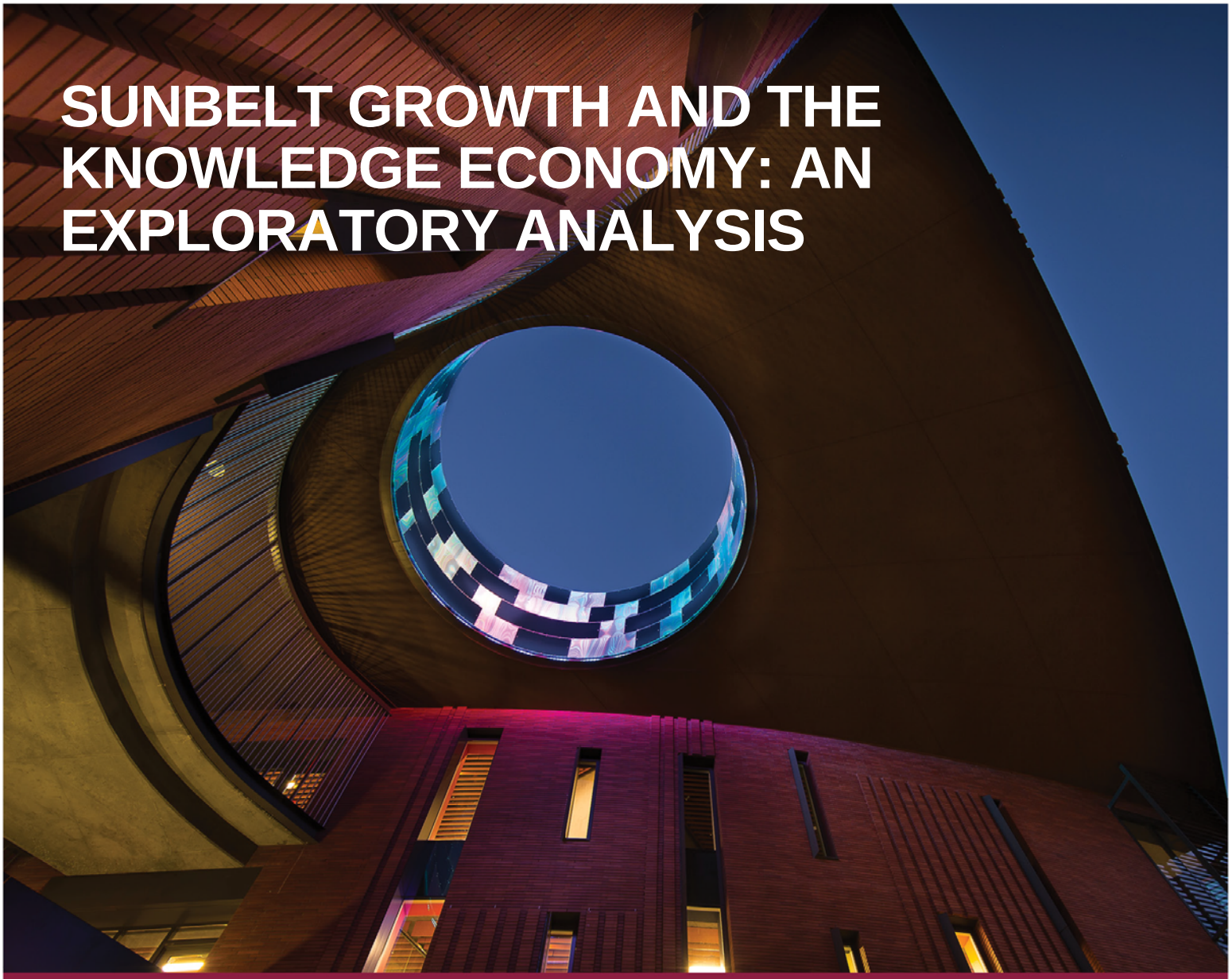
# SUNBELT GROWTH AND THE KNOWLEDGE ECONOMY: AN EXPLORATORY ANALYSIS



**June 2007**

**Dennis Hoffman, Ph.D.**
**Professor, Department of Economics; Director, L. William Seidman Research Institute; and Director, Office of the University Economist**

