VOLUME 48 • NUMBER 10

AZB ARIZONA BUSINESS

OCTOBER 2001

ARIZONA STATE UNIVERSITY'S MONTHLY NEWSLETTER ON THE ARIZONA ECONOMY

An overview of the U.S. electronics industry

With a focus on semiconductors

Computers and electronic products have been central to the economic expansion of the past decade. Spending on information processing equipment has grown three times as fast as private domestic investment, and investment has been the fastest-growing component of aggregate demand. On the supply side, advances in information technology have raised total factor productivity, paving the way for what many observers believe will be an increase in the long-term growth rate of the economy.

Electronics is especially important to the Arizona economy. Arizona accounts for 1.6 percent of U.S. total employment but 2.9 percent of employment in the broad category of computers and electronic products and 9.1 percent of employment in semiconductor manufacturing. Including multiplier effects, electronics production accounts for 5 to 6 percent of Arizona's employment and earnings.

This article provides an overview of the U.S. electronics industry, including information on basic economic characteristics of the industry and its representation across individual states. Given the importance of semiconductors to Arizona, special attention is paid to that industry. Recent trends are reviewed, including changes in product mix and manufacturing practices, as well as shifts in the U.S. geography of semiconductor production.

NAICS 334

Under the new North American Industry Classification System (NAICS), most of what would be regarded as electronics manufacturing is classified in "NAICS 334: Computer and Electronic Manufacturing Industries." NAICS 334 includes establishments that manufacture computers, computer peripherals, communication equipment, navigational and measuring instruments, and the electronic components for these products. Design and use of integrated circuits and application of methods of miniaturization are common to the production technologies used in this industry group.

Table 1 presents selected statistics for major individual industries within NAICS 334. The data are for 1997, the year of the most recent census of industries.

• Average payroll per employee in electronics establishments is 26 percent higher than it is for manufacturing as a whole. This wage premium reflects the high level of skills (e.g., engineering and technical) required of workers in the group. Wages vary considerably across individual industries within NAICS 334. Establishments producing instruments for search and guidance, telephone apparatus, and semiconductor devices pay 18 to 24 percent above the group average, while semiconductor assembly operations pay only 81 percent of the group average.

• Electronic products and components are highly tradable. Exports and imports as a percent of output are about twice as high in these industries as they are in the general manufacturing sector. International trade is most important in semiconductor manufacturing and least important to establishments producing instruments for search and guidance.

Overall, the U.S. runs a balance of trade deficit in electronic products, as it does for all manufactures. As measured by the trade balance, the U.S. is most competitive in communications equipment and least competitive in printed circuit assembly. There is strong two-way trade in semiconductor devices, with the U.S. a net exporter of high-value, design-intensive chips and a net importer of commodity and memory chips.

GEOGRAPHY OF ELECTRONICS EMPLOYMENT

Table 2 shows, for selected states with at least 30,000 electronics employees, the percent of national employment accounted for by each state. The table covers NAICS 334 and the principal four-digit industries within the broad group. Because of its importance to Arizona, NAICS 3344 is broken out into semiconductors and all other electronic components.

California dominates the U.S. electronics industry, accounting for about one-fourth of national employment. Also notable in terms of

INSIDE

CENTER FOR BUSINESS RESEARCH

ASU College of Business
ARIZONA STATE UNIVERSITY

absolute size are Texas with 8 percent of total electronics employment and Massachusetts with 6 percent. By individual industry, the top states are: California, North Carolina, and Minnesota in computer manufacturing; California, Illinois, and Texas in communications equipment; California, Texas, and Arizona in semiconductor manufacturing; and California, Massachusetts, and Texas in navigational and control instruments.

Location quotients can be used to judge the relative importance of electronics manufacturing to a state's economy. Location quotients are calculated by dividing a state's share of national employment in an industry by the state's share of total national employment (not shown). From this perspective, electronics is most important to Massachusetts. As a share of total employment, electronics employment is 2.4 times greater in Massachusetts than it is in the nation. The state with the next highest location quotient is California, with a location quotient of 2.2. Arizona joins Minnesota and Oregon in the next group of states with an electronics sector that accounts for 1.8 times as much employment in the state as in the nation.

Agglomeration economies are strong in electronics manufacturing. States that are important producers of semiconductors and other components also tend to have a significant presence in the production of some kind of final product. Less predictable is the particular niche a state will have. The highly populated states of California, New York, and Texas have a diversified electronics sector. Smaller states are specialized along product lines. Minnesota, North Carolina and Oregon are specialized in computer manufacturing; Illinois has a niche in communications equipment; and Massachusetts is focused on communications equipment and navigational and control instruments. Arizona is unusual in that it has a very large semiconductor industry but little computer manufacturing and only a moderately significant presence in communications equipment and instruments.

