales figures will cool significantly as the year progresses. The economy's rate of growth should recede further and fall "below average" in 1997.

In recent months, job growth has moved into the four percent range and that is what one should expect for the remainder of the year (**Exhibit 6**). About 50,000 new jobs in 1996 are expected. The largest increases will be recorded in services (21,000 jobs) and trade (8,000). Expansions at several manufacturing plants will boost payrolls by 7000, or 4.3%. That's about half of manufacturing's 1994 gain of 9.6%, but better than last year's gain of 1.6%.

The Phoenix area is the selected site of several new chip plants scheduled to be built during the second half of this decade. Projects include new plants and expansions at Intel, Motorola, Microchip Technology, SGS-Thompson Microelectronics, and Sumitomo Sitix. These projects, which typically mean several hundred million dollars of investment and thousands of high-paying jobs, bode well for Phoenix's future.

EXHIBIT 8 Annual Changes in Population and Nonag Employment

Phoenix-Mesa Metro Area



In recent months, however, soft sales of computers and reduced demand for chips, memory, etc. have led to downward revisions in industry forecasts. One project was recently canceled – Micron’s \$2 billion plant in Utah. And, the bellwether book-to-bill ratio for the semiconductor industry dropped below one in both January and February, which means that demand is shrinking. This development obviously needs monitoring.

Housing markets, after retreating in the first half of 1995, have regained lost ground in recent months and moved to new highs for this business cycle. Single family building peaked in the spring of 1994 and drifted lower until 1995’s first quarter, due primarily to higher interest rates. Then, as interest rates fell, single family building surged again and as 1996 began, permits were running in excess of 30,000 units at an annual rate. However, interest rates jumped in March and building activity will decline as the year unfolds. We look for 25-26,000 single family permits for all of 1996 (**Exhibit 7**).

Over 8,100 apartment units were permitted in 1995, a jump of 26% from the prior year. Never-the-less, apartment vacancies remained

at a sub-5% seasonally adjusted level in last year’s 4th quarter. Going forward, the forecast calls for 7,100 apartments in 1996.

Resale housing markets also recovered in late 1995, jumping to a record annual selling rate of 40,000 by year end. As with new construction, resales are expected to move lower as the year unfolds.

Consumer confidence, as measured in a study by the Behavior Research Center in an on-going study sponsored by Stockton Capital Management of Scottsdale, remains near its peak for this business cycle, with a reading near 107 in the first quarter. But with consumer debt at high levels and pent-up demand pretty well satisfied, consumer spending will moderate. Retail sales increased a strong 9.7% in 1995, but the pace was slowing as 1995 ended. We project an increase of five to six percent for all of 1996. Given the subdued rate of inflation – 2.5% or so – that’s a real gain of 2.5-3.5%.

Phoenix-Mesa’s population approached 2.6 million people in mid-1995, a gain of 4.2% from the prior year. A 3.2% increase is expected for 1996, representing some 83,500 new residents.

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Further slowing is expected for the Phoenix economy in 1997. Job growth will recede to 3.6%, personal income will grow by only 6.0%, and retail sales will slow into the three to four percent range. Population will increase by 2.8%. The following year, 1998, promises more modestly-below-average growth. (**Exhibit 8**). Still, these numbers remain well above recession readings. The outlook for the Metro Phoenix area, indeed, remains bright. \$

¹ Blue Chip Job Growth Update, Economic Outlook Center, Arizona State University, various issues.
² U.S. Department of Commerce, Bureau of the Census, C-40 reports.

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US West Communications*

Forecasts for Arizona

	1994	1995	1996	1997	1998
Personal Income (\$ mill)	78,049.8	85,450.4	91,563.8	97,484.1	103,433.8
percent change	8.7	9.5	7.2	6.5	6.1
Per Capita Personal Income	19,169.1	20,335.6	21,169.6	21,953.2	22,718.4
percent change	5.6	6.1	4.1	3.7	3.5
Aggregate Retail Sales (\$ mill)*	35,108.8	37,864.5	40,294.6	41,899.8	43,551.4
percent change	10.8	7.8	6.4	4.0	3.9
Population (000s, mid-year)	4,071.6	4,202.0	4,325.2	4,440.5	4,552.9
percent change	3.0	3.2	2.9	2.7	2.5
Net Migration (000s)	87.2	92.2	78.1	72.8	70.1
Wage & Salary Employment (000s)	1,693.4	1,783.7	1,850.8	1,910.6	1,966.5
percent change	6.8	5.3	3.8	3.2	2.9
Goods-Producing	310.5	324.8	334.2	339.3	342.8
percent change	11.8	4.6	2.9	1.5	1.0
Construction	108.3	117.4	122.1	121.5	121.4
percent change	21.5	8.4	4.0	-0.5	-0.1
Manufacturing	190.3	195.0	199.2	204.9	208.5
percent change	7.9	2.4	2.2	2.8	1.8
Service-Providing	1,382.9	1,458.9	1,516.6	1,571.3	1,623.6
percent change	5.7	5.5	4.0	3.6	3.3
Trade (Wholesale & Retail)	416.9	442.2	457.7	470.5	482.0
percent change	7.0	6.1	3.5	2.8	2.4
Services	484.7	522.2	550.2	580.5	611.2
percent change	7.6	7.7	5.4	5.5	5.3

Forecasts for Phoenix-Mesa Metro Area

	1994	1995	1996	1997	1998
Personal Income (\$ mill)	52,028.9	56,893.6	60,974.0	64,659.3	68,582.6
percent change	9.6	9.4	7.2	6.0	6.1
Per Capita Personal Income	20,910.9	21,934.1	22,773.7	23,482.7	24,257.9
percent change	6.6	4.9	3.8	3.1	3.3
Aggregate Retail Sales (\$ mill)*	22,892.6	24,966.9	26,445.3	27,437.9	28,503.1
percent change	12.5	9.1	5.9	3.8	3.9
Population (000s, mid-year)	2,488.1	2,593.8	2,677.4	2,753.5	2,827.2
percent change	2.8	4.2	3.2	2.8	2.7
Net Migration (000s)	44.6	81.7	58.5	50.0	46.6
Wage & Salary Employment (000s)	1,142.5	1,215.2	1,264.9	1,309.9	1,348.4
percent change	6.8	6.4	4.1	3.6	2.9
Goods-Producing	226.0	235.8	244.3	251.8	255.2
percent change	12.2	4.3	3.6	3.1	1.4
Construction	74.6	81.6	83.7	84.9	84.8
percent change	22.3	9.4	2.6	1.3	-0.1
Manufacturing	146.7	149.0	155.4	161.7	165.2
percent change	8.0	1.6	4.3	4.1	2.2
Service-Providing	916.5	979.4	1,020.6	1,058.2	1,093.1
percent change	5.6	6.9	4.2	3.7	3.3
Trade (Wholesale & Retail)	280.4	306.2	318.9	328.0	336.1
percent change	7.0	9.2	4.2	2.8	2.4
Services	335.9	363.5	384.3	406.2	426.8
percent change	8.6	8.2	5.7	5.7	5.1

Forecasts for Tucson Metro Area

	1994	1995	1996	1997	1998
Personal Income (\$ mill)	13,307.9	14,236.6	14,908.9	15,652.1	16,576.5
percent change	8.5	7.0	4.7	5.0	5.9
Per Capita Personal Income	18,018.5	18,729.7	19,205.6	19,756.4	20,470.9
percent change	5.8	3.9	2.5	2.9	3.6
Aggregate Retail Sales (\$ mill)*	6,067.4	6,302.3	6,657.6	6,925.2	7,207.1
percent change	9.2	3.9	5.6	4.0	4.1
Population (000s, mid-year)	738.6	760.1	776.3	792.3	809.8
percent change	2.6	2.9	2.1	2.1	2.2
Net Migration (000s)	13.8	16.5	10.9	10.6	12.0
Wage & Salary Employment (000s)	294.6	301.9	307.6	315.3	324.3
percent change	7.0	2.5	1.9	2.5	2.9
Goods-Producing	47.4	49.5	48.7	48.3	48.9
percent change	13.2	4.5	-1.6	-0.8	1.2
Construction	18.9	19.7	19.4	19.0	19.2
percent change	20.8	4.3	-1.4	-2.4	1.0
Manufacturing	26.4	27.6	27.1	27.2	27.7
percent change	9.7	4.5	-1.8	0.6	1.5
Service-Providing	247.2	252.4	258.9	267.0	275.4
percent change	5.9	2.1	2.6	3.1	3.1
Trade (Wholesale & Retail)	67.8	69.0	70.3	72.1	74.1
percent change	6.7	1.7	1.9	2.6	2.8
Services	88.3	92.0	95.8	100.6	105.7
percent change	6.1	4.2	4.1	5.0	5.1

* Aggregate Retail Sales includes retail, food, restaurant & bars and gasoline sales.

Source: Economic and Business Research Program, Karl Eller Graduate School of Management, College of Business and Public Administration, The University of Arizona

CHARACTERISTICS OF ARIZONA'S HIGH TECH INDUSTRY

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In the February 1996 issue of this publication, the high technology industry in Arizona was defined and its economic impact was assessed. In this article, we summarize the results of a survey of high technology firms.¹ While the focus of the previous article was to determine the influence of the high technology industry on Arizona's economy, this article provides insights into the nature of the industry, in terms of its organizational structure, its research and development effort, its purchasing and selling patterns, as well as the characteristics and payscale of its workers.