**Timothy Hogan, Ph.D.**
**Professor Emeritus, Department of Economics; and Senior Research Associate, L. William Seidman Research Institute**

P3 | PRODUCTIVITY AND PROSPERITY PROJECT

ASU W. P. CAREY SCHOOL of BUSINESS
ARIZONA STATE UNIVERSITY

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## A Report from the Productivity and Prosperity Project (P3), Supported by the Office of the University Economist

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**Timothy Hogan, Ph.D.**
Professor Emeritus, Department of Economics;
and Senior Research Associate, L. William Seidman Research Institute

Center for Competitiveness and Prosperity Research
L. William Seidman Research Institute
W. P. Carey School of Business
Arizona State University
Box 874011
Tempe, Arizona 85287-4011

(480) 965-5362
FAX: (480) 965-5458
EMAIL: Dennis.Hoffman@asu.edu
wpcarey.asu.edu/research/competitiveness-prosperity-research
economist.asu.edu


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## INTRODUCTION

Policy makers in the Sunbelt have recognized that the traditional approach to economic development – a strategy of offering a lower cost of doing business to attract business relocation and using job growth as the metric of success – must be replaced in a world characterized by globalization and rapid technological change. While the fundamental goal for economic development has always been prosperity, the operational goal has shifted from providing jobs to increasing living standards. Dollar-denominated metrics – most often wages and/or per capita income – have supplanted or at least supplemented job growth as the target variables of regional development.

In many cases, the initial change in strategy was to shift the focus to attracting high-wage jobs – often characterized as "high tech" manufacturing. Over time, this approach has been broadened to recognize that the standard of living is fundamentally determined by the productivity of the regional economy and that high productivity and productivity growth comes from producing higher value products and services and by increasing efficiency in producing those goods and services. Based on this concept of economic development, the challenge facing policy makers is to attract high value-added economic activity and to create conditions conducive to high productivity and sustained productivity growth.

A popular way to characterize this approach to economic development is in terms of the "knowledge economy" or as a "knowledge-based economy." A knowledge-based economic growth strategy often is defined broadly to incorporate innovation, research and development activities, and non-education aspects of human capital, but much of the discussion of the knowledge economy has focused on the link between economic growth and the stock of human capital as measured in terms of the college-educated population. Based on national datasets, empirical research clearly links economic growth and prosperity and college-educated population (see for example, Glaeser and Saiz 2003 and Moretti 2004), and one study actually asserts the "percentage of adults with a college degree is the single most important driver of economic growth" (Weissbourd and Berry 2004).

Over the past fifty years, the portion of the U.S. known as the Sunbelt has experienced rapid growth.[1] The Sunbelt's share of the national population jumped from 28 percent in 1950 to 40 percent by 2000. At the beginning of the 21st century, the population of the Sunbelt nearly equals the combined population of the nation's traditional Northeast and Midwest "core" regions – 110 million versus 118 million (Lang and Rengert 2001). Empirical research has implied that the non-economic factor of climate has been a significant determinant of this growth pattern (see, for example, Gallup, Sachs, and Mellinger 1999 and Glaeser, et. al. 2001). Some analysts have speculated that climate has historically been a substitute for human capital development (Quan and Beck 1987; Glaeser and Saiz 2003).

This paper explores whether a knowledge economy explanation for economic growth seems to fit with the growth experience of the Sunbelt during the 1990s. The issue is addressed through analysis of two different datasets. First, the education and income characteristics of the people moving to the Sunbelt region are examined using migration data from the 2000 census. Then we look at the link between the knowledge economy metric of the share of college educated adults and economic growth in the Sunbelt in the 1990s using data for 116 Sunbelt MSAs.