IMPORTANCE TO ARIZONA

Arizona establishments that manufacture electronic products and components directly employ 48,400 people (circa 1997). Additional jobs are supported when electronics manufacturers purchase materials and services from in-state suppliers and when workers directly and indirectly connected to the industry purchase goods and services with the income they earn.

The total contribution of electronics manufacturing to the state economy can be assessed using input-output analysis. Such an analysis was carried out using an Arizona-specific version of IMPLAN. The estimated impacts account for both backward linkages to other industries and for the effects of consumer spending by affected workers. The impacts do not include purchases of capital equipment by electronics manufactures.

Estimates from the input-output model indicate that, through the multiplier process, Arizona electronics firms indirectly support an additional 57,900 in-state jobs. Many of these jobs are in consumer service industries, such as retail trade and health care. Electronics firms also purchase a variety of business services, including computer and data processing, research and testing, management consulting, and personnel supply services. The total employment impact of the industry is 106,300 jobs, or 5.4 percent of total state employment.

The electronics industry directly contributes $2.7 billion in earnings and $4.7 billion in value-added to the state economy. Through the multiplier process, the industry supports an additional $1.5 billion of earnings and $2.8 billion of value-added. Altogether, electronics manufacturing can account for 5.7 percent of Arizona earnings and 5.6 percent of value-added in the state.

HISTORICAL TRENDS

The U.S. semiconductor industry has experienced profound changes over the past three decades. During the 1970s the industry was moving toward high-volume production of standard devices. To lower production costs, semiconductor firms adopted traditional models of mass production from the auto and textile industries. Design and manufacturing became spatially and organizationally separated. Research and development was carried out in centers located within major high-technology complexes. High-volume fabrication facilities, dedicated to a particular product line to achieve scale economies, were located at dispersed low-wage sites outside of major U.S. metro areas. Labor-intensive assembly operations were moved offshore.

Because of the rapid pace of technological change, however, traditional models of mass production were poorly suited to semiconductor manufacturing. U.S. production came to suffer from poor yields (a high percentage of manufactured devices with defects) and fluctuating capacity utilization. Japanese manufacturing, on the other hand, was organized around the concept of continuous innovation, allowing firms to continually rebuild their mass production capabilities. The Japanese system also promoted interactive learning between designers and manufacturers.

TABLE 1
U.S. COMPUTER AND ELECTRONIC PRODUCT MANUFACTURING (NAICS 334)

Industry (NAICS code)*	*Number of Employees (in thous)*	*Payroll per Employee (in $ thous)*	*Exports as Percent of Output*	*Imports as Percent of Output*
Computer & electronic product mfg (334)	1,699	42.8	33.8	41.0
Computers & peripheral equipment (3341)	242	45.7	36.9	47.8
Electronic computer mfg (334111)	100	42.8	14.1	11.5
Communications equipment (3342)	294	46.3	31.3	19.8
Telephone apparatus (334210)	104	51.1	27.5	19.2
Wireless communication equipment (334220)	164	44.8	38.3	20.6
Semiconductors & other components (3344)	589	37.8	41.4	54.5
Semiconductors and related devices (334413)	199	50.7	52.4	48.6
Printed circuit assembly (334418)	111	34.6	24.6	72.2
Navigational and control instruments (3345)	487	47.1	22.9	14.1
Search, detection & guidance (334511)	188	53.1	8.3	3.9
All Manufacturing Industries (31-33)	16,888	33.9	15.7	21.5

Sources: 1997 Economic Census, 1998 IMPLAN data files
*Industries listed are all four- and six-digit industries with at least 100,000 employees.

Through higher yields, Japanese firms gained a significant cost advantage over U.S. firms and quickly eroded U.S. market shares, especially in the market for memory devices. In 1983 Japan surpassed the United States as the world's largest producer of memory chips, and by 1986 held 65 percent of the worldwide memory market. U.S. market share in memory chips fell from around 75 percent in 1980 to below 30 percent by 1986.

Part of the U.S. response to Japan was political. U.S. firms succeeded in bringing anti-dumping suits against Japanese manufacturers of memory devices, leading to the 1986 U.S.-Japan Semiconductor Agreement. More important to the resurgence of U.S. firms were self-initiated changes in product mix and manufacturing practices. Resources were deployed to markets in which the innovative capability of U.S. firms in product design offset Japan's leadership in high-volume manufacturing. This involved a shift in product mix out of memory and commodity chips into microprocessors and design-intensive ASICs (application-specific integrated circuits).

U.S. firms also changed their methods of manufacturing with an eye toward improving yields and reducing time-to-market. An effort was made to better integrate technology development and production. Multidimensional technology-development teams were formed involving personnel from all areas of the company to introduce concerns of production and marketing at the beginning of the technology development cycle. U.S. firms also set up "development facilities" in which product development, pilot production, and volume production could occur within the same physical facility.