A total of 613 questionnaires were sent to firms that met the definition of high technology that was outlined in the February article. The overall response rate for the survey was 15.7%. However, because of an 82% response rate among the largest firms, a large share (55%) of total industry employment is captured in the survey. Most of the figures in this article have been calculated by weighting them by total employment in each responding firm. The exception to this is when figures on the number of firms are reported. These have not been weighted by employment and are presented as surveyed firm results.

INDUSTRY ORGANIZATION

The high technology industry is characterized by a large number of young firms. Fifty-eight percent of the sample firms began operations in Arizona in the past 15 years (since 1980) and 52% of the sample firms did not exist in any state or country prior to 1980 (Table 1). Despite their relatively young age, 63% of the facilities described by the survey firms had been located somewhere other than their current location. Seventy percent of the firms that relocated moved from another location in Arizona (26% of the firms did not indicate where they had moved from). Seventy-one percent of the

survey firms began in Arizona. These predominantly smaller firms provided an estimated 11% of total jobs in the industry.

Over two-thirds of the survey firms operated out of a single location. Seventeen percent had branch plants in Arizona but headquarters located in another state. Six percent were headquartered in Arizona but had no other Arizona facilities and 8% had both headquarters and other facilities in Arizona. Of the 870 branches that the survey firms operated, 13% are in Arizona, 53% are in other states and 34% are in other countries (Figure 1).

Several questions in the survey asked firms to describe some of the relationships within their business and between their business and other businesses. One of the first questions concerned where decisions about hiring workers and purchasing inputs were made. Overall, for those firms that had more than one location, 23% indicated that hiring decisions were made at the company headquarters and 26% indicated that purchasing decisions were made at company headquarters (Figure 2). Forty-two percent and 35%, respectively, indicated that hiring and purchasing decisions were made at individual facilities or branch plants. A large percentage (35% for hiring and 39% for purchasing) of the firms indicated that these decisions were made at both locations.

TABLE 1
When survey firms were established

	Number Established	%	No. Established in Arizona	%
Prior to 1951	12	13	3	3
1951-1959	3	3	9	9
1960's	13	14	8	8
1970's	17	18	20	21
1980's	35	38	41	43
1990-1994	13	14	14	15
Total	93	100%	95	100%

FIGURE 1
Location of Branch Facilities

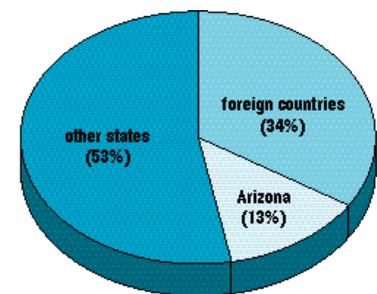


TABLE 2
Firms involved in new forms of business relations

Type of Relationship	Involved with AZ firm	Involved with Non-AZ firm
	(percentages)	
Exclusive subcontractor to	16	19
Exclusive buyer of inputs	14	12
Key inputs available from one seller	15	35
Product bundling with	7	19
Joint R&D ventures	20	32
Share development or engineering resources	20	26
License technology to	10	21
Buy technology licenses from	9	19
Other	10%	
Number of firms reporting	81	

TABLE 3
Workers in R&D by sector and firm size

Sector	All Firms	Small Firms	Medium Firms	Large Firms
	(percentages of total workers)			
Electronic components and computers	17	11	13	18
Aerospace, instruments and chemicals	22	16	7	25
High technology services	22	24	30	NA
Total	20	15	18	20

TABLE 4
R&D expenditures as a percentage of total sales

	Number of firms	Percent
Less than 1%	14	16
1-3%	13	15
4-5%	10	12
6-8%	12	14
9-12%	13	15
13-25%	15	17
Greater than 25%	9	11
Total	86	100%

A variety of business relationships exist between high technology firms and other firms. In addition, because high technology industries use very sophisticated inputs that are often custom-made for specific end products, questions were asked about subcontracting and licensing agreements. The responses of the sample firms are presented in **Table 2**. Some of the most common relationships are: a firm is purchasing key inputs that are available from only one seller who is located outside of Arizona; the firm is involved in joint R&D ventures with a firm outside of Arizona; or the firm shares development or engineering resources with a firm outside of Arizona. Although the percentage of firms involved in any one of these special relationships with other firms is low, over two-thirds of the firms were involved in one or more of these affiliations. Those firms with special relationships with other firms were involved in an average of four different types of alliances.

Another issue related to business relations is the buyer-seller relationships within and between high technology industry sectors. For the sample firms, a large number of these relationships existed between the largest firms in the high technology sector and all high technology firms. Overall, 48% of the surveyed firms indicated that they purchased inputs from one of 14 large firms. Fifty-three percent indicated that they sell to, or are input suppliers to, these 14 firms. The 14 large firms listed on the survey were Alcatel Information Systems, Allied Signal, Bull Worldwide Information Systems, Burr-Brown, Digital Equipment, IBM(Adstar), Intel, AT&T Network Cable Systems, McDonnell Douglas Helicopter Division, MicroAge, Motorola, Honeywell, Hughes Missile, and TRW Vehicle Safety Systems.

TABLE 5
Expenditures by high technology industry

Expenditure Category	Amount <i>(in billions of \$)</i>	% of Total
Wages and benefits	4.360	40
Materials and supplies	3.635	33
Equipment	1.517	14
Buildings and land	0.307	3
State taxes	0.250	2
Utilities	0.215	2
Other ¹	0.702	6
Total	10.986	100%

¹ Includes federal taxes, transfer payments, and other expenses.

Ten percent of all survey firms indicated that the 14 large firms were among their five largest input suppliers. However, on the other side of the relationship, 31% of all survey firms indicated that one or more of these large firms was among their five largest customers in terms of dollar value of sales.

FIGURE 2
Where purchasing and hiring decisions are made in multilocation firms

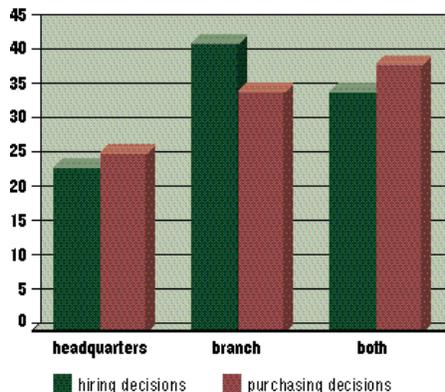


FIGURE 3
Sources of R&D funds

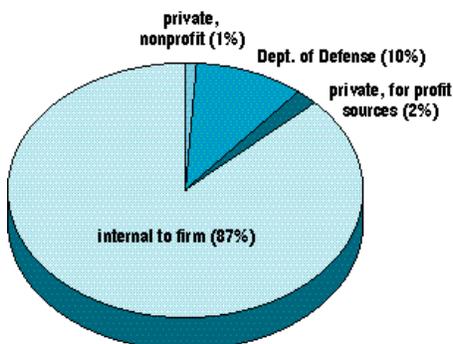


TABLE 6
Arizona expenditures as a percentage of total expenditures by category

Category	In Arizona	Outside Arizona	In Arizona	Outside Arizona
	<i>(percent)</i>		<i>(billions of \$)</i>	
Equipment	29	71	0.440	1.077
Materials and supplies	39	61	1.418	2.217
Other	33	67	0.232	0.470
Total¹	60	40	6.592	4.394

¹ Includes all expenses described in the previous table. However, expenses occurred outside Arizona in only three categories of expense.

The implications of this are that the largest high technology firms, in addition to providing a large share of employment and value added in the industry, are also important purchasers of products from other high technology firms in the state. While these large firms are also suppliers of inputs to almost half of all high technology firms in Arizona, they are not among the five largest suppliers to these firms.

RESEARCH AND DEVELOPMENT

Approximately 20% of all employees in the high technology industry are believed to work in research and development (R&D). This varies somewhat by sector and by the size of the firm, as evident in **Table 3**. In particular, a high percentage of workers in electronic components, computers and computer software, and services are involved in R&D. As might be expected, the share of employees involved in R&D is larger for large firms (with more than 1,000 employees) than for medium and small sized firms (**Table 3**). In the case of aerospace, missiles, instruments and chemicals, small firms had a higher percentage of employees working in R&D than medium firms. In the other sectors, small firms had the smallest share of workers in R&D.

The median size of R&D expenditures as a percentage of total sales is approximately six to eight percent for the survey firms. The distribution of firms according to their R&D expenditures was similar for small firms when compared to medium and large firms. In particular, almost 28% of the responding firms spent 13% or more of total sales on R&D. On the other end of the spectrum, 16% spent less than one percent of total sales on R&D (**Table 4**).