## A HIGHLY SELECTIVE REVIEW OF PREVIOUS RESEARCH

The 2003 study of the link between education and urban growth by Glaeser and Saiz (2003) served as the initial motivation for the research on which this paper is based. Their analysis, which included a battery of control variables and regional fixed effects, found a strong link between the share of college-educated adults and population growth using primarily census data for a national set of MSAs for the 1970-2000 period. The results also showed positive effects of warm and dry climate measures. Of particular interest to the current project were the results of two sets of regression models in the study:

1. Two simple models of population growth as a function of the share of college graduates – one using the entire MSA sample and the other using only MSAs which had average January temperatures of 40 degrees+. The results showed the regression coefficient in the first model was four times as big as that for the "warm climate" sub-sample.
2. Models that included interaction effects between education and climate that also implied a weaker link between education and both MSA growth and MSA wage levels in warmer areas.

The 2003 Glaeser and Saiz investigation built upon an earlier study by Glaeser and Shapiro (2001) in which somewhat less sophisticated empirical analysis identified what were termed "three large trends that determined the recent growth of cities" – human capital, movement to warmer, drier places, and reliance on autos.

Empirical results from an earlier study of regional growth at least tangentially addressed the link between the knowledge economy and economic growth in the Sunbelt. Quan and Beck (1987) looked at the link between education and state economic growth, but their analysis focused on the relationships between per capita income, wages and employment and public expenditures on K-12 and higher education. They found positive links between education spending and the economic variables for Northern states but little evidence (with some results actually showing a negative relationship) of any link for Sunbelt states. In their conclusion, they argued their results were consistent with Sunbelt states relying on in-migration of persons educated in other states.

## GROWTH AND EDUCATIONAL ATTAINMENT IN THE SUNBELT

Some areas of the Sunbelt have achieved great economic success along with aggregate growth – metro areas like Atlanta and Charlotte are obvious examples. Other areas have experienced explosive population and job growth but have not done as well in raising the standard of living of their residents (at least in comparison with the national average). For example, McAllen-Edinburg-Mission, TX was the second fastest growing Sunbelt MSA in the 1990s, but income grew slower than the national average so that its per capita personal income figure fell from 48 percent of the national level in 1990 to 45 percent in 2000. And not all Sunbelt states have shared in the rapid growth experienced by the rest of the region. Four states (Alabama, Arkansas, Mississippi, and Oklahoma) trailed the national growth trend over the 1950 – 2000 period.

Focusing on the decade of the 1990s, the aggregate statistics presented in Table 1 show that the population of the 15-state Sunbelt region grew more than twice as fast as the Non-Sunbelt states between 1990 and 2000. The Sunbelt states also outpaced the rest of the nation in terms of aggregate economic growth – for example, the GDP of the Sunbelt region increased 78 percent

over the decade compared with 60 percent for the Non-Sunbelt states. But the Sunbelt region was not as successful in terms of personal economic measures. The average per capita GDP in 2000 for the 15 state Sunbelt region was $33,104 – 92 percent that of the Non-Sunbelt region, and per capita GDP growth for the Sunbelt states also lagged behind the rest of the nation during the decade.

The region as a whole surpassed the rest of the U.S. in terms of aggregate growth, but the pattern of growth during the 1990s was not uniform among the individual Sunbelt states. Some states like Arizona, California, and North Carolina had rapid aggregate growth and also managed 60+ percent increases in per capita GDP. Others like Nevada and South Carolina grew rapidly but had below average increases in per capita GDP. And at the other end of the scale, Louisiana lagged behind the Non-Sunbelt region in all four measures.

