



# A COMPARISON OF ARIZONA TO NATIONS OF COMPARABLE SIZE

**July 2009**

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## SUMMARY

Arizona is compared to the 11 nations with the highest gross domestic product (GDP) per capita that have a population of between four million and 10 million: Austria, Denmark, Finland, Ireland, Israel, New Zealand, Norway, Singapore, Sweden, Switzerland, and the United Arab Emirates.

Population growth in Arizona is much higher than in most of the comparison nations and lower than only the United Arab Emirates (UAE). Net migration to Arizona has been consistently higher than to each of the comparison nations except the UAE. Net natural increase in Arizona also has been higher than in most of the comparison group.

Arizona's share of the population of working age is lower than in each of the comparison nations except Israel. Arizona has the second-highest share of children; its share of senior citizens is below the comparison group median.

Educational achievement, as measured by test scores, appears to be lower in Arizona than in all but one (Israel) of the nine nations with data. In contrast, the educational attainment of the working-age population, defined as the percentage with at least an associate's degree, is higher in Arizona than in each of the nine nations with data. However, some of these nations are catching up to Arizona.

Education spending as a share of GDP, adjusted for the share of children in the population, is below the norm of the comparison group in Arizona. Only Ireland, Singapore, and the UAE spends less than Arizona.

Arizona has a relatively low labor force participation rate and a low employment-to-population ratio—calculated relative to both the entire population and the working-age population. Arizona's gains in these measures have been substandard since the early 1990s. However, the large and rising number of undocumented immigrants working in "unofficial" jobs in Arizona likely contributes to these low figures.

On two measures of income, Arizona ranks above the middle of the comparison group. However, its gains over time have been subpar.

The poverty rate in Arizona is higher than that of each of the eight nations with comparable data. Similarly, it appears that income inequality in Arizona is greater than in each of these nations.

In the 1991-to-2001 economic cycle, only one of the comparison nations had a greater gain in inflation-adjusted GDP than Arizona, and only two countries posted greater increases in real GDP per capita and real GDP per employee. In contrast, in the current economic cycle, Arizona's real GDP gain was less than that of four nations. Arizona's real GDP per capita growth was the least and Arizona was among the lowest on real GDP per employee gains.

Despite the slower growth in recent years, Arizona still ranks relatively high on GDP per capita and GDP per employee. Arizona's per capita figure in 2008 was higher than that of six nations and its 2007 per employee figure exceeded seven of the 10 nations with these data.



## INTRODUCTION TO DATA AND METHODOLOGY

The purpose of this project is to summarize the Arizona economy and its trends over the last 25 years, compared directly to 10 nations with a population of between 4-and-10 million people.

The first step was to select the comparison nations. Eleven nations were considered to be suitable for comparison. Comparable data are not available for all 11 nations for all indicators, so none of the 11 was dropped from the analysis.

The next step was data collection. Because of the strong influence of economic cycles, data collection went back to 1982, the end of a recession in the United States and in many other countries. Other recessions ended in 1991 and 2001; the ongoing recession likely will end during 2009. The latest data vary by indicator, generally from 2006 through 2008. The change over time in many of the indicators is expressed by economic cycle: 1982-1991, 1991-2001, and 2001-date.

### Selection of Comparison Nations

Approximately 40 nations have a population of between 4 million and 10 million residents (Arizona's population is about 6.5 million and rising rapidly). Of these 40, most are developing nations with a standard of living, as measured by gross domestic product (GDP) per capita, far less than that of Arizona. GDP per capita is the most widely used measure to compare living standards across nations. GDP per employee is a better measure of economic efficiency, but employment estimates are not available for all nations.

**TABLE 1**  
**SUMMARY OF ARIZONA AND 11 COMPARISON NATIONS**

|                         | Population<br>in 2008 (in<br>millions) | Population<br>Growth<br>From 2001<br>to 2008 | GDP Per<br>Capita in<br>2008 | GDP Per<br>Employee in<br>2007 | OECD<br>Country |
|-------------------------|--|--|------------------------------|--------------------------------|-----------------|
| Arizona                 | 6.5                                    | 23%  | \$38,289                     | \$87,834                       |                 |
| Norway                  | 4.8                                    | 6  | 56,258                       | 105,902                        | Yes             |
| Ireland                 | 4.3                                    | 11   | 43,891                       | 90,345                         | Yes             |
| Switzerland             | 7.7                                    | 6  | 41,274                       | 74,429                         | Yes             |
| Singapore               | 4.8                                    | 17   | 40,322                       | 102,490                        | No              |
| Austria                 | 8.4                                    | 4  | 38,825                       | 77,439                         | Yes             |
| Sweden                  | 9.2                                    | 4  | 36,769                       | 73,338                         | Yes             |
| Denmark                 | 5.5                                    | 2  | 36,442                       | 71,284                         | Yes             |
| Finland                 | 5.3                                    | 2  | 36,401                       | 74,703                         | Yes             |
| United Arab<br>Emirates | 5.6                                    | 61   | 28,623                       | na                             | No              |
| Israel                  | 7.3                                    | 13   | 27,499                       | 70,446                         | No              |
| New Zealand             | 4.3                                    | 10   | 26,800                       | 52,715                         | Yes             |

na: not available

Sources: The Economist Intelligence Unit (nations) and U.S. Department of Commerce, Bureau of Economic Analysis (Arizona).

The 11 nations with the highest GDP per capita were selected as the comparison group. Five had a GDP per capita greater than Arizona's \$38,600 in 2008 (see Table 1). Six had a lesser GDP per capita, but within \$12,000 (30 percent) of Arizona's figure. The next highest GDP per capita was several thousand dollars lower and 25 years of history do not exist for that nation (Slovakia).