TABLE 7
Sales by destination

Sector	Sold to:		Rest of				Rest of Europe	Other
	AZ	CA	U.S.	Mexico	Japan	Asia		
	(percentages)							
Electronic components and computers	2	3	57	2	8	11	18	1
Aerospace, instruments and chemicals	7	4	57	2	3	7	12	8
High technology services	31	1	50	0	1	7	9	2
High technology industry TOTAL	7	3	56	2	5	9	14	4

TABLE 8
Destination of Arizona exports, by sector, 1993*

	Chemicals SIC-28	Fab. Metal Prod. (incl Ordnance) SIC-34	Industrial Mach (incl. Computers) SIC-35	Electronic Equipment SIC-36	Trans. Equip. Aerospace SIC-37	Instruments SIC-38	Electronic Equipment & Computers SIC35+36	Aerospace, Instruments & Chemicals OTHER	TOTAL
	(percent distribution)								
World	100	100	100	100	100	100	100	100	100
Canada	15	7	8	5	7	11	6	8	6
Mexico	33	77	29	10	32	6	14	32	17
Japan	18	1	6	14	1	5	12	3	11
EUROPE	21	6	33	26	25	55	28	28	28
Rest of ASIA	9	8	18	43	32	20	37	25	35
Other	3	1	6	2	3	3	3	3	3
	(in millions of \$)								
World	78.9	247.6	831.4	3,224.1	1,160.0	426.4	4,055.6	1,912.8	9,945.1
Canada	12.1	16.0	66.2	173.6	77.1	47.0	239.7	152.3	619.6
Mexico	26.3	192.2	241.2	329.1	378.9	26.6	570.3	623.9	1,738.3
Japan	14.2	1.5	50.8	453.8	12.9	21.2	504.7	49.8	1,044.9
EUROPE	16.6	14.0	276.0	843.7	290.0	232.3	1,119.7	553.0	2,775.9
Rest of ASIA	7.0	20.9	143.8	1,373.1	369.6	85.2	1,516.9	482.7	3,509.4
Other	2.7	2.9	53.4	50.8	31.4	14.2	104.2	51.2	257.0

* Export data is only available at the two-digit SIC level. Only portions of all of these two-digit sectors (except 38) are high technology.
Source: Derived from the National Trade Data Base, University of Massachusetts, MISER Files

FIGURE 4
Sources of technology for high technology survey firms

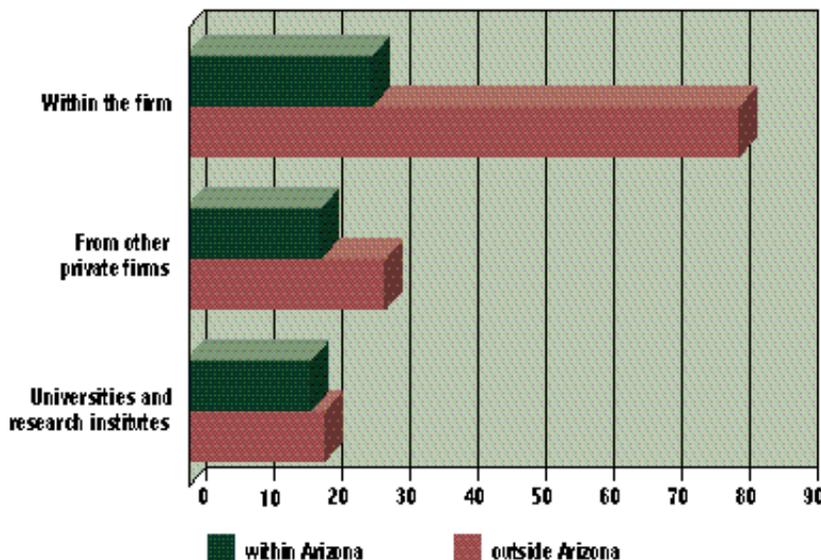


TABLE 9
Sales that are inputs versus final products

Sector	Inputs	Final Products
	(percentages)	
Electronic components & computers	78	22
Aerospace & missiles	34	66
Instruments	62	38
Chemicals	95	5
Computer software & services	67	33
Research services	18	82
Total	45	55

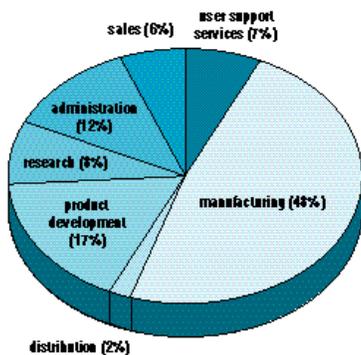
Firms relied heavily on internal sources of funds for their research. Eighty-seven percent of all research funding for the survey firms came from internal sources. The next most significant source was the U.S. Department of Defense which provided approximately ten percent of funding for research (Figure 3).

In addition to doing their own research, companies have the option of acquiring technology from other sources. Eighty-one percent of the respondents indicated that they rely on sources of technology within the firm. However, 28% of the survey firms indicated that they acquired technology from private for-profit entities in Arizona and 20% acquired technologies from universities or research facilities (Figure 4). Small and medium-sized firms tend to be less likely to develop technology within the company than are larger firms. Smaller firms also tend to be more likely to acquire technologies within Arizona rather than outside it.

EXPENDITURES

The estimated expenditures of high technology industry in several broad categories are presented in Table 5. Some of the major expenditures are on wages and benefits (40% of total expenditures) and on materials and supplies (33% of total expenditures). Smaller expenditure categories include \$250 million paid in state taxes, \$215 million spent on utilities and \$702 million in miscellaneous spending. Of these total expenditures, 60% or \$6.592 billion were made in Arizona (Table 6). The total materials and supplies purchased in Arizona were valued at \$1.418 billion in 1994. This represents approximately 39% of all materials and supplies purchased by high technology firms.

FIGURE 5
Distribution
of employment
by task or department



Over the past five years, high technology industry has spent an estimated \$1.202 billion on construction. An estimated 17% of all capital equipment in the industry was purchased in the past one year, 56% was purchased in the past five years and 87% has been purchased in the last ten years.

MARKETING

High technology firms are important contributors to international exports from Arizona. High technology foreign exports from Arizona were approximately \$5.369 billion in 1994.² This represents an estimated 63% of total foreign exports from the state. Only approximately seven percent of total sales in the high technology industry remains in the state of Arizona. Other important export markets are described in **Table 7**. About 59% of total sales remain in the U.S. in states other than Arizona. Of the remaining 34% that is exported overseas, 14% is sent to Europe and 14% is exported to Asia. These represent two of the largest markets for high technology products from Arizona. Japan alone is a market for roughly five percent of total high technology exports from Arizona. As might be expected, high technology services sell a higher percentage of their services within the United States, but still have exports totaling 18% of total sales. The electronic components and computers sector is the most export-oriented with 38% of total sales abroad.

Note that the export estimates based on the survey differ somewhat from published export data for Arizona. **Table 8** presents the destination of Arizona exports, by two-

TABLE 10
Sales by type of
purchasing agreement

	Formal Subcontracts	Informal Purchasing Agreements	Other
	(percentages)		
Electronic components & computers	77	23	0
Aerospace & missiles	94	0	6
Instruments	88	11	1
Chemicals	67	33	0
Computer software & services	42	54	4
Research services	45	55	0
Total	78	20	2

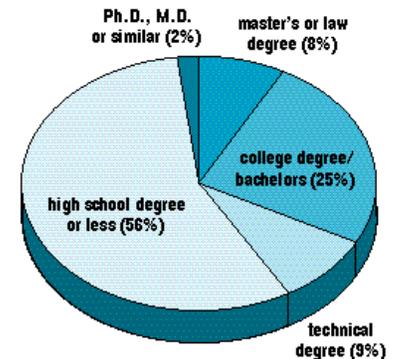
digit sector for 1993. The percentages of exports going to Mexico and the Rest of Asia in **Table 8** are substantially higher than the percentages of exports going to these regions as reported by survey firms and reported in **Table 7**. The reason for this is that survey firms reported distribution of *the sale of final products* but **Table 8** reports the value of all shipments leaving the state for these

FOR THOSE FIRMS
THAT SOLD FINAL OR
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destinations. Thus, **Table 8** includes shipments of components or intermediate goods to Mexico and Rest of Asia that are destined for further assembly, not for final sale. The difference in the percentages of exports reflect the maquiladora operations in Mexico and off-shore assembly in parts of Southeast Asia.

The percentage of total sales of inputs (or components) versus final products varies significantly by sector (**Table 9**). Research services and aerospace and missiles tended to have a larger percentage of sales in final

FIGURE 6
Education and attainment
of high technology
industry employees



products. Overall, 45% of high technology sales were of inputs or components and 55% were of final products.

For those firms that sold inputs or components, 78% were sold based on formal sub-contracts with the buying firms (**Table 10**). The high technology service sectors tended to rely more on informal purchasing agreements (representing about 55-66% of their total sales) than on formal subcontracts. Over 88% of total sales of inputs or components were made to large firms with more than 1,000 employees (**Table 11**). Only high technology chemicals and services tended to sell a large percentage of their inputs/components to small and medium-sized firms.

For those firms that sold final or finished products to the end users of that product, almost a quarter were sold to the U.S. Department of Defense (**Table 12**). Although this percentage may be lower than if this survey had been conducted ten years ago, it still indicates a significant dependency on defense contracts in Arizona's high technology industry. See **Table 13** for real defense contracts in Arizona for various years from 1971 to 1992. The highest percentage of sales of final products to the U.S. Military are for high technology services, aerospace and missiles, and electronic components and computers. Clearly, the U.S. Department of Defense is not only an important customer for firms in aerospace and missiles, but also for other producers of high technology products and services.