Turning to comparisons of the 15-state Sunbelt region with the rest of the nation in terms of the human capital metric often used in studies of the knowledge economy – the proportion of college graduates, the figures in Table 2 demonstrate that the share of those 25 and over with at least bachelor's degree in 2000 was lower for the Sunbelt region than in the Non-Sunbelt states. Looking particularly at younger adults (aged 25 to 39), the relative ranking remains the same –

**TABLE 1**
**GROWTH IN POPULATION, GROSS DOMESTIC PRODUCT AND PER CAPITA GDP, 1990 – 2000**

| | Population Growth | GDP Growth | Per Capita GDP | Per Capita GDP Growth |
|---|---|---|---|---|
| Sunbelt States | 18.9% | 77.9% | $33,104 | 49.7% |
| Alabama | 10.1 | 61.2 | 25,764 | 46.4 |
| Arizona | 40.0 | 128.7 | 30,899 | 63.4 |
| Arkansas | 13.7 | 75.3 | 24,987 | 54.1 |
| California | 13.8 | 63.3 | 38,001 | 43.5 |
| Florida | 23.5 | 83.2 | 29,490 | 48.3 |
| Georgia | 26.4 | 108.5 | 35,533 | 65.0 |
| Louisiana | 5.9 | 40.5 | 29,430 | 32.7 |
| Mississippi | 10.5 | 65.8 | 22,592 | 50.0 |
| Nevada | 66.3 | 131.7 | 36,892 | 39.3 |
| New Mexico | 20.1 | 88.8 | 27,885 | 57.2 |
| North Carolina | 21.4 | 95.1 | 34,003 | 60.7 |
| Oklahoma | 9.7 | 55.5 | 26,012 | 41.8 |
| South Carolina | 15.1 | 71.2 | 28,044 | 48.8 |
| Tennessee | 16.7 | 84.9 | 30,733 | 58.5 |
| Texas | 22.8 | 89.3 | 34,876 | 54.2 |
| Non-Sunbelt States | 9.0 | 67.7 | 35,845 | 53.7 |
| United States | 13.2 | 71.8 | 34,642 | 51.8 |

Source: Computed by authors based on data from the U.S. Census Bureau and the U.S. Bureau of Economic Analysis.

and while the proportion is higher among younger adults all across the nation, the gap between the Non-Sunbelt and Sunbelt regions is larger than for all adults.

The economies of some areas in the Sunbelt have clearly benefited from "knowledge economy"-based growth, but the statistics in Table 2 indicate that much of the region still lags far behind in developing knowledge-based resources. For example, a recent Milken Institute study of Arkansas' position in the knowledge-based economy ranked the state next-to-last in knowledge-economy resources, and the analysis also cautioned that several other Sunbelt states were in similar, if slightly better situations (Milken Institute 2004).

## U.S. DOMESTIC NET MIGRATION

Recent decades have witnessed steady north-to-south net domestic migration in the U.S. The impetus for this phenomenon has been the continuing decline of Midwest manufacturing as a source of lifetime employment coupled with preferences for a more temperate climate. The Sunbelt states have generally been the primary recipients of these domestic migration flows.

A Census report, *Domestic Net Migration in the United States: 2000 to 2004* (Perry 2006) reveals the progression of north to south migration continued in a pattern that prevailed

**TABLE 2**
**EDUCATIONAL ATTAINMENT OF THE POPULATION 25 AND OVER AND 25 TO 39, IN 2000**

| | Population 25 and over | Percent BA or more | Population 25 to 39 | Percent BA or more | Difference 25-39 vs 25+ |
|---|---|---|---|---|---|
| Sunbelt States | 78,980,254 | 23.0% | 27,556,649 | 24.1% | 1.1 |
| Alabama | 2,887,400 | 19.0 | 942,624 | 21.6 | 2.6 |
| Arizona | 3,256,184 | 23.5 | 1,123,657 | 23.5 | 0.0 |
| Arkansas | 1,731,200 | 16.7 | 545,770 | 18.3 | 1.6 |
| California | 21,298,900 | 26.6 | 7,859,690 | 26.5 | -0.1 |
| Florida | 11,024,645 | 22.3 | 3,290,048 | 23.4 | 1.1 |
| Georgia | 5,185,965 | 24.3 | 1,983,774 | 27.2 | 2.9 |
| Louisiana | 2,775,468 | 18.7 | 932,770 | 20.3 | 1.6 |
| Mississippi | 1,757,517 | 16.9 | 591,157 | 18.1 | 1.2 |
| Nevada | 1,310,176 | 18.2 | 464,406 | 17.6 | -0.6 |
| New Mexico | 1,134,801 | 23.5 | 369,089 | 20.7 | -2.8 |
| North Carolina | 5,282,994 | 22.5 | 1,849,280 | 25.5 | 3.0 |
| Oklahoma | 2,203,173 | 20.3 | 682,826 | 20.9 | 0.6 |
| South Carolina | 2,596,010 | 20.4 | 874,969 | 22.0 | 1.6 |
| Tennessee | 3,744,928 | 19.6 | 1,256,971 | 22.6 | 3.0 |
| Texas | 12,790,893 | 23.2 | 4,789,620 | 23.6 | 0.4 |
| All Non-Sunbelt States | 103,231,385 | 25.5 | 34,014,715 | 29.3 | 3.9 |
| United States | 182,211,639 | 24.4 | 61,571,364 | 27.0 | 2.6 |