Thus, the 11 nations with comparable numbers of residents that have a GDP per capita figure relatively close to the Arizona figure are examined in this report. Seven of the 11 nations are in Europe, two are in the Middle East, and two are in the Pacific. In Table 1, these 11 nations are compared to Arizona on a few key indicators. GDP per capita is between \$36,000 and \$44,000 in seven of the countries and in Arizona. GDP per employee is between \$70,000 and \$78,000 in six of the countries; Arizona's figure is \$10,000 higher than the top of this range.

Most of these nations are experiencing very slow rates of population growth relative to Arizona. Almost all of the nations of similar population size whose population is growing at rates similar to Arizona are Third-World countries with a GDP per capita only a fraction of that of Arizona. The United Arab Emirates is an exception, with population growth faster than in Arizona and a standard of living not too far below that of Arizona.

### **Collection of Data**

The compilation of comparable data across nations is a significant undertaking, made even more difficult by the desire to build a dataset that included 25+ years of data. Multiple sources were employed, most notably:

- The Economist Intelligence Unit, generally the best source for time series economic data.
- The Organisation for Economic Co-operation and Development (OECD), whose data are limited to its member nations (including eight nations in the comparison group—see Table 1) plus Israel.
- The United Nations.
- The World Bank.

More than one source provided time series data for some indicators. Usually, the data reported were similar but not exactly the same, though considerable differences existed in a few cases.

For many indicators, data were not available for the entire time period for every country. Some indicators are not available at all for a few countries, most frequently the United Arab Emirates and Singapore.

In some cases, data for Arizona was directly comparable to that collected for the nations. In many cases, however, in order to compare Arizona to the other nations, an intermediate step was required: the available Arizona data were compared to the United States data using the same definition, then the United States data based on this definition were compared to the U.S. data collected by the international organization. (Data for the United States as well as the comparison nations were collected for all indicators.) In some cases, the internationally reported data for the United States were so different from the domestically collected data that a precise relationship between Arizona and the comparison nations could not be formed.

## **OVERVIEW OF COMPARISON NATIONS**

This section includes a qualitative assessment of the economy of each nation, drawn from *The World Factbook* produced by the Central Intelligence Agency of the United States.

### **Austria**

With a land area just 28 percent that of Arizona, Austria's population is about 1.9 million higher. The median age of its residents is the highest of the comparison nations; this contributes to the lowest net natural increase (births less deaths) among the comparison nations and little overall population growth.

GDP per capita and per employee are in the middle of the comparison nations. GDP per capita is slightly higher than in Arizona but GDP per employee is lower. Austria has a well-developed market economy with close ties to other European Union members. It needs to restructure its economy to be more knowledge based. With an aging population, it needs to increase its labor force participation rate, which is the second lowest of the 11 nations.

### **Switzerland**

Switzerland's land area is just half that of neighboring Austria, but its population is nearly as large. Switzerland also has a relatively old population, but net natural increase and population growth are not as low as in Austria.

GDP per capita is third highest of the 11 nations, higher than in Arizona, but GDP per employee ranks sixth, less than in Arizona. Switzerland has a modern market economy focused on financial services and high-technology manufacturing. It has a highly skilled work force.

### **Denmark**

About the same size as Switzerland, Denmark's population is not as large. Though its populace is not quite as old, its net natural increase and population growth are among the lowest of the comparison group. Considering the number of residents that are of school age, Denmark's expenditures for education are relatively high.

GDP per capita and per employee in Denmark are just below the median of the 11 nations and lower than in Arizona. Denmark also has a modern market economy, focused on foreign trade, but government plays a larger role than in Switzerland. Denmark faces a challenge with a declining ratio of workers to retirees. It is the only comparison nation to experience a decline in its labor force participation rate in the current economic cycle.

### **Norway**

Norway is one of three nations with a land area greater than Arizona. The area of Norway is 7.5 times that of Denmark, but its population is lower; Norway has the lowest population density among the comparison nations. Though the median age of its residents is the lowest of the six continental European countries, it still is higher than that of Arizona. Though still low by international standards, it has the highest net natural increase among the six continental European nations. Net migration has recently increased and is expected to remain higher than in the past. Considering the number of residents that are of school age, Norway's expenditures for education are the highest of the comparison group.

Norway has the highest GDP per capita of the comparison nations by a substantial margin and also the highest GDP per employee. It has a substantial quantity of natural resources, including oil. Its economy is described as welfare capitalism featuring both free-market forces and government intervention.

### **Finland**

Finland is the same size as Norway but has a somewhat larger population. Along with Austria, its populace has the highest median age among the comparison group. Finland has low rates of net natural increase and net migration; its population growth is the slowest in the comparison group.

GDP per capita and per employee are near the median of the 11 nations, each less than in Arizona. Finland has an industrialized free-market economy that relies on trade.

### **Sweden**

Sweden is the largest of the European comparison nations, both in terms of area and population. It has the highest proportion of senior citizens, though its median age is a bit less than in Finland and Austria. Its net natural increase and population growth are low. Considering the number of residents that are of school age, Sweden's expenditures for education are relatively high.

Sweden's GDP per capita and per employee are near the median of the comparison group, less than in Arizona. Sweden's economy features high-technology capitalism and welfare. It already has begun reforms to boost employment, reduce welfare dependency, and reduce the role of the state.

### **Ireland**

Ireland has the smallest population of any of the comparison nations and one of the smaller land areas. Its median age is less than that of the other European countries, about equal to that of Arizona. However, since it has lesser proportions of children and senior citizens than Arizona, Ireland's percentage of the population that is of workforce age is a little higher than in Arizona. Ireland's rates of net natural increase and net migration are greater than in the other European comparison nations and have climbed since the early 1990s.