These changes in product mix and manufacturing practices have brought about a dramatic turnaround in the international competitiveness of U.S. semiconductor firms. The U.S. share of worldwide semiconductor sales has risen from 37 percent in 1989 to 50 percent in 2000.

TABLE 2
DISTRIBUTION OF ELECTRONICS EMPLOYMENT ACROSS STATES
(Percent of National Totals)

State	Total Nonfarm Employment	NAICS 334	NAICS 3341	NAICS 3342	NAICS 334413	NAICS 3344 less 334413	NAICS 3345
Arizona	1.62	2.85	0.69	2.37	9.06	2.59	2.16
California	10.71	23.34	28.29	24.21	27.26	22.11	19.21
Colorado	1.61	2.38	4.29	1.12	2.49	2.27	2.56
Illinois	4.71	4.51	1.09	10.48	0.20	5.47	3.52
Massachusetts	2.54	6.21	3.33	7.74	4.77	5.07	8.86
Minnesota	2.03	3.58	7.15	1.85	1.02	3.85	4.06
New York	6.57	5.08	5.18	5.05	3.92	6.21	4.95
North Carolina	2.98	3.01	8.05	2.80	0.90	3.75	1.02
Oregon	1.25	2.22	4.94	0.77	4.18	1.76	1.56
Pennsylvania	4.40	3.63	1.33	3.42	3.97	4.57	3.61
Texas	7.02	7.98	6.03	7.52	19.11	6.13	6.33
Washington	2.05	2.72	2.96	1.08	1.56	1.38	5.28

Sources: 1997 Economic Census, Bureau of Labor Statistics

TABLE 3
SHIFTS IN THE STATE DISTRIBUTION OF U.S. SEMICONDUCTOR EMPLOYMENT

	1997		1987		1977	
State/County	Level	Share	Level	Share	Level	Share
Arizona	18,100	9.1	19,900	10.8	14,300	12.5
California	54,600	27.6	58,600	31.7	33,300	29.2
Santa Clara County	36,000	18.2	41,900	22.7	25,600	22.5
Massachusetts	9,400	4.7	11,600	6.3	4,700	4.1
New York	7,800	3.9	16,800	9.1	12,700	11.1
Oregon	8,300	4.2	2,100	1.1	300	0.3
Pennsylvania	7,900	4.0	9,700	5.3	10,600	9.3
Texas	37,100	18.7	19,600	10.6	19,500	17.1
Other States	54,900	27.7	46,300	25.1	18,600	16.3
United States	198,100	100.0	184,600	100.0	114,000	100.0

Source: Census of Manufactures

SHIFTING EMPLOYMENT

Table 3 provides information on changes in the state distribution of U.S. semiconductor employment that have taken place over the past three decades. States shown are those that were among the top five states in terms of semiconductor employment in at least one of the three decades. Because of its importance to the national industry, Santa Clara County (Silicon Valley) is reported separately from the rest of California.

According to the product life cycle theory, as an industry matures and its products and processes become standardized, production will move away from the core centers of innovation and relocate to developing countries and low-wage non-metropolitan regions within the source country. Shifts in the international distribution of semiconductor manufacturing, e.g., the rising importance of South Korea, Taiwan, and other Asian countries as producers of commodity and memory chips, are very much in line with the logic of the theory. During the 1970s and much of the 1980s, U.S. semiconductor manufacturing also began to follow the life cycle patterns expected of a maturing industry. Semiconductor employment became more dispersed across U.S. states. California, Texas, Arizona, New York, and Pennsylvania, which had 79 percent of semiconductor employment in 1977, accounted for only 48 percent of the industry's employment growth from 1977-1987. Texas, in particular, was hit hard by the loss of the memory market to Japanese firms, and its share of national semiconductor employment fell from 17 percent to 11 percent. Many of the new plants designed to produce higher-value integrated circuits were sited in Western states such as Oregon, Washington, Utah, and Colorado.

The product life cycle model describes the patterns of industrial location in mass production industries that compete on the basis of manufacturing costs. Competition based on continuous innovation, however,

undermines the logic of this process. The strategic focus in industries that continually create new products and applications is on time-to-market, not product cost. Because their product life cycles are short, high-tech industries sometimes never experience geographic dispersal. The medical instruments industry, for example, never left the innovation phase of the product life cycle model. Firms that manufacture medical instruments specialize in small volume products and have remained concentrated in historically significant locations.

The U.S. semiconductor industry now seems to be following a similar pattern. As the industry began to restructure in the late 1980s, dispersal of employment slowed considerably. States other than the top seven listed in Table 3 collectively gained only 2½ points of employment share from 1987-1997, after experiencing a rise in share of almost 9 points from 1977-1987. There has been a notable decline in Silicon Valley's level and share of national employment. But, in general, the spatial integration of innovation and production that has been critical to the industry's restructuring has served to limit geographic dispersal and, in some cases, has brought production back to the core from the periphery. Texas, for example, which helped to pioneer integrated circuits and has always been a core producing state, saw its share of national semiconductor employment rise from 11 percent in 1987 to 19 percent by 1997.