Source: U.S. Census Bureau, Educational Attainment: 2000, August 2003, and 2000 Census IPUMS 5 percent files.

throughout the 1990s. Eight of the top ten states for domestic net migration were Sunbelt states while California (partially Sunbelt) experienced significant net domestic out-migration.

Behind the aggregate net migration numbers, questions remain. What are the knowledge and skill characteristics of the people that dominate these population flows? What role does age play in the observed domestic net migration patterns? Quite simply, are the knowledge and skills of the people migrating from north to south different from the average state-to-state migrant? And is this north-to-south migration consistent with the arguments that knowledge and skill development will be an important catalyst for economic growth and prosperity?

Tables 3 and 4 summarize data extracted from the Census 2000 migration DVD. The data were sorted to compare attributes of people who migrated to the Sunbelt from outside the Sunbelt at some point between 1995 and 2000 (the top of Tables 3 and 4) with people who moved from the Sunbelt in the same time period (the bottom of Tables 3 and 4). It turns out that their characteristics are quite similar. The data suggest the educational attainment of people migrating north to south are essentially identical to those migrating south to north. For example, 34.9 percent of the north-to-south migrants had college degrees while 35.5 percent of the south-to-north migrants were college graduates. Similarly, 47.9 percent of the north-to-south migrants reported incomes in excess of $50,000 while 49.5 percent of the south-to-north migrants reported incomes in excess of $50,000. So, in the aggregate, it appears education and income earning skill characteristics are essentially randomly distributed across domestic migrants regardless of their (north vs. south) direction of movement.

But the aggregate analysis in Tables 3 and 4 ignores age differences that may prevail among the domestic migrants, and it assumes the Sunbelt is comprised of essentially a homogeneous set of states. We consider each in turn.

## TABLE 3
## MIGRATION TO AND FROM THE SUNBELT BETWEEN 1995 AND 2000 BY EDUCATIONAL ATTAINMENT IN 2000

| Educational Attainment | Non-Hispanic White | | Non-Hispanic Black | | Other | | Total | |
|---|---|---|---|---|---|---|---|---|
| To the Sunbelt | | | | | | | | |
| Less than high school | 256,574 | 8.7% | 64,491 | 16.5% | 149,379 | 26.3% | 470,444 | 12.0% |
| High school graduate or some college | 1,583,933 | 53.6 | 240,453 | 61.6 | 253,950 | 44.7 | 2,078,336 | 53.1 |
| College Degree | 1,112,913 | 37.7 | 85,276 | 21.9 | 165,449 | 29.1 | 1,363,638 | 34.9 |
| Total | 2,953,420 | 100.0 | 390,220 | 100.0 | 568,778 | 100.0 | 3,912,418 | 100.0 |
| From the Sunbelt | | | | | | | | |
| Less than high school | 175,193 | 8.9 | 32,787 | 14.8 | 142,849 | 29.7 | 350,829 | 13.1 |
| High school graduate or some college | 1,040,434 | 52.8 | 133,297 | 60.3 | 200,979 | 41.8 | 1,374,710 | 51.4 |
| College Degree | 755,891 | 38.3 | 55,082 | 24.9 | 137,238 | 28.5 | 948,211 | 35.5 |
| Total | 1,971,518 | 100.0 | 221,166 | 100.0 | 481,066 | 100.0 | 2,673,750 | 100.0 |

Source: U.S. Census Bureau, Census 2000 Migration DVD.