Ireland's GDP per capita and per employee are near the top of the comparison group. Ireland has a modern trade economy with many multinational companies. It experienced rapid economic growth overall, per employee, and per capita for more than a decade, but like most nations it currently is mired in recession.

### **New Zealand**

The population of New Zealand is nearly identical to that of Ireland, but New Zealand's land area is much larger, nearly as large as Arizona. New Zealand's median age is slightly higher than that of Ireland and Arizona. Its rate of net natural increase is less than in Ireland, but more than in the other European countries, and its net migration rate has recently slipped to comparable to the other European countries. Considering the number of residents that are of school age, New Zealand's expenditures for education are relatively low, one of three comparison nations with a figure lower than in Arizona.

New Zealand's GDP per capita and per employee are the lowest in the comparison group, with GDP per employee considerably less than each of the other nations. Over the last 20 years, the country is transforming from an agrarian-based economy to a free-market economy. Typically, such a transformation is accompanied by rapid economic growth as a nation catches up to more developed nations. However, New Zealand's economic growth rates overall and per person have only been in the middle of the comparison group and GDP per employee has lagged behind. The country needs to improve its productivity and infrastructure.

### **Singapore**

Based on area, Singapore is tiny relative to the other comparison nations. Yet its population is similar to that of several of the comparison nations; its population density is nearly 20 times higher than the next densest comparison country. Though the median age is only slightly less than that of most of the European nations, a low percentage of Singapore's residents are of retirement age. The share of its populace of working age is considerably higher than that of Arizona and each of the comparison nations except for the UAE. Net migration also is higher than that of each country except the UAE. Net natural increase has dropped significantly. Singapore spends the second least on education as a share of GDP.

Singapore has experienced strong economic growth during the last two economic cycles. Its GDP per capita ranks fourth among the comparison nations and GDP per employee is second to Norway. Singapore has a highly developed free-market economy focused on exports. Its goal is to become a financial and high-tech hub less vulnerable to global demand cycles.

### **Israel**

Israel is a small country, with an area less than in each of the comparison nations except Singapore. Its population density is the highest except for Singapore. With a median age the lowest of the comparison countries, Israel has the highest proportion of children and the lowest share of working age. Israel's net natural increase is the highest of the comparison nations but its once high net migration has slowed considerably. Considering the number of residents that are of school age, Israel's expenditures for education are relatively low, one of three comparison nations with a figure lower than in Arizona.

Israel's GDP per capita and per employee are second lowest in the comparison group. Israel has a technologically advanced economy marked by substantial government participation. It runs a large trade deficit. Structural reforms and fiscal policy has induced strong growth overall, but not per capita or per employee.

### **United Arab Emirates**

The UAE has an area much less than Arizona. Its population density is more than twice that of Arizona. Among the comparison nations, the median age of UAE's residents is second lowest. Hardly any senior citizens live in the country and its proportion of children is at the median of the comparison group; the proportion of the population of working age is the highest of the comparison nations by a wide margin.

With the second-highest birth rate and the lowest death rate, the net natural increase is second highest. Its net migration rate, the highest in the world, is by far the highest of the comparison



nations and a little higher than the Arizona average. Thus, its population growth is by far the highest of the comparison nations, and higher than in Arizona.

Less than one-fifth of the nation's residents are citizens. Half of the population immigrated from southern Asia. Considering the number of residents that are of school age, the UAE's expenditures for education are very low, far lower than in Arizona. Only 78 percent of the residents are literate.

Despite the highest GDP growth in the comparison group, the UAE had the lowest growth per capita in each of the last two economic cycles. GDP per capita is low, though a little higher than in Israel and New Zealand. Growth was spurred by the discovery of oil reserves more than 30 years ago, but the open economy has diversified and features strong trade surpluses. The country's dependence on oil and an expatriate workforce are challenges. The UAE is working to attract foreign investors, improve education, and increase the private-sector employment of its citizens.

### **COMPARISON OF ARIZONA TO 11 NATIONS**

Arizona's total area of 295,254 square kilometers is smaller than the area of three of the countries: Sweden is considerably larger while Finland and Norway are slightly larger. New Zealand is a little smaller. The other seven countries are much smaller: their land area is only 28 percent or less of Arizona's area. Singapore consists of only 693 square kilometers.

#### **Population**

Arizona's estimated population of 6.5 million in 2008 is above the median of the 11 nations, with Sweden, Austria, Switzerland, and Israel having a greater number of residents. Arizona's population density is below the median. The population density in four countries is near that of Arizona's 22 people per square kilometer. However, the density is between 50 and 60 in Ireland and the United Arab Emirates, near 100 in Austria and Denmark, 184 in Switzerland, 348 in Israel, and 6,721 in Singapore.

Arizona's population growth rate varies widely with the economic cycle, but has averaged close to 3 percent per year. Population growth is greater only in the UAE, and is far less in most of the comparison nations.

Net migration is one component of population growth. For the comparison nations, it equates to net immigration from other countries. In the case of Arizona, in addition to net immigration, net domestic migration from other U.S. states is included. In nearly every year since the early 1980s, the net migration rate to Arizona has been higher than that of each of the comparison nations except the UAE. Though migration rates go up and down with the economic cycle, the rates in the UAE and Arizona have not shown any trend since the early 1980s.

While generally positive, net migration usually is minimal to the European nations, though Ireland has experienced strong net migration since 2000. Singapore's strong net migration during the 1980s and 1990s has since slowed. Israel had substantial net migration during the 1990s, exceeding the Arizona figure in two years.

The other component of population growth is net natural increase: the difference between births and deaths. The rate of net natural increase in Arizona is higher than that of most of the comparison countries. In recent years, only the UAE and Israel have had higher rates. The rates are considerably lower in the European countries. Arizona's crude birth rate in recent years has been higher than in any of the comparison nations except Israel. Its crude death rate is less than the median of the comparison group; Israel, New Zealand, Singapore, and the UAE have lesser rates.