PRESENT STRUCTURE

The semiconductor industry now consists of two businesses: high-volume production of memory and commodity devices and lower-volume production of design-intensive circuits using advanced design tools and flexible manufacturing technologies. U.S. firms generally have de-emphasized commodity products in favor of high-margin customized products.

The U.S. semiconductor industry is diverse. There are large manufacturers, such as Intel, Motorola and Texas Instruments, with annual shipments of over $1 billion and interests in a wide range of commodity and niche markets. The eight largest U.S. semiconductor companies account for more than half of total industry shipments. Middle-sized companies, with sales between $200 million and $1 billion, maintain advanced design and fabrication capability but are focused on a limited set of product markets and process technologies. Then there are hundreds of small companies with a very narrow product focus and shipments of less than $200 million. Many are design houses that contract out actual fabrication and assembly. Small firms account for only 10 percent of industry shipments but have been extremely important in extending technological advances to new products.

The diversity of the U.S. industry is apparent from statistics on semiconductor manufacturing in the top-producing states (see Table 4). Average payroll per employee ranges from a high of $70,000 in Santa Clara, Calif., to around $50,000 in Arizona, New York, and Texas and down to $44,000 in Massachusetts and Oregon. States with higher paying establishments presumably employ a higher percentage of engineers and a smaller percentage of machine operators.

The capital intensity of semiconductor manufacturing varies widely across states. Operations in Arizona and Oregon are highly capital intensive, as evidenced by the fact that labor's share of value-added in these states is only 5 to 10 percent. In contrast, the share of payroll in value-added is 30 percent in California and Massachusetts and 60 percent in New York.

States also differ in the average size of their establishments. Arizona, Oregon, and Texas have large manufacturing facilities, with an average of 350-450 employees per establishment. Less than 10 percent of the semiconductor employment in these states is in establishments with fewer than 250 workers. Mid-size and small establishments are more common in California, Massachusetts, and Pennsylvania.

OUTLOOK FOR SEMICONDUCTORS

With the sharp drop in spending on information technology equipment that began in the fourth quarter of last year, the demand for semiconductors has weakened considerably. The long-term outlook for semiconductors is bright, however. Growth in demand will continue to be fueled by the transition from analog to digital applications, wired to wireless communications, and an ever-increasing semiconductor content in household electronic products, automobiles, and industrial and medical devices. High value will continue to be placed on customizing electronic components for end users. Given the size of the U.S. market and the importance of close contact between chip producers and their customers, the United States should remain an important center for semiconductor development and production.

Experts also expect the pace of technological change in the industry to accelerate, not slow. The structural changes the industry went through during the past 15 years are likely to serve the industry well in the future. Competitive strategy will remain focused on continuous innovation, and the new forms of corporate organization, such as spatial integration of innovation and production, should remain viable. Given the importance of agglomeration in semiconductor manufacturing, U.S. production is likely to stay concentrated in a few key states. Arizona which already has a rich base of producers and suppliers and which continues to attract young workers should remain a top producing state.

— Kent Hill
Research Economist

TABLE 4
COMPARING SEMICONDUCTOR MANUFACTURING ACROSS STATES

State/County	*Average Payroll per Employee (in $ thous)*	*Labor's Share of Value Added*	*Employees per Establishment*	*Percent of Employees in Establishments w/ < 250*
Arizona	53.0	9.9	352	9.0
California	61.0	30.2	131	25.8
Santa Clara County	69.7	32.4	164	23.7
Massachusetts	43.9	30.6	149	27.5
New York	48.9	61.2	172	17.8
Oregon	43.1	5.1	334	8.3
Pennsylvania	48.0	10.8	143	27.2
Texas	49.3	15.8	467	6.7
United States	50.7	15.7	181	17.8

Sources: 1997 Economic Census, 1998 County Business Patterns

Second quarter building permit activity is mixed

The Arizona commercial real estate sector responded to weakening economic and market conditions with a 44 percent decline, from $1 billion in first quarter 2001 to $577 million in the second quarter. In spite of the economic news, the single-family market continued to post increases, from $1.8 billion the first quarter to $1.9 billion. This sector improved from a 52 percent share in total construction activity to 56 percent ($3.5 billion). Most of the improvement in the industrial sector is due to a single permit ($188 million) for the new Intel project in Chandler.

Phoenix was the most active area of development, with more than 21 percent of Arizona's construction market, while the 12 communities listed in Table 1 represented 76 percent of the state's recorded activity. Other areas of significant development included Tempe ($69 million), Glendale ($69 million), Avondale ($58 million), Lake Havasu City ($36 million), unincorporated Yavapai County ($44 million), and Casa Grande ($38 million).