Almost two-thirds of the value of all high technology products and services are custom-made for the buyer. Virtually all products

TABLE 11
Sales of inputs by size of purchasing firm

	Small firms (less than 100 workers)	Medium firms (101 to 1,000 workers)	Large firms (over 1,000 workers)
	(percentages)		
Electronic components & computers	2	9	89
Aerospace & missiles	0	1	99
Instruments	2	5	93
Chemicals	24	27	49
Computer software & services	21	1	78
Research services	20	24	56
Total	4	8	88

TABLE 12
Sales of final products by type of customer

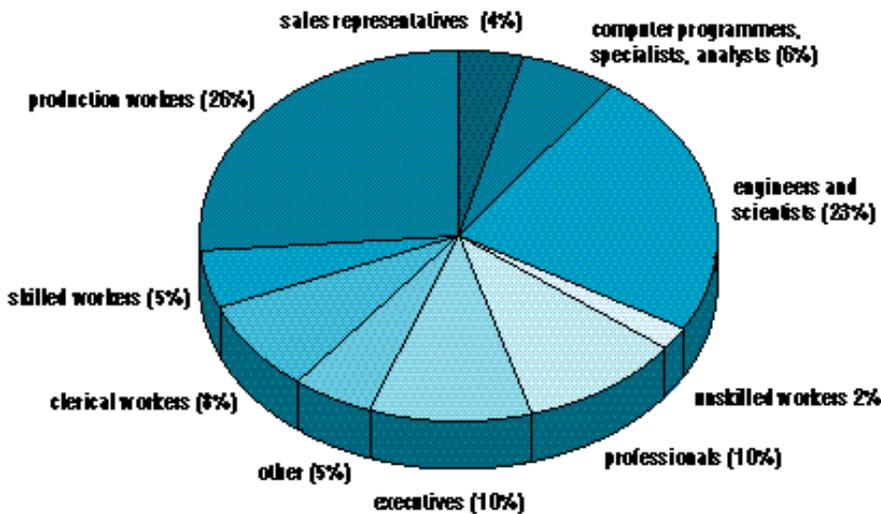
	US Military Department of Defense	Non-military federal agencies	All other customers
	(percentages)		
Electronic components & computers	27	2	71
Aerospace & missiles	29	1	70
Instruments	11	4	85
Chemicals	0	1	99
Computer software & services	55	36	9
Research services	1	2	97
Total	24	4	72

TABLE 13
Arizona prime contract awards

Year	Contract Awards Real \$ 1994 (in thousands)
1992	2,055,509
1991	2,731,774
1985	3,360,500
1979	1,440,179
1975	1,699,664
1974	1,535,688

Derived from: U.S. Department of Defense, Prime Contract Awards; *Balancing the Books: Military Spending in Arizona* by Nina Mohit; and *The Rise of Military-Industrial Spending in Arizona 1970-1972* by David A. Tansik and R. Bruce Billings.

FIGURE 7
Employment in high technology industries by occupation



in the aerospace and missiles sector are custom-made (**Table 14**).

In addition, sales in the high technology industry are fairly concentrated. On average, almost one-fourth of a high technology firm's sales are to its largest customer. Almost half of all the firm's sales are to its five largest customers (**Table 15**). Thus, the major buyers of high technology products and services have significant bargaining power.

EMPLOYMENT

Direct employment in the high technology industry as defined here was approximately 95,099 in 1994. The high technology industry

is a high-wage employer in Arizona, with an average payroll of \$38,896 per employee. Not surprisingly, the industry is a major employer of engineers, scientists, computer specialists and professionals (**Figure 7**). Over a quarter of all doctoral scientists and engineers estimated to work in the state of Arizona are employed in the high technology industry.³

Over a third of the high technology workers have a four year college degree or higher (**Figure 6**). A large percentage of the work force is involved in research and development as mentioned earlier (**Figure 5**). Approximately 20-25% of the total high technology work force is involved in research

and development work. However, over half of all employees in the high technology industry have at most a high school degree.

Per employee wages and salaries by occupation are presented in **Table 16**. Several of the largest high technology firms did not provide information on this question, hence, it reflects more of the average pay per employee for small and medium-sized firms. Drawing on secondary data sources, the average payroll per employee for all industries in Arizona in 1992 was \$21,925 (*1992 County Business Patterns*). The average payroll per employee for the high technology industry was \$38,376 per employee in 1992. Estimated 1994 high technology payroll per employee was \$38,896 in 1994. Our survey results indicate wages and salaries per employee of \$37,000. Clearly, the high technology industry provides high wages to its employees compared to other industries in Arizona.

Several of the largest high technology firms in Arizona are noted for their employee training programs. Motorola is especially well known for its employee education and training programs. High technology firms spend an average of \$900 per employee on training each year. Fifty-three percent of this was spent on in-house training. Total employee training expenditures by high technology firms were estimated at \$86 million in 1994. The highest training expenditure is for in-house or on-the-job training. For 12% of the firms responding to this question, it was the only type of training indicated. The next highest expenditure for training was generally for sending employees to seminars, meetings and workshops. The third and

TABLE 14
Sales in custom versus standard products/services

Sector	Custom made for the buying firm	Standardized product
	(percentages)	
Electronic components & computers	55	45
Aerospace & missiles	100	0
Instruments	81	19
Chemicals	71	29
Computer software & services	26	74
Research services	32	68
Total	66	34

TABLE 15
Sales to largest customers

Sector	Sales to largest customer	Sales to five largest customers
	(average percentages)	
Electronic components & computers	21	46
Aerospace & missiles	36	57
Instruments & chemicals	18	52
Computer software & services	31	40
Research services	12	22
Total	24	49

TABLE 16
Payroll per employee by occupation

Occupation	Payroll per Employee
	(\$)
Executives and managers	57,220
Professionals (lawyers, accountants, etc.)	46,351
Engineers, scientists and mathematicians	50,759
Computer programmers, specialists and analysts	46,268
Sales representatives	24,750
Skilled workers (mechanics, craftsmen and machinists)	28,477
Production workers (assemblers, fabricators, operators)	28,168
Unskilled workers (material handlers, laborers)	14,825
Clerical workers	32,492
All workers	37,000

fourth highest expenditures were for providing incentives/support for employees to complete additional course work or degrees and to bring in consultants to train employees.

CONCLUSION

In this article, numerous characteristics of Arizona's high technology industry are described and measured. Several of the survey results have significant implications for Arizona's economy. Since the high technology industry is an extremely important sector in our economy, its continued growth and stability is critical to the health of Arizona's economy. Arizona's economy is closely tied to the international competitiveness of our high technology

firms because approximately one-third of final sales of this industry is in foreign exports. The survey results also document the degree of the high technology industry's dependency on the defense industry. The U.S. Department of Defense purchases approximately one quarter of the industry's final sales and also plays an important role in funding research and development. Although there is some evidence that Arizona's dependency on defense has declined in recent years, the state continues to have risk associated with federal defense cuts. The study found strong ties among high technology firms and between high technology firms and other sectors in the economy. The survey also found significantly higher levels of in-state purchases than were found in previous studies of Arizona and a wider variety of relationships among high technology firms. \$

The growth of high technology in Arizona will be the subject in the next issue of *Arizona's Economy*.

- 1 Copies of the complete study are available from the authors, from Frank Plencner at the Arizona Department of Commerce, GSPED office (602)280-1499, and from the Internet at <http://ag.arizona.edu/AREC/arechome.html>. The study was sponsored by The Governor's Arizona Science and Technology Council and The Governor's Strategic Partnership for Economic Development. Funds to support the project came from the following companies: Arizona Electronics Association; Apollo Group, Inc.; Arizona Public Service Company; Hughes Missile Systems; Intel Corporation; Inter-Tel, Inc.; Lansdale Semiconductor, Inc.; MechTronics of Arizona, Inc.; Medtronic Micro-Rel, Inc.; Meyer, Hendricks, Victor, Osborn, and Maledon; MicroAge, Inc.; Motorola, Inc.; Pillar Financial; Quarles and Brady; SGS - Thompson Microelectronics, Inc.; Simula, Inc.; Snell and Wilmer; Tally Defense Systems; Three-Five Systems, Inc.; Tiffany & Hoffman; and Tucson Electric Power.
- 2 This estimate is based on the University of Massachusetts MISER files and information from the Arizona Department of Commerce, International Trade Office, not on information from the survey.
- 3 Based on National Science Foundation figures on doctoral scientists and engineers in Arizona in 1991 and survey data.