## TABLE 4
## MIGRATION TO AND FROM THE SUNBELT BETWEEN 1995 AND 2000 BY HOUSEHOLD INCOME IN 1999

| Household Income in 1999 | Not Hispanic | | Hispanic | | Total | |
|---|---|---|---|---|---|---|
| To the Sunbelt | | | | | | |
| Under $25,000 | 1,041,180 | 20.8% | 162,200 | 29.6% | 1,203,380 | 21.7% |
| $25,000 to $49,999 | 1,494,110 | 29.9 | 191,580 | 35.0 | 1,685,690 | 30.4 |
| $50,000 to $74,999 | 1,065,820 | 21.3 | 101,510 | 18.5 | 1,167,330 | 21.1 |
| $75,000 or more | 1,397,050 | 28.0 | 92,770 | 16.9 | 1,489,820 | 26.9 |
| Total | 4,998,160 | 100.0 | 548,060 | 100.0 | 5,546,220 | 100.0 |
| From the Sunbelt | | | | | | |
| Under $25,000 | 692,350 | 20.3 | 136,980 | 27.5 | 829,330 | 21.2 |
| $25,000 to $49,999 | 976,110 | 28.5 | 174,630 | 35.1 | 1,150,740 | 29.4 |
| $50,000 to $74,999 | 735,500 | 21.5 | 94,660 | 19.0 | 830,160 | 21.2 |
| $75,000 or more | 1,015,850 | 29.7 | 61,050 | 18.3 | 1,106,900 | 28.3 |
| Total | 3,419,810 | 100.0 | 497,320 | 100.0 | 3,917,130 | 100.0 |

Source: U.S. Census Bureau, Census 2000 Migration DVD.

### Age Issues

As is widely known, significant migration of people aged 55+ from north to south has been a continuing phenomenon. The Census 2000 report, *Internal Migration of the Older population: 1995 to 2000* (He and Schachter 2003) shows seven of the top 10 destination states for elderly interstate migrants were Sunbelt states. Nevada, Arizona and Florida received most of these elderly migrants. In many Sunbelt states this population flow of older people serves to boost local economies. In Nevada, as reported in the *Economist* (2006), the elderly population is serving as an important source of service industry labor. And across the Sunbelt, the migrating elderly are generally more educated and wealthier in comparison with national averages at the same age cohort – resulting in a positive tug on average educational attainment and income in the 25+ population for many Sunbelt states. The challenge of course is that the elderly provide little boost to the quality of skills in the working age labor force and may indeed result in increasing pressures for more service industry jobs. Further, as the Baby Boom generation ages, Sunbelt states will no doubt find themselves with increasing proportions of very elderly people – especially in the most attractive states for the elderly migrants, Arizona, Florida and Nevada.

### Young and College Educated

A special Census 2000 report highlighted the migration patterns of the young (25-39), single and college-educated population for the period 1995 to 2000 (Franklin 2003b). The analysis reveals that seven of the ten states with the highest rates of net domestic migration among this group were Sunbelt states. These findings suggest that Sunbelt states added significantly to their numbers of young, college-educated people. However, the Sunbelt states also received most of the total net domestic migration so it may not be surprising that they saw significant increases in the number of young, single, educated people as well.