RESIDENTIAL

In the darkening economic environment, home buyers are the single strongest light. The driving economic concern is whether the light will be extinguished when the impact of increasing job layoffs, falling consumer confidence, and a weakening economy finally catches up with the housing sector. There are many reasons for the current housing market, ranging from lingering vestiges of a good economy with commensurate consumer confidence, to home buyers taking a last chance to satisfy their housing dreams with low interest rates.

Leading areas of single-family development were Phoenix (1,522 permits), Mesa (1,192 permits), and Gilbert (1,276 permits). The West Valley communities of Surprise (888 permits), Avondale (711), Goodyear (656), and El Mirage (512) now account for nearly 30 percent of the new home market, up from last year's 23 percent.

Although down slightly from first quarter 2001, Pima County is well ahead of last year (see Table 2). Tucson authorized 635 homes; unincorporated Pima County, 607; Marana, 215; and Oro Valley, 198. The average permit value in Pima County increased from last year's $135,355 to $146,140, while in Maricopa County it rose from $137,1540 to $141,355.

Pinal County (1,004 permits) accounted for 7 percent of the state's new home market, while Mohave (544) and Yavapai (529) each represented 4 percent. In these counties the unincorporated areas are important markets, with 538 permits in unincorporated Pinal County, 228 in Yavapai and 114 in Mohave. Specific communities included Casa Grande (315), Lake Havasu City (284), Apache Junction (147), Prescott (126), and Prescott Valley (120). Average permit values were $167,170 in Prescott, $174,250 in Sedona, $144,750 in Flagstaff, $96,980 in Casa Grande, and $100,145 in Lake Havasu City.

COMMERCIAL

All of the key commercial sectors slowed in the second quarter in response to increased competition from existing projects, higher vacancies and slower rent growth. The apartment market in Maricopa County slowed but

TABLE 1
REPORTING UNITS WITH GREATEST TOTAL VALUE OF BUILDING PERMITS
Second Quarter 2001

Reporting Unit	*Value (in millions)*
Phoenix	$713
Chandler	424
Gilbert	254
Mesa	253
Scottsdale	204
Unincorporated Maricopa County	158
Tucson	133
Unincorporated Pima County	131
Surprise	104
Goodyear	101
Peoria	89
Unincorporated Pinal County	73

Source: Arizona Real Estate Center, L. William Seidman Research Institute, College of Business, Arizona State University.

TABLE 2
KEY SECTOR CONSTRUCTION ACTIVITY
Second Quarter 2001, First Quarter 2001 and Second Quarter 2000

	Single-family		COMMERCIAL						Industrial	
			Apartments[a]		Office Buildings[b]		Retail Stores[c]			
	Number of Permits	*Dollar Value (000)*	*Number of Permits*	*Dollar Value (000)*	*Number of Permits*	*Dollar Value (000)*	*Number of Permits*	*Dollar Value (000)*	*Number of Permits*	*Dollar Value (000)*
MARICOPA COUNTY										
2nd Quarter 2001	9,615	1,360,070	2,060	103,119	107	129,113	108	104,124	30	264,994
1st Quarter 2001	8,951	1,277,493	3,518	183,684	134	208,699	125	195,145	36	1,8079
2nd Quarter 2000	9,455	1,300,439	1,621	74,633	97	172,443	138	139,642	66	54,802
PIMA COUNTY										
2nd Quarter 2001	1,655	245,172	8	516	23	7,671	18	6,994	3	13,846
1st Quarter 2001	1,692	239,539	296	17,101	14	7,147	13	5,941	6	6,252
2nd Quarter 2000	1,503	203,437	225	9,028	26	7,871	22	10,892	3	1,042
REST OF ARIZONA										
2nd Quarter 2001	3,006	3,30,373	97	2,003	38	9,144	42	16,713	22	11,139
1st Quarter 2001	2,592	2,77,816	66	4,987	32	6,272	39	25,977	13	3,220
2nd quarter 2000	2,550	2,76,205	134	6,163	29	5,053	43	15,770	22	4,955
ARIZONA TOTAL										
2nd Quarter 2001	14,276	1,935,615	2,165	105,638	168	145,928	168	127,831	55	289,979
1st Quarter 2001	13,235	1,794,848	3,880	205,772	180	222,118	177	227,063	55	27,551
2nd Quarter 2000	13,508	1,780,081	1,980	89,824	152	185,367	203	166,304	91	60,799

[a] Five or more housing units [b] Office, bank, medical and professional buildings [c] Shopping centers and other mercantile buildings

Source: Arizona Real Estate Center, L. William Seidman Research Institute, College of Business, Arizona State University, from U.S. Department of Commerce, Bureau of the Census, *County Business Patterns*, 1998.

was still active, with 1,077 units in Phoenix, 328 in Mesa and 256 in Gilbert. The office market is well below the activity of first quarter 2001 and last year (see Table 2). Although Phoenix led all areas at $51 million, the single largest permit ($19 million) was issued by Tempe for Hayden Ferry Lakeside I. Office building development included Scottsdale ($21 million) and Chandler ($17 million). Retail activity also slowed, with $47 million in Phoenix, followed by $20 million in Chandler and $12 million in Tempe. Remodeling of existing space totaled $60 million, with $8 million in Tempe and $32 million in Scottsdale. Permits for development of parking garages totaled $48 million (including $32 million in Phoenix and $14 million in Tempe).