The UAE's higher population growth rate is due to both a greater pace of net natural increase and a higher net migration rate. The projected rate of population growth in Arizona is considerably higher than that of each of the countries for which projections are available, but this list excludes the UAE and Singapore. Arizona's population is projected to exceed that of each of the other nine nations before 2030.

### **Demographics**

The age distribution of Arizona's population is different from that of most of the comparison group by having a high share of children—22 percent, second only to Israel—and a lower-than-average share of working age (defined as 15 through 64)—65 percent, second lowest to Israel. In most of the comparison nations the working-age share is only a little higher than in Arizona, but the share is much higher in Singapore and the UAE.

The median age of residents in most countries is higher than Arizona's 35 years, ranging as high as 42 in Austria and Finland. In contrast, the median age is only 29 in Israel and 30 in the UAE. Hardly anyone in the UAE is of retirement age, while the youth and elderly shares are both low in Singapore. In most of the European countries, the youth share is low relative to Arizona while the retiree share is high.

In each of the nations except Denmark, the share of the population less than 15 years old is shrinking, but the decline in Arizona has been minimal. After rising in the 1990s, the share of the population between 25 and 54 years of age—prime working age—is falling in most countries. The exceptions are the UAE and Ireland. Arizona's increase in this age group during the 1990s was relatively small, but the decrease since 2000 also is not as large as in the average nation.

Though Arizona frequently has been associated with a large share of retirees, its proportion aged 65 or older is typical of the United States and of the comparison nations. With the exception of Finland and Singapore, the percentage of retirement age has changed little since 1990. However, this is about to change, with large increases projected in coming decades in all of the comparison countries with projections (data are not available for Singapore and the UAE). The projected increase in Arizona is below average (only Sweden is projected to have a lesser increase in retirement-age share), so that Arizona's retirement share also will fall to below average.

### **Education**

Literacy is at least 98 percent in each comparison country except Singapore (92 percent) and the UAE (only 78 percent). The PISA test, taken every three years by those 15 years old, is used to compare educational achievement across countries. Data are not available for Singapore or the UAE.

The United States compares poorly to the nine comparison countries on the PISA test, with its most recent scores on the reading, mathematics, and science portions of PISA each higher than only one or two of the nine countries. The U.S. scores fell relatively to the comparison group between 2000 and 2006. Finland had the highest scores, and Israel the lowest, on each of the three subjects.

PISA scores are not available for Arizona, so it is necessary to compare Arizona to the United States on other measures of educational achievement in order to compare to the nine comparison nations that participate in the PISA test. On various measures of achievement, Arizona's students rank from around the middle to near the bottom of the U.S. states. Thus, Arizona's educational achievement appears to be inferior to each of the nine comparison countries except Israel.

Three measures of education expenditures—as a share of gross domestic product, as a share of gross national income, and as a share of all government spending—can be compared across countries. However, each measure is spotty in its coverage of countries and years.

As a share of GDP, Arizona's expenditures for education are considerably greater than those in Singapore and the UAE and slightly higher than those in Ireland, both before and after adjusting for the share of children in the population. Adjusted for the share of children in the population, Denmark expends the most, followed by the other Scandinavian countries.

As a share of gross national income (personal income in Arizona), Arizona ranks nearly as low. A direct comparison to the nations cannot be made as a share of total government expenditures since the national data includes federal spending. The United States ranks poorly on this measure while state and local government expenditures for education in Arizona are a little less as a share of the total than the national average. So, it appears that Arizona's expenditures also are low on this measure. The ranks are different on this measure, with the share the highest in the UAE (the UAE is lowest on the other two measures). Denmark and Sweden rank in the middle.

While less than the U.S. average, the educational attainment in 2000 of Arizona's population of ages 25 to 64 compared favorably to the eight OECD countries (data are not available for Israel, Singapore or the UAE). Arizona had the highest percentage with a tertiary degree (an associate's degree or more). However, Arizona lost ground between 2000 and 2006. In 2006, Israel and New Zealand had a higher proportion with a tertiary degree than Arizona, with Denmark and Finland close behind.

### **Labor Force**

As expected from its rapid population growth, the UAE also has experienced by far the greatest gains in the size of its labor force since the early 1980s. In both the 1982-91 and 1991-2001 economic cycles, Arizona's labor force growth rate was greater than in each of the nations except the UAE, though not by much. In the current economic cycle, Arizona's rate of growth has slipped below that of Singapore and Ireland. Generally, Singapore and Israel have had considerable growth in their labor force, though Israel's gains have slowed in recent years. After experiencing little increase during the 1980s, the labor force in Ireland also has shot up.

Relative to the entire population, the labor force participation rate in 2008 was highest in Singapore and the UAE, and lowest in Austria and Israel. Arizona's figure was higher than only the latter two countries. The rate of growth in the labor force participation rate has been highest in Singapore and the UAE, and since the early 1990s, in Ireland. Arizona's growth in the rate was typical of the comparison nations during the 1982-91 cycle, but has since slipped to near the bottom.

Compared to the working-age population (defined as ages 15 through 64) rather than the entire population, Singapore's labor participation rate is only in the middle of the group of nations, with Denmark, New Zealand, Norway, and Sweden all having rates higher than Singapore and nearly as high as in the UAE. Arizona's rate again is higher than only Austria and Israel. The increases in this participation rate have been greatest in the UAE, with strong gains also in Ireland and Israel. Arizona fell from just below average in the 1990s to last between 2000 and 2005 on the increases in its rate.

Employment figures are not available for the UAE and are not available back to the early 1980s in some countries. Since 1991, employment growth has been greatest in Ireland and Israel. Arizona has matched their rate of increase.