To examine how well the Sunbelt states did in attracting young, single and college educated migrants, Table 5 lists the 17 states, plus the District of Columbia, with net positive domestic in-

## TABLE 5
## DOMESTIC MIGRATION BETWEEN 1995 AND 2000

| | Young, Single and College Educated | | | | Age 5 or Older | |
|---|---|---|---|---|---|---|
| | | | Net Migration | | Net Migration | |
| | Inmigrants | Outmigrants | Number | Rate | Number | Rate |
| Nevada | 13,651 | 6,863 | 6,788 | 281.8 | 233,934 | 151.5 |
| Colorado | 49,665 | 31,803 | 17,862 | 157.7 | 162,633 | 43.8 |
| Georgia | 63,306 | 38,639 | 24,667 | 150.5 | 340,705 | 48.6 |
| Arizona | 34,850 | 25,586 | 9,264 | 109.9 | 316,148 | 74.3 |
| Oregon | 24,296 | 17,940 | 6,356 | 103.5 | 74,665 | 24.6 |
| Washington | 39,469 | 27,800 | 11,669 | 96.5 | 75,330 | 14.3 |
| California | 170,270 | 97,233 | 73,037 | 92.7 | -755,536 | -24.6 |
| North Carolina | 44,925 | 37,706 | 7,219 | 50.2 | 337,883 | 48.4 |
| Texas | 74,350 | 57,537 | 16,813 | 48.7 | 148,240 | 8.1 |
| Florida | 69,053 | 58,599 | 10,454 | 40.1 | 607,023 | 44.0 |
| Alaska | 3,984 | 3,598 | 386 | 38.9 | -30,498 | -51.0 |
| Virginia | 58,572 | 52,097 | 6,475 | 38.4 | 75,730 | 11.9 |
| Maryland | 42,126 | 37,768 | 4,358 | 32.2 | -19,723 | -4.1 |
| Minnesota | 25,681 | 23,962 | 1,719 | 15.5 | 29,169 | 6.5 |
| Tennessee | 23,581 | 22,264 | 1,317 | 15.2 | 146,314 | 28.7 |
| Illinois | 69,250 | 65,416 | 3,834 | 12.4 | -342,616 | -29.7 |
| Idaho | 5,276 | 5,189 | 87 | 5.9 | 33,847 | 29.6 |
| District of Columbia | 25,428 | 25,320 | 108 | 2.5 | -45,331 | -81.7 |
| Massachusetts | 60,198 | 61,260 | -1,062 | -4.6 | -54,708 | -9.4 |
| New York | 113,055 | 119,666 | -6,611 | -11.3 | -874,248 | -48.8 |
| New Jersey | 43,138 | 45,922 | -2,784 | -13.0 | -182,829 | -23.7 |

Note: States in the list had a net migration rate for young, single, and college educated higher than the overall rate.

Source: U.S. Census Bureau, Census 2000 Special Migration Reports.

migration for the young, single and college educated plus Massachusetts, New York and New Jersey. These last three states all experienced declines in this educated demographic that were smaller than their overall net domestic migration losses. The 30 states that do not appear in Table 5 include seven Sunbelt states and 23 non-Sunbelt states. All of these saw outflows of the young, single and college educated in the late 1990's that were more negative than their overall rate of net migration.

The figures presented in Table 5 reveal the Sunbelt generally performed well in terms of net migration for this subpopulation, but they also show the absolute numbers of this group are small relative to total net migrants. Only 6,788 of the 233,934 net in-migrants to Nevada were in this young, single, and college-educated demographic, while Arizona realized 9,264 out of 316,148, and Florida only 10,454 out of 607,023. In contrast, California, Alaska, Maryland, Illinois, and the District of Columbia, increased their shares of young, single and college educated while actually having a net outflow of domestic migrants from 1995 to 2000.

While this special Census report chose to focus on young, unmarried college graduates, it makes more sense to take a somewhat broader look at all young college graduates as the subgroup most important for what is happening with an area's human capital resources. The numbers presented

in Table 2 already demonstrated this desirable subpopulation is a smaller share of all young adults in the 15-state Sunbelt region than in the Non-Sunbelt states. The net migration figures in Table 6 show that the Sunbelt states as a region gained a total of more than 200,000 young college educated individuals from the rest of the nation over the 1995-2000 period. And young, college-educated persons made up 13.9 percent of total net migration into the region – substantially higher than the 5.8 percent share this subpopulation made up of the 5+ population of the region in 2000. Still, even after adding gaining these "economically desirable" new residents at the expense of the Non-Sunbelt states, the proportion of college-educated young adults in the Sunbelt region remained substantially below the rest of the nation in 2000 (see Table 2).