THE GROWTH OF
HIGH TECHNOLOGY
IN ARIZONA
WILL BE THE SUBJECT
IN THE NEXT ISSUE OF
ARIZONA'S ECONOMY

	NOV 95	DEC 95	JAN 96	FEB 96	MAR 96	% change versus year ago for:	
						most recent month	most recent 12-months
YUMA METROPOLITAN REGION							
Civilian Labor Force, ADES							
Employment	63,760	61,116	59,825	59,950	57,275	-6.9	1.9
Unemployment	48,944	49,060	48,000	49,800	46,800	-3.1	8.2
Unemployment Rate (%)	14,816	12,056	11,825	10,150	10,475	-20.7	-11.3
Unemployment Rate (%)	23.2	19.7	19.8	16.9	18.3	-14.8	-13.7
Employees on Nonagricultural Payrolls, ADES							
Total	37,400	37,800	37,100	37,000	37,100	0.8	6.5
Mining	0	0	0	0	0	...	...
Construction	1,700	1,700	1,700	1,600	1,600	-5.9	-5.2
Manufacturing	1,400	1,400	1,400	1,400	1,400	0.0	-13.6
Trans., Comm. & Publ. Util.	1,800	1,900	1,800	1,800	1,800	0.0	10.8
Trade	12,700	13,000	12,300	12,200	12,200	-2.4	6.2
Finance, Ins. & Real Estate	1,200	1,200	1,200	1,200	1,200	-7.7	-1.4
Services	8,900	8,900	9,200	9,300	9,400	8.0	12.6
Government	9,700	9,700	9,500	9,500	9,500	1.1	7.9
Sales (\$000s) ADOR							
Gross Retail	71,682	93,028	73,724	75,789	...	-0.4	4.1
Retail	59,502	76,606	57,585	58,426	...	-3.8	4.3
Restaurants & Bar	6,486	9,335	8,460	9,637	...	11.9	2.4
Gasoline, EBR	5,694	7,087	7,679	7,726	...	13.9	4.4
Gallons (000s) ADOT	5,387	6,336	6,737	6,765	...	14.6	4.3
Contracting	8,268	10,173	9,719	9,498	...	10.4	-3.8
Value of Construction Contract Awards (\$000s) F.W. Dodge							
Total	7,807	22,484	14,625	10,323	7,672	-24.9	17.9
Residential Building	4,276	3,737	3,622	4,525	6,034	30.5	-0.5
Non-Residential Building	2,584	15,652	3,569	1,874	798	-13.1	44.4
Non-Building	947	3,095	7,434	3,924	840	-82.0	17.4
Number of Dwelling Units Awarded, F.W. Dodge							
Total	55	52	46	65	87	42.6	1.5
One Family Houses	55	52	46	65	72	18.0	0.1
MOHAVE-LA PAZ REGION							
Civilian Labor Force, ADES							
Employment	67,647	67,032	66,900	67,025	67,975	9.1	9.2
Unemployment	63,144	62,584	62,025	62,050	63,150	9.5	11.4
Unemployment Rate (%)	4,503	4,448	4,875	4,975	4,825	4.1	-14.4
Unemployment Rate (%)	6.7	6.6	7.3	7.4	7.1	-4.5	-21.6
Employees on Nonagricultural Payrolls, ADES							
Total	38,200	37,800	37,900	37,800	37,700	0.8	5.3
Mining	200	200	200	200	200	0.0	71.4
Construction	2,700	2,700	2,700	2,600	2,600	-13.3	-1.8
Manufacturing	3,700	3,700	3,700	3,700	3,500	-2.8	3.7
Trans., Comm. & Publ. Util.	2,000	2,000	2,000	2,000	2,000	11.1	13.8
Trade	11,500	11,500	11,300	11,000	11,200	0.9	4.2
Finance, Ins. & Real Estate	1,500	1,400	1,400	1,500	1,500	-6.3	-11.8
Services	9,200	8,900	9,100	9,300	9,400	4.4	5.2
Government	7,400	7,400	7,500	7,500	7,300	2.8	12.3
Sales (\$000s) ADOR							
Gross Retail	73,153	88,065	78,626	81,033	...	8.0	7.2
Retail	55,986	68,517	54,220	58,334	...	1.9	5.7
Restaurants & Bar	9,141	10,119	10,533	11,697	...	10.1	7.1
Gasoline, EBR	8,026	9,429	13,873	11,002	...	53.6	16.2
Gallons (000s) ADOT	7,593	8,430	12,170	9,633	...	54.7	15.4
Contracting	12,516	14,823	11,764	15,613	...	16.5	-7.7
Value of Construction Contract Awards (\$000s) F.W. Dodge							
Total	13,873	11,654	16,953	25,804	14,886	-29.0	-14.1
Residential Building	9,271	8,709	9,076	9,201	11,455	-13.5	-19.4
Non-Residential Building	3,079	681	2,372	547	1,194	-62.9	-38.6
Non-Building	1,523	2,264	5,505	16,056	2,237	-50.2	39.6
Number of Dwelling Units Awarded, F.W. Dodge							
Total	121	110	102	111	133	-13.6	-18.9
One Family Houses	117	108	102	111	133	-10.1	-18.1

See notes at bottom of Arizona - Quarterly table.

	NOV 95	DEC 95	JAN 96	FEB 96	MAR 96	% change versus year ago for: most recent month	most recent 12-months
COCHISE-SANTA CRUZ REGION							
Civilian Labor Force, ADES							
Employment	58,204	57,099	57,350	57,400	56,850	3.1	4.1
Unemployment	51,789	50,830	50,325	50,775	50,700	3.6	5.9
Unemployment Rate (%)	6,415	6,269	7,025	6,625	6,150	-0.8	-7.3
	11.0	11.0	12.2	11.5	10.8	-3.8	-11.1
Employees on Nonagricultural Payrolls, ADES							
Total	42,000	41,700	41,600	41,700	41,900	4.0	3.4
Mining	100	100	0	0	0	-100.0	-25.0
Construction	2,000	2,000	2,000	2,000	2,000	5.3	8.2
Manufacturing	2,100	2,100	2,100	2,100	2,100	5.0	2.5
Trans., Comm. & Publ. Util.	2,200	2,300	2,300	2,300	2,300	4.5	2.3
Trade	11,200	11,300	11,300	11,100	11,000	-5.2	-2.5
Finance, Ins. & Real Estate	900	900	900	900	900	-10.0	-6.6
Services	9,200	8,800	8,800	8,900	9,100	7.1	8.2
Government	14,300	14,200	14,200	14,400	14,500	11.5	6.3
Sales (\$000s) ADOR							
Gross Retail	56,724	73,632	57,296	58,234	...	-4.5	-5.1
Retail	44,972	58,832	41,759	44,486	...	-6.1	-7.1
Restaurants & Bar	7,245	8,588	8,032	7,850	...	-4.6	-0.1
Gasoline, EBR	4,507	6,212	7,505	5,898	...	9.1	4.7
Gallons (000s) ADOT	4,263	5,554	6,584	5,165	...	9.8	4.1
Contracting	9,518	13,090	9,206	10,024	...	-11.2	7.3
Value of Construction Contract Awards (\$000s) F.W. Dodge							
Total	9,381	5,100	7,841	20,238	19,388	10.4	-29.7
Residential Building	8,849	4,676	5,683	19,669	13,341	104.1	35.8
Non-Residential Building	391	100	908	220	1,498	3.1	-73.8
Non-Building	141	324	1,250	349	4,549	-52.5	-60.0
Number of Dwelling Units Awarded, F.W. Dodge							
Total	108	60	72	63	112	12.0	19.0
One Family Houses	108	60	72	63	112	12.0	1.1
GILA-GRAHAM-GREENLEE REGION							
Civilian Labor Force, ADES							
Employment	35,982	35,697	35,750	35,750	35,325	5.7	9.0
Unemployment	33,430	33,165	32,725	32,875	32,575	6.5	10.3
Unemployment Rate (%)	2,552	2,532	3,025	2,875	2,750	-3.6	-4.6
	7.1	7.1	8.5	8.0	7.8	-8.8	-12.5
Employees on Nonagricultural Payrolls, ADES							
Total	25,800	26,000	25,700	25,600	25,800	7.5	8.8
Mining	2,800	2,800	2,800	2,800	2,800	3.7	-9.0
Construction	1,700	1,700	1,800	1,800	1,700	0.0	10.1
Manufacturing	1,900	2,000	2,000	2,000	2,000	11.1	5.0
Trans., Comm. & Publ. Util.	800	800	800	800	800	14.3	4.4
Trade	5,600	5,600	5,400	5,300	5,300	-3.6	5.5
Finance, Ins. & Real Estate	600	600	500	500	500	-16.7	13.3
Services	5,100	5,100	5,100	5,100	5,100	24.4	22.6
Government	7,300	7,400	7,300	7,300	7,600	10.1	12.2
Sales (\$000s) ADOR							
Gross Retail	36,349	42,805	34,497	32,916	...	19.8	9.3
Retail	28,725	34,384	26,588	24,685	...	21.7	9.9
Restaurants & Bar	4,610	4,713	4,487	4,604	...	7.1	6.5
Gasoline, EBR	3,014	3,708	3,422	3,627	...	25.5	8.1
Gallons (000s) ADOT	2,851	3,315	3,002	3,176	...	26.4	7.4
Contracting	9,497	9,413	9,107	8,707	...	6.0	-1.7
Value of Construction Contract Awards (\$000s) F.W. Dodge							
Total	8,182	3,915	9,107	5,447	6,476	39.8	5.6
Residential Building	3,228	2,937	2,753	3,099	4,248	111.2	15.9
Non-Residential Building	740	75	882	143	962	...	-29.1
Non-Building	4,214	903	5,472	2,205	1,266	-51.7	27.1
Number of Dwelling Units Awarded, F.W. Dodge							
Total	38	31	35	34	46	70.4	16.5
One Family Houses	36	31	35	34	46	70.4	2.3

See notes at bottom of Arizona - Quarterly table.