Compared to the entire population, the employment-to-population ratio in 2007 was highest in Switzerland. Most nations had a ratio nearly as high, but Singapore and Israel had much lower ratios. Arizona's figure was greater than only these two countries. Arizona's change in the ratio was relatively rapid during the 1982-91 cycle, only a little less than the norm of the countries during the 1991-2001 cycle, but near the bottom in the current economic cycle. Ireland and New Zealand have posted the strongest gains, with their ratios rising from below average to average.

Relative to the working-age population, Arizona's employment-to-population ratio in 2007 was higher than only Israel of the nine countries with available data. Arizona's increase in the ratio was a little below average in the 1990s and near the bottom between 2000 and 2005.

Arizona's relatively low labor force participation and employment-to-population rates and its decreases in rate in recent years compared to gains in most nations may be an indicator of the size of Arizona's "underground" economy. If the large number of undocumented immigrants working "unofficial" jobs were included in the labor force numbers, Arizona likely would not compare so unfavorably. Still, workforce participation rates are not a strength of the Arizona economy.

The unemployment rate is highly cyclical and the world's countries do not all follow the same economic cycle. In addition, the unemployment rate has been criticized for not including discouraged individuals who are not actively looking for a job. Further, the rate for Arizona (and other U.S. states) is based on a small sample and thus has a large margin of error. The unemployment rate is not available for the UAE and estimates for Singapore vary widely across three international sources of unemployment rates. The estimates vary somewhat in other countries as well.

At the peak of the economic expansion in 2007, Arizona's rate was slightly lower (better) than the middle of the 10 countries. In 2008, Arizona's rate was a little worse than the middle. Denmark, Norway, and Switzerland had the lowest rates, while Finland, Israel, and Sweden had relatively high rates.

### **Income**

Two measures of income are compared: gross national income per capita (for the OECD countries plus Israel) and personal disposable income, which is not available for the UAE. The former measure is not applicable to Arizona, so personal income was used instead.

Per capita gross national income in 2007 was the highest in Norway, followed by Switzerland. Arizona's equivalent figure was greater than that of the other six countries with data for 2007. New Zealand and Israel have the lowest incomes on this measure. The leaders on the inflation-adjusted gain in income have varied over time, but Ireland has been at or near the top since the early 1980s. In the 1982-91 cycle, Arizona's gain was above the middle of the nine nations, but its relative position has since slipped to near the bottom.

On the disposable personal income measure, Switzerland had the highest figure in 2008, followed by Ireland and Norway. Arizona's figure was just above the middle of the 10 countries, similar to Austria and Denmark. The disposable personal income figures in Europe show a pattern of losses during the 1990s, then sharp gains in recent years. Over the 1991-to-2008 period, Ireland and Singapore had the greatest gains, with Sweden and Israel lagging behind. The increase in Arizona was less than the median of the 10 countries, ahead of Sweden and Israel and about the same as Norway.

Measures of income inequality and poverty rates are limited to the OECD countries. The United States has higher income inequality than each of the eight comparison countries on four of the five measures, and ranks second highest on the other measure. Measures of income inequality for Arizona are limited, but it appears that Arizona's income inequality is at least as high as the national average, and thus likely higher than in each of the comparison nations. The United States also has higher poverty rates than each of the eight nations; Arizona's poverty rate is higher than the U.S. average.

### **Gross Domestic Product**

During the 1991-2001 cycle, Arizona's inflation-adjusted gross domestic product increased more than that of any of the comparison nations except Ireland. In the current economic cycle, however, Arizona's growth has not been nearly as rapid, with four of the comparison nations—the UAE, Singapore, Ireland, and Israel—experiencing greater growth.

Real GDP, however, is not a good measure with which to compare nations. When available, real GDP per employee is the preferred measure; employment is not available for the UAE. Real GDP per capita is used when employment data are not available.

Relative rankings can vary substantially across these three measures. For example, the UAE posted the greatest real GDP gain in the current cycle and was third highest in the prior cycle, but ranked last on GDP per capita growth in both cycles. In the case of Arizona, only Ireland had a greater real GDP gain during the 1991-2001 cycle, but Singapore also bested Arizona on the



other two measures—by a very wide margin on real GDP per employee. The difference by measure is more notable in the current cycle; Arizona had greater real GDP growth than seven of the 11 nations, but had the smallest gain on real GDP per capita and ranked among the lowest of the 10 nations on the increase in real GDP per employee.

Despite its poor performance since 2001 on gains in real GDP per capita and per employee, Arizona still ranks relatively high on the level of these two measures. In 2008, Arizona's nominal GDP per capita was higher than in six of the 11 nations. Norway, Ireland, Switzerland, and Singapore had higher figures, and Austria's figure was marginally higher. In 2007, Arizona's nominal GDP per employee was higher than in seven of the 10 nations. Norway, Singapore, and Ireland had higher GDP per employee figures. New Zealand had the lowest per capita and per employee figures; the per capita figures in Israel and the UAE also were low.

For nine of the nations (not including Ireland or Switzerland), GDP data are available for the broad sectors of agriculture, "industry" (manufacturing, mining, and construction), and services. Agriculture is a small share of the total (3 percent or less) in each of the nations except New Zealand (6 percent). Agriculture accounts for less than 1 percent of Arizona's GDP. The "industry" share varies from 22 percent in New Zealand to 50 percent in the UAE, but Arizona is lower at 18 percent, despite the disproportionate size of its construction sector. Thus, the services sector in Arizona makes up a substantially larger share of GDP than in any of the comparison nations.

In the current economic cycle, the growth in services has exceeded that of "industry" in most of the nations and in Arizona. In the prior cycle, as many nations had faster growth in "industry" as had greater gains in services.