Although extremely limited (see Table 2), all apartment activity in Pima County occurred in Tucson. Office building activity was reported in Tucson ($4 million), unincorporated Pima County ($3.1 million), and Sierra Vista ($2.7 million). Primary areas of retail development were Tucson ($5.6 million), Apache Junction ($3.6 million), Lake Havasu City ($3.3 million), and Yuma ($2.4 million).

In the hotel/motel sector, only $17 million in new projects was authorized; the most active area was unincorporated Pinal County ($7.7 million).

INDUSTRIAL AND OTHER

The current Intel project is dominating the industrial sector with a quarterly total of $246 million, or 93 percent of the authorized industrial development in Maricopa County. Tucson issued a single permit for $13.5 million, followed by Casa Grande with one at $3.3 million.

Construction of educational and other public facilities improved from $35 million in first quarter 2001 to $74 million, with $14 million recorded in Queen Creek. The single largest permit was issued by Phoenix, valued at $100 million for Maricopa County's adult detention center.

LOOKING AHEAD

The single-family home has always been the icon for family security; now it seems to represent investment security. While the stock market has been volatile, people have seen their homes steadily appreciate. Thus, one of the factors driving the continuing strong housing market is that people are using this appreciation to buy new homes. Further, people have bought homes as vacation and rental properties. While the economy continues to weaken, as long as there is some growth and interest rates stay low, home buyers will remain active in satisfying both family and investment security.

In contrast, the commercial development market appears to be taking the full brunt of the weakening economy and real estate market. With increasing vacancy rates and mounting concerns about the viability of many companies, there is little incentive to build new projects, whether office or retail. If not for the Intel project, total activity for the industrial sector in Maricopa County would have only been $19 million. Thus, the health and direction of the local economy will continue to be watched closely by commercial and residential developers.

— Jay Q. Butler
Director
Arizona Real Estate Center

TABLE 3
ARIZONA HOUSING UNITS AUTHORIZED
Second Quarter 2001

	One Family	*Mobile Homes*	*Duplex*	*3-4 Family*	*5 or More*	*Total*
MARICOPA COUNTY	9,615	305	36	112	2,060	12,128
% Change, Previous Year	-4	-29	13	-15	27	-1
% Change, Previous Quarter	7	8	-31	20	-41	-6
PIMA COUNTY	1,707	399	14	33	9	2,161
% Change, Previous Year	14	35	-73	-37	-96	2
% Change, Previous Quarter	0	113	-13	–	-97	-2
REST OF ARIZONA	3,006	979	46	16	96	4,144
% Change, Previous Year	18	-12	-15	-30	-28	7
% Change, Previous Quarter	16	-4	-23	-48	45	10
TOTAL, ARIZONA	14,328	1,683	96	161	2,165	18,433
% Change, Previous Year	1	-11	-30	-22	5	0
% Change, Previous Quarter	8	13	-25	30	-44	-2

Note: A dash indicates that a percent change could not be calculated because at least one period had no activity.

TABLE 4
ARIZONA BUILDING PERMITS
Second Quarter 2001

	Residential*		**Commercial**		**Industrial**		**Other**		**Total**	
	Number of Permits	*Dollar Value (000)*	*Number of Permits*	*Dollar Value (000)*	*Number of Permits*	*Dollar Value (000)*	*Number of Permits*	*Dollar Value (000)*	*Number of Permits*	*Dollar Value (000)*
MARICOPA COUNTY	12,062	1,414,939	900	481,206	30	264,994	10,962	474,664	23,954	2,635,803
% Change, Previous Year	-4	2	-8	-10	-55	384	2	-14	-2	4
% Change, Previous Qtr.	5	6	-21	-48	-17	1,366	16	29	8	0
PIMA COUNTY	2,856	262,666	293	39,375	3	13,846	1,536	27,492	4,688	343,379
% Change, Previous Year	2	20	62	-9	0	1,229	69	-58	21	4
% Change, Previous Qtr.	9	4	-16	-31	-50	121	61	30	19	2
REST OF ARIZONA	5,968	386,450	355	55,944	22	11,139	1,987	40,403	8,332	493,936
% Change, Previous Year	-4	13	-30	-30	0	125	0	20	-5	7
% Change, Previous Qtr.	9	16	-13	6	69	246	0	2	6	15
ARIZONA TOTAL	20,886	2,064,055	1,548	576,525	55	289,979	14,485	542,559	36,974	3,473,118
% Change, Previous Year	-4	5	-8	-15	-40	377	5	-17	-1	4
% Change, Previous Qtr.	7	8	-18	-44	0	953	17	27	9	2

* Includes mobile homes

Source (Tables 3 and 4): Arizona Real Estate Center, L. William Seidman Research Institute, College of Business, Arizona State University.