	NOV 95	DEC 95	JAN 96	FEB 96	MAR 96	% change versus year ago for:	
						most recent month	most recent 12-months
APACHE-NAVAJO REGION							
Civilian Labor Force, ADES							
Employment	49,905	50,299	50,750	50,675	50,200	2.2	3.9
Unemployment	43,694	43,643	42,750	42,850	42,400	2.0	5.0
Unemployment Rate (%)	6,211	6,656	8,000	7,825	7,800	3.7	-1.4
	12.4	13.2	15.8	15.4	15.5	1.4	-5.2
Employees on Nonagricultural Payrolls, ADES							
Total	40,300	40,700	39,800	40,300	40,500	3.6	2.2
Mining	1,000	1,000	900	900	900	-10.0	-2.5
Construction	1,600	1,700	1,700	1,700	1,700	13.3	2.1
Manufacturing	1,700	1,700	1,700	1,700	1,700	0.0	-11.1
Trans., Comm. & Publ. Util.	2,900	2,900	2,800	2,900	2,900	3.6	0.3
Trade	6,900	6,800	6,600	6,700	6,700	1.5	1.6
Finance, Ins. & Real Estate	1,400	1,400	1,400	1,400	1,500	7.1	16.6
Services	11,100	11,200	10,700	10,800	10,900	1.9	1.2
Government	13,700	14,000	14,000	14,200	14,200	6.0	4.7
Sales (\$000s) ADOR							
Gross Retail	49,473	57,507	48,906	46,396	...	-85.4	-27.9
Retail	39,126	45,772	38,023	35,807	...	-88.4	-33.9
Restaurants & Bar	3,856	4,494	3,740	3,970	...	3.3	6.3
Gasoline, EBR	6,491	7,241	7,143	6,619	...	13.0	2.3
Gallons (000s) ADOT	6,140	6,474	6,266	5,796	...	13.8	1.5
Contracting	7,858	7,702	7,348	6,130	...	12.3	14.2
Value of Construction Contract Awards (\$000s) F.W. Dodge							
Total	2,989	18,595	3,593	14,436	5,820	-62.6	-14.6
Residential Building	2,003	1,535	1,510	1,832	2,485	-19.9	6.8
Non-Residential Building	925	7,692	210	9,175	2,000	-59.1	-38.5
Non-Building	61	9,368	1,873	3,429	1,335	-82.4	-3.5
Number of Dwelling Units Awarded, F.W. Dodge							
Total	28	18	20	23	28	-12.5	32.5
One Family Houses	28	18	20	23	28	-12.5	44.2
COCONINO-YAVAPAI REGION							
Civilian Labor Force, ADES							
Employment	122,008	120,281	118,075	115,600	116,500	0.8	6.6
Unemployment	115,593	113,617	110,200	107,925	109,375	1.1	7.9
Unemployment Rate (%)	6,415	6,664	7,875	7,675	7,125	-3.8	-9.6
	5.3	5.5	6.7	6.6	6.1	-4.6	-15.2
Employees on Nonagricultural Payrolls, ADES							
Total	91,400	91,000	86,900	88,900	90,000	2.6	3.6
Mining	900	900	900	900	900	0.0	2.9
Construction	5,900	5,800	5,900	5,900	6,200	6.9	2.4
Manufacturing	5,600	5,600	5,600	5,400	5,500	-8.3	-4.2
Trans., Comm. & Publ. Util.	2,900	2,900	2,800	2,800	2,900	0.0	-1.1
Trade	25,100	24,800	23,600	23,700	23,900	2.6	2.8
Finance, Ins. & Real Estate	2,400	2,400	2,400	2,400	2,300	-11.5	-5.2
Services	23,400	23,100	22,600	22,600	23,100	1.3	3.8
Government	25,200	25,500	23,100	25,200	25,200	7.7	8.5
Sales (\$000s) ADOR							
Gross Retail	139,081	162,157	125,899	128,194	...	7.7	8.1
Retail	104,738	125,945	93,488	92,404	...	5.3	7.7
Restaurants & Bar	22,125	23,353	21,379	22,951	...	17.3	10.4
Gasoline, EBR	12,218	12,859	11,032	12,839	...	9.5	7.0
Gallons (000s) ADOT	11,558	11,497	9,678	11,242	...	10.2	6.2
Contracting	32,084	33,883	31,167	34,255	...	15.7	8.3
Value of Construction Contract Awards (\$000s) F.W. Dodge							
Total	55,262	24,036	22,697	65,826	42,760	-9.1	6.0
Residential Building	21,718	18,922	17,079	19,920	24,452	-25.1	-20.6
Non-Residential Building	32,529	1,667	3,732	5,982	12,480	62.2	103.7
Non-Building	1,015	3,447	1,886	39,924	5,828	-12.9	41.0
Number of Dwelling Units Awarded, F.W. Dodge							
Total	247	172	163	188	224	-37.6	-18.3
One Family Houses	181	152	147	168	214	-4.0	-20.7

See notes at bottom of Arizona - Quarterly table.

	NOV 95	DEC 95	JAN 96	FEB 96	MAR 96	% change versus year ago for:	
						most recent month	most recent 12-months
PHOENIX-MESA METROPOLITAN REGION (MARICOPA AND PINAL)							
Civilian Labor Force (000s) ADES	1,385.7	1,381.6	1,361.3	1,372.7	1,375.0	3.7	7.0
Employment	1,344.8	1,341.6	1,315.5	1,328.6	1,331.7	4.0	8.1
Unemployment	40.9	39.9	45.8	44.1	43.3	-5.3	-18.4
Unemployment Rate, Seas. Adj. (%)	3.1	3.0	3.3	3.3	3.3	-8.3	-24.0
Employees on Nonagricultural Payrolls (000s) ADES							
Total	1,249.8	1,261.3	1,240.4	1,261.0	1,269.2	4.4	5.4
Mining	5.2	5.2	5.2	5.2	5.2	2.0	4.9
Construction	84.9	85.2	84.5	86.8	85.8	5.9	7.7
Manufacturing	150.5	151.1	151.3	152.6	152.8	4.6	1.8
Durable	113.5	114.1	114.6	115.7	115.9	5.7	2.7
Nondurable	37.0	37.0	36.7	36.9	36.9	1.1	-1.0
Trans., Comm. & Publ. Util.	64.2	64.8	63.3	63.6	64.0	0.5	0.4
Trade	317.4	323.7	313.1	314.5	318.2	4.4	7.8
Wholesale	75.1	75.7	75.8	76.8	78.0	6.7	8.9
Retail	242.3	248.0	237.3	237.7	240.2	3.7	7.4
Finance, Ins. & Real Estate	87.4	87.8	87.7	88.2	88.3	2.0	-1.6
Services	371.5	357.0	374.8	381.6	385.2	5.6	6.4
Government	168.7	168.5	160.5	168.5	169.7	3.4	6.4
Sales (\$000s) ADOR							
Aggregate Retail Sales	2,107,773	2,669,320	2,132,979	2,158,201	...	12.3	10.0
Retail	1,481,790	1,991,094	1,462,110	1,469,582	...	8.7	9.8
Food, EBR	288,542	290,996	293,728	295,854	...	7.4	11.2
Restaurants & Bars	235,236	274,076	270,309	278,747	...	11.0	9.4
Gasoline, EBR	102,205	113,154	106,832	114,019	...	159.8	11.9
Contracting	397,126	478,816	386,325	415,439	...	20.6	10.1
Value of Construction Contract Awards (\$000s) F.W. Dodge							
Total Awards	537,538	566,054	407,270	511,573	599,631	17.9	9.5
Residential Building	287,510	268,748	294,849	276,175	434,192	39.6	0.7
Non-Residential Building	197,002	274,335	72,071	110,758	103,893	-38.2	15.6
Non-Building	53,026	22,971	40,350	124,640	61,546	108.6	54.7
New Housing Units Authorized, Census C-40							
Total Units	2,992	3,443	3,367	4,341	3,954	5.6	17.6
Single Family Units	2,200	2,276	2,235	2,374	3,071	24.3	14.8
2-4 Unit Structures	59	60	45	32	16	73.3	38.5
5-plus Unit Structures	733	1,107	1,087	1,935	867	28.7	26.2
Housing Sales and Prices, ARMLS							
Total Sales (\$000s)	352,118	388,316	331,251	310,847	465,604	24.2	19.0
Total Units	2,886	3,181	2,576	2,514	3,795	35.7	12.6
Average Price (\$)	122,009	122,074	128,591	123,646	122,689	-8.5	5.4
Phoenix Skyharbor International Airport, PSIA							
Total Passengers	2,325,232	2,417,088	2,325,621	2,480,939	2,920,143	13.7	10.2
Total Aircraft Movements	32,466	34,978	35,148	33,044	36,070	-20.4	-13.4