### **Time Series**

The cyclical pattern of Arizona's gross domestic product per capita and per employee since 1982 relative to the national average is displayed in Chart 1. In the last two economic cycles, GDP per capita has not regained the peak of the prior cycle and the latest figure (2008) is the lowest on record. In contrast, GDP per employee in the 1990s recovered the losses of the late 1980s; it does not display any downward trend.

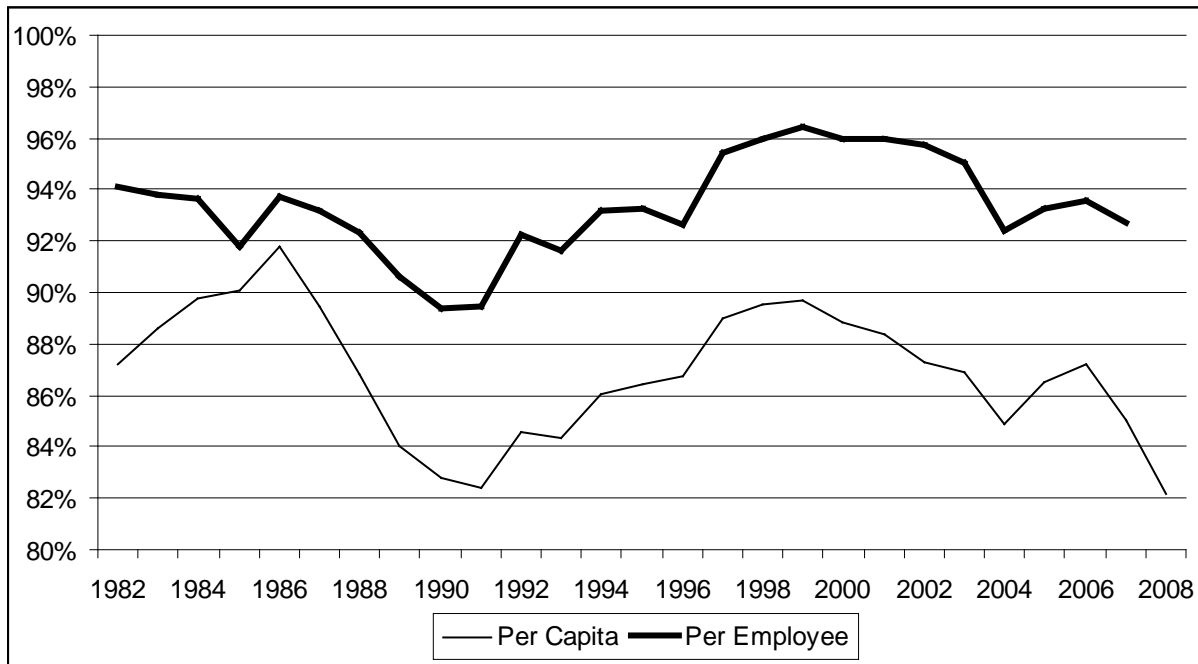
Arizona's GDP per capita is compared to the nations in the comparison group in Chart 2. Arizona has not kept pace with the gains in Ireland, Norway or Singapore, but has matched the other countries. The situation is similar based on GDP per employee (see Chart 3).

## **Other Measures**

### **Inflation**

As calculated from the GDP implicit price deflator, Arizona experienced little inflation relative to the comparison nations during the 1990s, but the inflation since then has been typical. Israel went from extremely high inflation rates in the 1980s and 1990s to near the lowest of the group. In contrast, the UAE had the least inflation during the 1980s, but the most in the current economic cycle. Austria, Singapore, and Sweden have consistently had relatively little inflation.

**CHART 1**  
**NOMINAL GROSS DOMESTIC PRODUCT PER CAPITA AND PER EMPLOYEE,**  
**ARIZONA AS A RATIO TO THE NATIONAL AVERAGE**



Source: U.S. Department of Commerce, Bureau of Economic Analysis.

### Productivity

Five measures of productivity are available for most of the comparison nations, but comparable measures are not available for Arizona. The ranking of the United States has slipped somewhat over time on most of these measures. During the current cycle, productivity gains in the United States have been just above the median of the comparison nations on the primary measures of labor productivity and total factor productivity. However, the United States ranks near the bottom on the other measures of growth of real capital stock, growth of real potential output, and industrial production.