Leading Index dips in August after 3-month climb

The Bank One Arizona Index of Leading Economic Indicators declined in August to 111.3. The number was 0.3 percent below the 111.6 number for July, and 0.7 percent above the previous August's 110.5 (1987 = 100).

Production, sensitive materials prices, materials inventories, employment from the Purchasing Managers Survey, hours worked in manufacturing and new orders were positive. The inflation-adjusted value of money supply M2 and Maricopa County residential building permits were negative.

ANALYSIS

The Leading Index is meant to forecast the course of the economy based on the direction of certain indicators before that same movement is reflected in the economy as a whole. The index cannot reflect the impact of unexpected events, such as that of the Sept. 11 terrorist attack. We recognize that the true significance of Sept. 11 is non-economic, and join the rest of America and the world in support of the victims and their families, as well as the survivors of the attack.

The economic picture before the attack as portrayed by the index was of an economy at or near the bottom poised to improve in the near future. The faint signs of an improving economy suggested that by the first of the year, some good news might be in view.

Unfortunately, the picture painted by the index is no longer accurate. The third quarter will be significantly affected. The disruption of the air traffic system for days cost the airlines, and other industries heavily dependent on air travel, many millions of dollars. Economic activity throughout the U.S. dipped in the days following the tragedy.

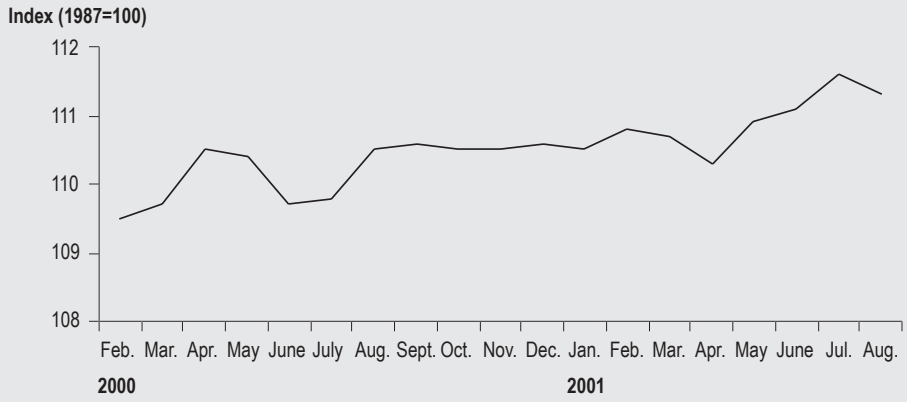
The impact on the national economy will be considerable; Arizona also will feel the effects, on a lesser scale.

(The July index, along with an expanded analysis, can be found on the Web at www.cob.asu.edu/seid/eoc/azli/.)

— Tracy Clark
Senior Economist
Bank One Economic Outlook Center

FIGURE I

ARIZONA INDEX OF LEADING ECONOMIC INDICATORS



Source: Bank One Economic Outlook Center, L. William Seidman Research Institute, College of Business, Arizona State University.

Arizona Purchasing Managers Index falls in August

The seasonally adjusted Arizona Purchasing Managers Index fell to 41.4 in August from 45.2 the previous month. An index reading of over 50 indicates that the local economy is growing, while a reading below 50 suggests a slowdown in the overall level of economic activity in the near term.

ANALYSIS

The index began to show signs of recovery in July, but slumped again in August as news from the rest of the nation worsened. Mainly production and employment appear affected, not unexpected in this type of slowdown. Typically, the index has been more reliable in forecasting economic bad times than recovery from recession or slowdown.

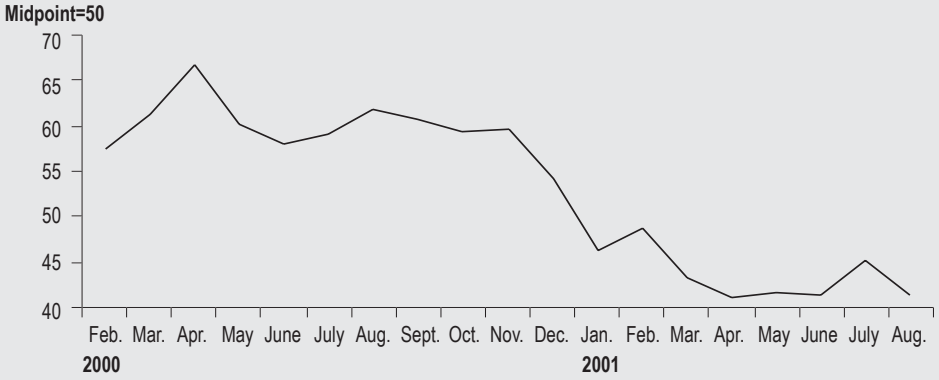
The sub-index of New Orders had risen significantly in July and held on to most of its gains in August, falling just 1.5 points to 44.5. Employment fell to 39.5, close to the June level, from 48.7 in August. Production fell to 39.8 from 48.7 the previous month, reaching the lowest level of production seen since June 1982. The Employment sub-index at that time was 31.2, far below the current level.