	PHOENIX-MESA METROPOLITAN REGION (MARICOPA AND PINAL) - QUARTERLY DATA					% change versus year ago for:	
	I 95	II 95	III 95	IV 95	I 96	most recent quarter	most recent 4-quarters
Demographics & Vital Statistics (000s, seas adj) ADHS & EBR							
Population	2,557.1	2,582.2	2,604.5	2,625.3	2,646.1	3.5	3.9
Natural Increase	5.9	6.0	6.0	6.1	6.2	3.9	3.0
Births	10.9	11.0	11.1	11.2	11.3	3.3	3.0
Deaths	5.0	5.1	5.1	5.1	5.1	2.7	3.0
Net Migration	20.8	19.2	16.3	14.7	14.7	-29.3	-15.7
Personal Income by Source (\$mil, SAAR) EBR							
Total Personal Income	55,270	56,396	57,460	58,449	59,444	7.6	8.7
Earnings by Place of Work	39,936	40,685	41,423	42,154	42,893	7.4	8.1
Less: Contributions for Social Insurance	2,439	2,479	2,520	2,560	2,602	6.7	7.2
Plus: Adjustment for Residence	-31	-31	-31	-31	-31	0.1	-1.5
Plus: Dividends, Interest & Rents	9,259	9,479	9,669	9,821	9,975	7.7	10.6
Plus: Transfer Payments	8,544	8,742	8,919	9,065	9,209	7.8	9.2
Per Capita Personal Income (\$, SAAR) EBR	21,614	21,840	22,062	22,264	22,465	3.9	4.7

See notes at bottom of Arizona - Quarterly table

	NOV 95	DEC 95	JAN 96	FEB 96	MAR 96	% change versus year ago for:	
						most recent month	most recent 12-months
TUCSON METROPOLITAN REGION (PIMA)							
Civilian Labor Force (000s) ADES							
Employment	377.6	375.9	370.7	372.2	373.0	1.3	3.6
Unemployment	366.2	364.8	358.2	360.1	360.6	1.3	4.2
Unemployment Rate, Seas. Adj. (%)	11.4	11.1	12.5	12.1	12.4	0.6	-11.5
	3.3	3.2	3.3	3.4	3.5	-2.8	-15.1
Employees on Nonagricultural Payrolls (000s) ADES							
Total	306.9	309.4	304.7	309.0	310.5	1.7	1.6
Mining	2.2	2.3	2.3	2.3	2.3	9.5	9.3
Construction	20.0	20.4	19.9	19.8	19.7	1.5	2.9
Manufacturing	27.5	27.7	27.4	27.5	27.6	0.7	2.3
Durable	22.2	22.5	22.3	22.3	22.4	0.9	3.7
Nondurable	5.3	5.2	5.1	5.2	5.2	0.0	-3.2
Trans., Comm. & Publ. Util.	13.6	13.8	13.8	13.7	13.6	0.7	2.8
Trade	70.1	71.0	70.0	70.2	70.4	2.3	1.0
Wholesale	9.9	9.9	10.3	10.3	10.5	6.1	1.2
Retail	60.2	61.1	59.7	59.9	59.9	1.7	1.0
Finance, Ins. & Real Estate	11.7	11.9	12.0	12.0	12.1	1.7	-4.6
Services	93.1	93.2	93.0	93.7	94.3	1.0	2.5
Government	68.7	69.1	66.3	69.8	70.5	2.3	0.8
Sales (\$000s) ADOR							
Aggregate Retail Sales	516,617	667,115	512,841	528,987	...	8.4	4.6
Retail	350,545	485,999	345,108	347,058	...	5.7	4.0
Food, EBR	79,069	79,742	79,117	79,689	...	5.6	7.1
Restaurants & Bars	57,846	68,045	61,709	69,367	...	6.5	4.2
Gasoline, EBR	29,157	33,329	26,907	32,873	...	71.9	7.5
Contracting	92,237	97,911	84,443	81,331	...	6.8	8.8
Value of Construction Contract Awards (\$000s) F.W. Dodge							
Total Awards	115,141	55,123	68,420	97,219	112,393	37.5	-7.8
Residential Building	64,946	36,405	42,957	54,554	72,359	43.5	-21.0
Non-Residential Building	45,198	13,892	14,988	27,739	31,947	88.4	18.0
Non-Building	4,997	4,826	10,475	14,926	8,087	-43.7	37.1
New Housing Units Authorized, Census C-40							
Total Units	373	354	577	397	...	-51.5	-27.9
Single Family Units	371	212	403	395	...	23.4	-26.3
2-4 Unit Structures	2	13	6	2	...	0.0	-50.0
5-plus Unit Structures	0	129	168	0	...	-100.0	-30.2
Housing Sales and Prices, TAR							
Total Sales (\$000s)	72,498	76,907	72,125	70,909	...	22.4	-3.7
Total Units	604	629	612	545	...	5.8	-7.3
Average Price (\$)	120,030	122,269	117,851	130,109	...	15.6	3.8
Tucson International Airport, TAA							
Total Passengers	289,081	291,833	283,183	312,477	349,205	4.6	4.9
Total Aircraft Movements	20,775	20,494	22,389	20,117	22,421	1.8	-0.5

	TUCSON METROPOLITAN REGION (PIMA) - QUARTERLY DATA					% change versus year ago for:	
	I 95	II 95	III 95	IV 95	I 96	most recent quarter	most recent 4-quarters
Demographics & Vital Statistics (000s, seas adj) ADHS & EBR							
Population	752.7	757.7	762.1	766.1	770.2	2.3	2.6
Natural Increase	1.2	1.3	1.3	1.3	1.3	6.6	7.0
Births	2.9	2.9	2.9	3.0	3.0	4.2	4.2
Deaths	1.6	1.6	1.7	1.7	1.7	2.5	2.1
Net Migration	4.2	3.7	3.1	2.8	2.8	-34.8	-26.7
Personal Income by Source (\$mil, SAAR) EBR							
Total Personal Income	13,965	14,157	14,332	14,492	14,657	5.0	6.2
Earnings by Place of Work	8,764	8,846	8,932	9,028	9,129	4.2	4.8
Less: Contributions for Social Insurance	544	550	557	565	573	5.3	5.9
Plus: Adjustment for Residence	139	140	142	144	147	5.8	6.8
Plus: Dividends, Interest & Rents	2,796	2,854	2,897	2,919	2,941	5.2	9.0
Plus: Transfer Payments	2,811	2,866	2,919	2,966	3,012	7.2	7.9
Per Capita Personal Income (\$, SAAR) EBR	18,553	18,684	18,807	18,916	19,030	2.6	3.5

See notes at bottom of Arizona - Quarterly table

	NOV 95	DEC 95	JAN 96	FEB 96	MAR 96	% change versus year ago for: most recent month	% change versus year ago for: most recent 12-months
ARIZONA MONTHLY DATA							
Civilian Labor Force (000s) ADES							
Employment	2,160.8	2,149.0	2,120.7	2,131.4	2,132.1	2.9	6.1
Unemployment	2,067.6	2,059.3	2,019.8	2,035.0	2,037.3	3.3	7.4
Unemployment Rate, Seas. Adj. (%)	93.3	89.7	100.9	96.4	94.8	-5.1	-13.6
	4.6	4.6	4.8	4.9	4.9	-7.5	-18.8
Employees on Nonagricultural Payrolls (000s) ADES							
Total	1,829.5	1,843.8	1,811.9	1,839.5	1,852.6	3.7	4.5
Mining	12.4	12.4	12.4	12.4	12.5	2.5	1.8
Construction	120.4	121.2	119.9	121.7	120.6	4.0	6.0
Manufacturing	194.4	195.3	195.3	196.4	196.5	3.4	1.5
Durable	147.2	148.1	148.2	149.2	149.2	4.0	2.3
Nondurable	47.2	47.2	47.1	47.2	47.3	1.3	-0.7
Trans., Comm. & Publ. Util.	91.3	92.3	90.9	91.3	92.0	2.0	1.4
Transportation	54.6	55.0	54.1	54.4	54.8	2.6	2.0
Trade	461.3	468.5	454.0	455.5	460.5	3.6	6.0
Wholesale	95.5	96.6	96.0	96.9	97.7	3.7	7.7
Retail	365.8	371.9	358.0	358.6	362.8	3.6	5.6
Finance, Ins. & Real Estate	107.3	107.8	107.2	107.6	107.8	0.8	-2.0
Services	531.5	534.3	532.0	541.2	547.7	5.1	6.0
Government	310.9	312.0	300.2	313.4	315.0	3.3	4.7
Federal	43.9	45.0	44.3	44.3	44.3	3.5	2.9
State & Local	267.0	267.0	255.9	269.1	270.7	3.2	5.0
Schools	160.6	161.5	150.0	163.3	165.2	3.1	5.8
Hours Worked Per Week, Manufacturing, ADES	42.1	42.2	43.1	42.8	...	1.4	-1.3
Average Hourly Earnings (\$) ADES							
Copper Mining	16.71	16.45	16.63	16.54	...	1.3	2.3
Construction	12.38	12.50	12.75	12.30	...	0.6	2.0
Manufacturing	11.57	11.39	11.21	11.31	...	0.4	1.4
Utilities	16.70	17.02	17.89	17.36	...	5.1	-4.5
Retail Trade	10.27	10.35	10.09	10.36	...	-2.3	6.4
Wholesale Trade	12.02	11.94	12.86	14.03	...	20.1	5.9
Sales (\$000s) ADOR							
Aggregate Retail Sales	3,148,938	3,952,549	3,168,096	3,213,849	...	0.9	7.1
Retail	2,165,384	2,887,149	2,118,881	2,130,782	...	-5.9	6.6
Food, EBR	465,698	469,659	476,172	479,618	...	7.9	7.7
Restaurants & Bars	346,545	402,723	388,649	408,823	...	10.1	8.1
Gasoline, EBR	171,311	193,018	184,394	194,626	...	89.2	10.0
Gallons (000s) ADOT	162,058	172,568	161,764	170,411	...	90.4	9.5
Utilities	306,746	322,194	358,302	323,992	...	1.8	0.6
Communications	122,147	125,288	108,654	127,701	...	9.9	13.8
Amusements	32,349	6,252	43,933	46,159	...	-11.0	-17.7
Rentals - Real Property	270,721	278,691	275,383	251,946	...	-6.8	19.3
Rentals - Personal Property	174,830	187,479	187,526	161,102	...	-22.8	11.1
Contracting	569,104	665,811	549,079	580,997	...	16.9	8.7
Mining - Metal, Oil & Gas	168,602	133,955	158,115	120,215	...	-18.9	14.7
Hotel/Motel	97,801	91,725	134,278	167,252	...	12.8	10.3
Value of Construction Contract Awards (\$000s) F.W. Dodge							
Total Awards	750,198	706,961	550,506	750,866	809,026	14.5	4.7
Residential Building	401,801	345,669	377,529	388,975	568,566	34.2	-4.3
Non-Residential Building	282,448	314,094	98,732	156,438	154,772	-23.8	13.1
Non-Building	65,949	47,198	74,245	205,453	85,688	7.8	37.3
New Housing Units Authorized, Census C-40							
Total Units	4,004	4,323	4,422	5,302	5,153	6.5	9.8
Single Family Units	3,171	2,897	3,053	3,167	4,101	20.8	7.4
2-4 Unit Structures	90	129	69	57	50	-58	-11.5
5-plus Unit Structures	743	1,297	1,300	2,078	1,002	-24.3	22.1
Bankruptcy Filings, U.S. Bankruptcy Court							
Total	1,384	1,272	1,333	1,827	1,529	15.3	17.8
Chapter 7	1,050	952	970	1,207	1,155	18.8	17.9
Chapter 11	32	14	27	52	25	-3.8	-31.0
Chapter 13	302	306	336	568	349	6.4	24.5