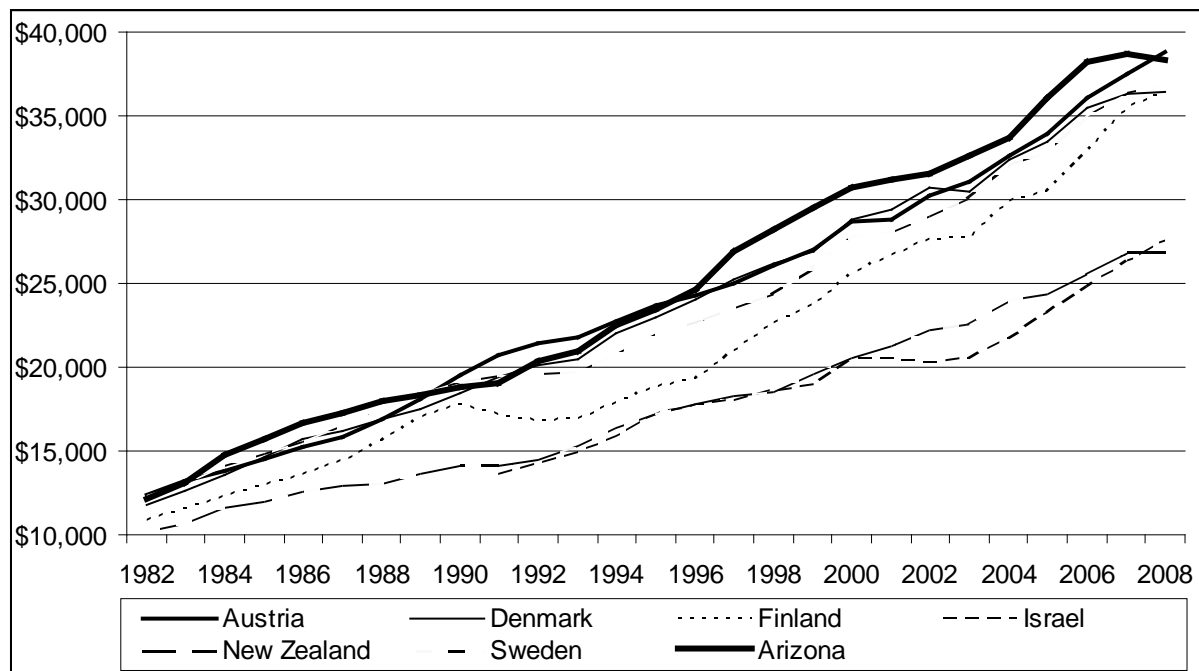
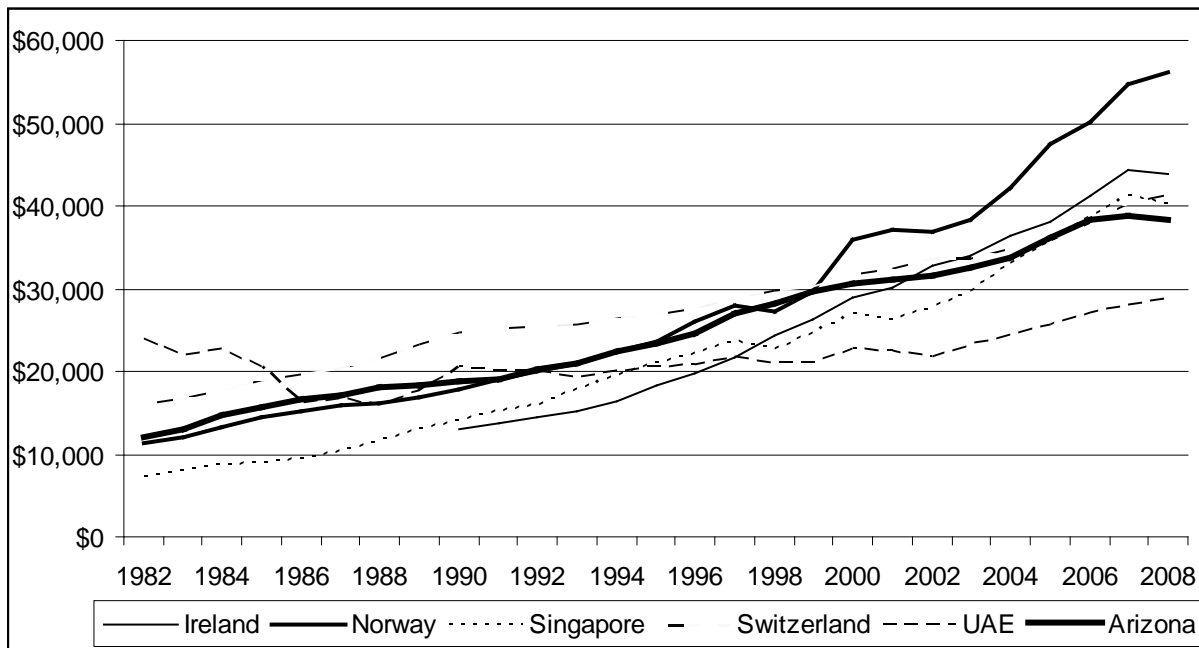
Real GDP per employee is the best proxy for productivity available for Arizona. During the 1991-2001 cycle, Arizona regained ground lost to the United States, but growth on this measure during the current cycle has lagged behind a little. In 2007, Arizona's nominal GDP per employee was 7 percent less than the national average. Arizona was further behind (18 percent) the nation in 2008 on nominal GDP per capita.

### Patents

Patent data available for Arizona are not consistent with the data presented by the OECD, which are limited to the 1990-to-2006 period, and do not include data for Singapore or the UAE. It appears that the per capita number of patents granted in Arizona in 2006 was just less than the middle of the nine nations. Switzerland and Sweden had the highest figures while Ireland and New Zealand had the lowest. The percentage increase over time in the per capita number of patents granted to Arizonans appears to be below that of most of the nations. The rate of increase