The Price Index fell slightly, to 45.0 in August from 44.9 in July. This indicates no upward pressure on prices. A reading has not been this low since April 1975. The highest level reached by the Price Index was 95.5 in December 1973 and the lowest was 41.4 in October 1962.

— Dawn McLaren
Research Economist
Bank One Economic Outlook Center

FIGURE I

ARIZONA PURCHASING MANAGERS INDEX*



*Excludes Price Index

Source (Table 1 and Figure I): Bank One Economic Outlook Center, L. William Seidman Research Institute, College of Business, Arizona State University.

College of Business

AZB/ARIZONA BUSINESS

Larry Edward Penley, Dean
Timothy D. Hogan, Center Director
Nancy A. Maneely, Editor

AZB/ARIZONA BUSINESS (ISSN 1079–4255) is published monthly by the Center for Business Research, L. William Seidman Research Institute, College of Business, Arizona State University, PO Box 874011, Tempe, AZ 85287–4011; phone (480) 965–3961. Annual fee: $18 per year to Arizona residents, $24 per year out-of-state, $30 per year foreign. Checks must be made payable to ASU Foundation, a separate non-profit organization which exists to support ASU. Your payment is not considered a charitable contribution. Fees will be applied to the printing and mailing of AZB/ARIZONA BUSINESS, which is not printed or mailed at state expense. Periodicals postage paid at Tempe, Arizona. POSTMASTER: Send change of address to AZB/ARIZONA BUSINESS, Center for Business Research, College of Business, Arizona State University, P.O. Box 874011, Tempe, AZ 85287–4011.

AZB/ARIZONA BUSINESS is also available online at: www.cob.asu.edu/seid/cbr.

ARIZONA ECONOMIC INDICATORS

	Month or Quarter	Current Value	Previous Value	Percent Change Previous Period	Percent Change from Year Ago	Year-to-Date Value	Year-to-Date Percent Change from Year Ago
LEADING ECONOMIC INDEX (1987 = 100)							
Arizona	July	111.6	111.1 r	0.5	1.6	NA	NA
PURCHASING MANAGERS INDEX							
Arizona	August	41.4	45.2	-8.4	-32.9	NA	NA
BUILDING PERMITS (Thousands of $)							
Maricopa County	July	745,720	1,027,447	-27	5	6,020,054	14
Pima County	July	129,917	100,327 r	29	30	810,085	5
Balance of State	July	156,160	162,958	-4	-4	1,079,153	2
Arizona	July	1,031,797	1,290,732 r	-20	6	7,909,292	11
TOTAL HOUSING UNITS AUTHORIZED							
Maricopa County	July	3,405	4,144	-18	5	28,430	3
Pima County	July	697	737 r	-5	28	5,068	1
Balance of State	July	1,217	1,430	-15	9	9,131	2
Arizona	July	5,319	6,311 r	-16	8	42,629	2
HOME SALES							
Maricopa County - Number	July	10,660	9,540	11.7	8.3	60,720	3.3
Maricopa County - Median Price($)	July	139,000	139,000	0	5.2	136,000	4.6
HOUSING AFFORDABILITY INDEXES							
Metropolitan Phoenix - New Homes	2nd Quarter	98	98	0	10.1	NA	NA
Metropolitan Phoenix - Resale Homes	2nd Quarter	113	117	-3.4	9.7	NA	NA
MORTGAGE RATES (30-year Fixed)							
Maricopa County	August	6.7	6.8	-1.5	-11.8	NA	NA
POPULATION ESTIMATES (Thousands)							
Maricopa County	*(The population estimates will be updated in January 2002.)*						
Arizona							
RETAIL SALES (Millions of $)							
Maricopa County	July	2,293	2,604	-11.9	2.2	17,671	2.7
Arizona	July	3,411	3,777	-9.7	3	25,799	2.9

Note: The above figures reflect the latest data available as of date of publication and are subject to revision.

NA = Not Applicable r = Revised

Source: Center for Business Research, Arizona Real Estate Center, and Bank One Economic Outlook Center, affiliates of the L. William Seidman Research Institute, College of Business, Arizona State University. Retail sales data are from the Arizona Department of Revenue.