See notes at bottom of Arizona - Quarterly table.

	I 95	II 95	III 95	IV 95	I 96	% change versus year ago for: most recent quarter most recent 4-quarters	
ARIZONA - QUARTERLY DATA							
Demographics & Vital Statistics (000s, seas adj) ADHS & EBR							
Population	4,153.0	4,185.9	4,218.2	4,249.9	4,280.6	3.1	3.2
Natural Increase	9.5	8.4	9.5	9.4	9.7	2.7	-0.3
Births	17.5	17.3	18.4	18.4	18.6	6.4	2.6
Deaths	8.0	8.9	8.9	9.0	8.9	10.9	5.8
Net Migration	23.9	23.8	22.8	21.7	20.5	-14.5	-1.7
Personal Income Derivation (\$mil, SAAR) EBR							
Total Personal Income	83,638	84,298	86,133	87,732	89,364	6.8	8.4
Earnings by Place of Work	57,800	57,846	59,142	60,198	61,399	6.2	7.4
Less: Contributions for Social Insurance	3,665	3,650	3,697	3,731	3,821	4.3	5.7
Plus: Adjustment for Residence	275	278	285	292	297	8.1	6.7
Plus: Dividends, Interest & Rents	14,376	14,690	15,005	15,373	15,510	7.9	11.5
Plus: Transfer Payments	14,853	15,135	15,397	15,599	15,980	7.6	8.6
Components of Earnings (\$mil, SAAR) BEA							
Wages and Salaries	47,055	47,337	...	...	...	9.0	10.0
Other Labor Income	5,246	5,302	...	...	...	10.5	11.3
Proprietor's Income	5,436	5,397	...	...	...	3.7	4.1
Farm	342	281	...	...	...	-29.0	-33.8
Nonfarm	5,094	5,117	...	...	...	6.4	8.0
Per Capita Personal Income (\$, SAAR) EBR	20,139	20,139	20,420	20,643	20,877	3.7	5.1
Average Wage Per Employee, Annual Rate (\$) E	26,059	26,130	...	...	...	3.2	3.1
Measures of Financial Institutions							
Banks and S&Ls Combined (\$mil) ASBD							
Assets	35,317	36,478	36,463	38,527	...	9.8	1.6
Loans	21,928	22,372	22,340	23,303	...	8.5	5.3
Liabilities	32,503	33,600	33,490	35,558	...	9.6	1.9
Deposits	30,942	31,482	30,752	32,546	...	5.8	2.4
Equity Capital	2,814	2,878	2,974	2,969	...	13.1	-1.9
Capital:Asset Ratio (%)	9.0	8.8	9.1	8.6	...	NA	NA

MEASURES OF INFLATION AND PRICES

	I 95	II 95	III 95	IV 95	I 96	% change versus year ago for: most recent quarter most recent 4-quarters	
Consumer Price Index (1982-84=100) ASU & BLS							
Metropolitan Phoenix	155.9	157.9	160.0	161.3	162.9	4.5	4.8
Western Region (U.S.)	152.8	153.6	154.1	154.3	156.4	2.4	2.5
U.S. - All Urban Consumers	150.9	152.2	152.9	153.6	155.0	2.7	2.8
U.S. - Urban Wage Earners	148.3	149.6	150.2	150.9	152.3	2.7	2.8
Price Indexes (1992=100) BEA							
Gross Domestic Product	106.7	107.3	108.0	108.4	109.0	2.2	2.5
Personal Consumption Expenditures	106.8	107.5	108.0	108.9	109.5	2.5	2.5

MEASURES OF INFLATION AND PRICES - MONTHLY DATA

	NOV 95	DEC 95	JAN 96	FEB 96	MAR 96	% change versus year ago for: most recent month most recent 12-months	
Consumer Price Index (1982-1984=100) BLS							
U.S. - All Urban	153.6	153.5	154.4	154.9	155.7	2.8	2.8
U.S. - Wage Earners	150.9	150.9	151.7	152.2	152.9	2.8	2.8

Sources and abbreviations:

ADES: Arizona Department of Economic Security
 ADHS: Arizona Department of Health Services
 ADOR: Arizona Department of Revenue
 ADOT: Arizona Department of Transportation
 ARMLS: Arizona Regional Multiple Listing Service
 ASBD: Arizona State Banking Department
 ASPB: Arizona State Parks Board
 ASU: Arizona State University, College of Business, Research Centers

BEA: Bureau of Economic Analysis, U.S. Department of Commerce
 BLS: Bureau of Labor Statistics, U.S. Department of Labor
 Census C-40, Bureau of the Census, U.S. Department of Commerce
 EBR: Economic & Business Research Program, The University of Arizona
 F.W. Dodge, Division of McGraw Hill Information Systems Co. (proprietary data provided by special permission)
 NPS: National Park Service, U.S. Department of the Interior

NSCCC: Nogales-Santa Cruz Chamber of Commerce
 PSIA: Phoenix Skyharbor International Airport
 SAAR: Seasonally adjusted at annual rates
 TAA: Tucson Airport Authority
 TAR: Tucson Association of Realtors
 USINS: U.S. Immigration & Naturalization Service, U.S. Department of Justice
 U.S. Bankruptcy Court, District of Arizona
 USCS: U.S. Customs Service, U.S. Department of the Treasury

TRAVEL AND TOURISM - MONTHLY DATA

	OCT 95	NOV 95	DEC 95	JAN 96	FEB 96	% change versus year ago for:	
						most recent month	most recent 12-months
Visits to Parks & Other Recreational Areas, ADOT, NPS & ASPB							
Northern Arizona	1,713,753	1,305,463	718,799	1,087,177	1,024,680	-4.7	-1.0
Historical	182,260	121,499	51,627	76,814	130,862	16.7	2.5
Scenic	575,109	259,539	204,572	208,660	246,649	-1.1	4.2
Water Based Recreation	956,384	924,425	462,600	801,703	647,169	-9.3	-4.0
Southern Arizona	214,560	205,969	167,332	258,038	400,015	0.3	2.2
Historical	41,205	46,299	34,848	56,911	92,873	8.2	-2.7
Scenic	140,134	138,683	120,265	179,251	272,078	-3.6	3.1
Water Based Recreation	33,221	20,987	12,219	21,876	35,064	13.3	5.0
International Border Crossings, USINS & USCS							
U.S. Citizens	676,425	718,081	701,767	664,778	...	0.5	-22.4
Aliens	1,921,193	2,062,580	1,972,537	1,867,159	...	0.2	-5.6
Vehicles	722,014	744,889	-11.7	-12.3

See notes at bottom of Arizona - Quarterly table.

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