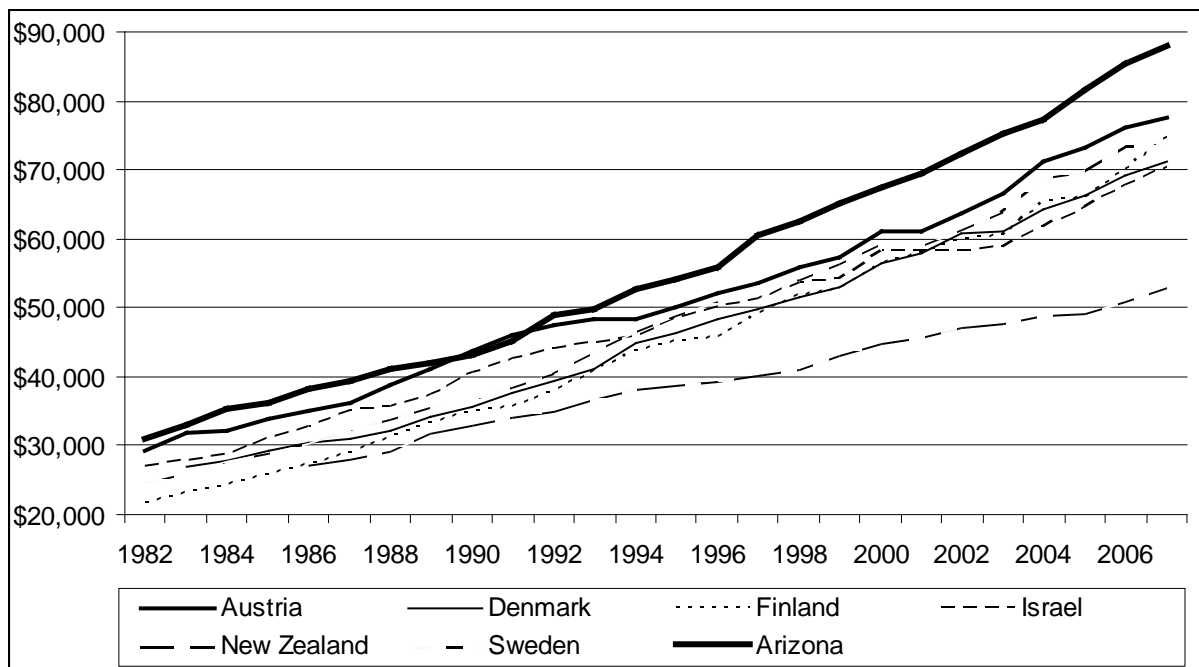
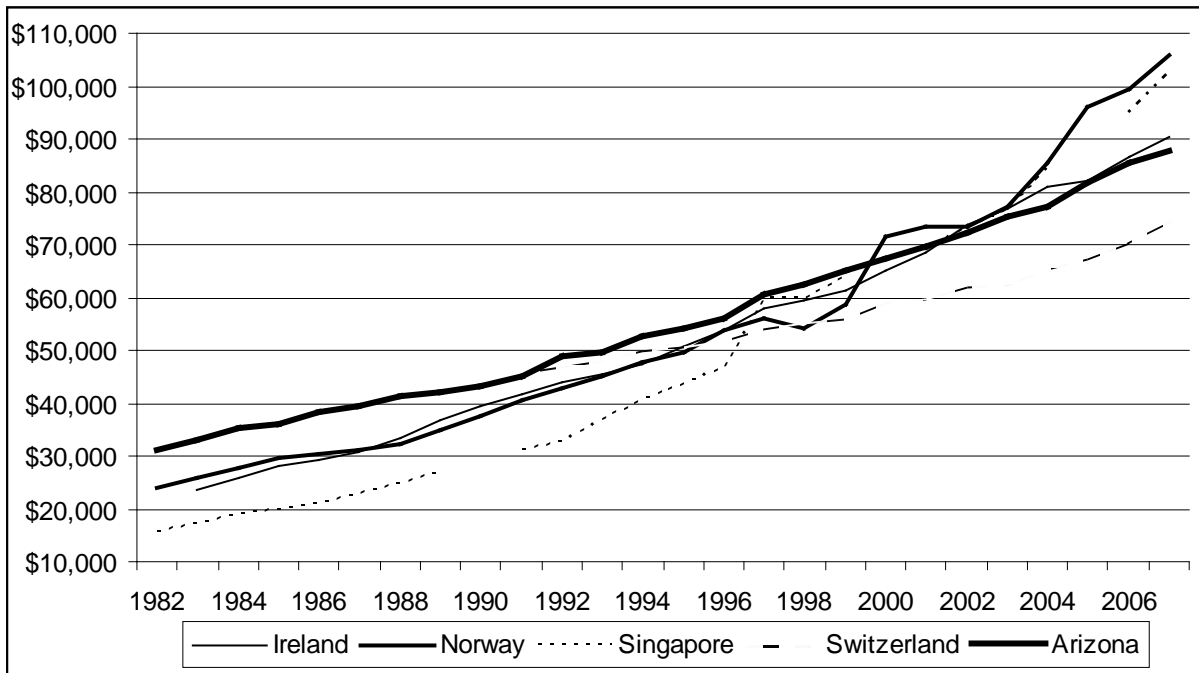
has been inconsistent across some countries, but Israel was among the leaders in the 1990s and since 2000.

**CHART 2**  
**NOMINAL GROSS DOMESTIC PRODUCT PER CAPITA,**  
**ARIZONA AND COMPARISON NATIONS**



Source: The Economist Intelligence Unit (nominal GDP and population).

**CHART 3**  
**NOMINAL GROSS DOMESTIC PRODUCT PER EMPLOYEE,**  
**ARIZONA AND SELECTED NATIONS**



Source: The Economist Intelligence Unit (nominal GDP) and the International Labor Organization (employment).

# THE PRODUCTIVITY AND PROSPERITY PROJECT

The Productivity and Prosperity Project: An Analysis of Economic Competitiveness (P3) is an ongoing initiative begun in 2005, sponsored by Arizona State University President Michael M. Crow. P3 analyses incorporate literature reviews, existing empirical evidence, and economic and econometric analyses.

Enhancing productivity is the primary means of attaining economic prosperity. Productive individuals and businesses are the most competitive and prosperous. Competitive regions attract and retain these productive workers and businesses, resulting in strong economic growth and high standards of living. An overarching objective of P3's work is to examine competitiveness from the perspective of an individual, a business, a region, and a country.

## THE CENTER FOR COMPETITIVENESS AND PROSPERITY RESEARCH

The Center for Competitiveness and Prosperity Research is a research unit of the L. William Seidman Research Institute in the W. P. Carey School of Business, specializing in applied economic and demographic research with a geographic emphasis on Arizona and the metropolitan Phoenix area. The Center conducts research projects under sponsorship of private businesses, nonprofit organizations, government entities and other ASU units. In particular, the Center administers both the Productivity and Prosperity Project, and the Office of the University Economist.

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