Six of the 15 Sunbelt states actually had net out-flows of young, college-educated individuals, and for states like Florida, Nevada, and Arizona these potential knowledge economy workers made up a very small part of their population gains. In a few Sunbelt states, however, the young college educated in-migrants were a major positive factor – for Georgia and Texas in particular they constituted a large share of the states' total net-migration – and California had a net gain of

**TABLE 6**
**DOMESTIC MIGRATION OF YOUNG AND COLLEGE EDUCATED BETWEEN 1995 AND 2000**

| | In-migrants | Out-migrants | Net Migration | Percent of Total 5+ Net Migration | YCE Share of Total 5+ Population in 2000 |
|---|---|---|---|---|---|
| Sunbelt States | 1,361,189 | 1,152,779 | 208,410 | 13.9% | 5.8% |
| Alabama | 35,512 | 47,552 | -12,040 | - | 4.9 |
| Arizona | 84,306 | 59,235 | 25,071 | 7.9 | 5.6 |
| Arkansas | 19,485 | 21,380 | -1,895 | - | 4.0 |
| California | 320,594 | 239,188 | 81,406 | - | 6.6 |
| Florida | 170,187 | 145,864 | 24,323 | 4.1 | 5.1 |
| Georgia | 151,572 | 101,960 | 49,612 | 14.3 | 7.1 |
| Louisiana | 30,400 | 51,950 | -21,550 | - | 4.5 |
| Mississippi | 19,781 | 27,911 | -8,130 | - | 4.1 |
| Nevada | 31,255 | 16,307 | 14,948 | 6.4 | 4.4 |
| New Mexico | 22,348 | 28,661 | -6,313 | 21.9 | 4.5 |
| North Carolina | 127,276 | 97,213 | 30,063 | 8.7 | 6.3 |
| Oklahoma | 24,993 | 39,479 | -14,486 | - | 4.4 |
| South Carolina | 49,855 | 48,229 | 1,626 | 1.3 | 5.1 |
| Tennessee | 69,399 | 63,410 | 5,989 | 4.2 | 5.3 |
| Texas | 204,228 | 164,438 | 39,790 | 29.9 | 5.9 |
| All Non-Sunbelt States | 2,017,952 | 2,226,362 | -208,410 | - | 6.8 |
| United States | 3,379,141 | 3,379,141 | 0 | - | 6.3 |

Source: U.S. Census Bureau, 2000 Census IPUMS 5 percent files and 2000 Census Special Tabulations PHC-T-22, Gross and Net Migration Tables.

more than 80,000 young, college-educated individuals at the same time that the state's overall net outflow was almost 800,000 over the 1995-2000 period.

### Knowledge and Skills Across the Sunbelt

While considerable north-to-south migration has occurred, it is clear the migration patterns to and from individual Sunbelt states vary considerably. Table 7 depicts the distribution of domestic in-migrants into individual Sunbelt states by income and educational attainment. The frequencies reveal considerable heterogeneity across the Sunbelt. The states with the highest income in-migrants are California, Georgia, and Texas; the share of high income migrants exceeds the average state by 21.1 percent for California and Georgia and by 15.3 percent for Texas. All three of these states also reported shares of college educated among in-migrants over 20 percent above the average Sunbelt state. The states with the lowest income in-migrants are Arkansas, Mississippi and Oklahoma with the proportions of in-migrants with income above the $50,000 level that lagged the average Sunbelt state by 21.7 percent, 13.9 percent and 19.5 percent respectively. In each of the lowest income states the proportion of in-migrants with college degrees was more than 20 percent below the average Sunbelt state.

Table 7 also reveals the income/skill correlation is not monotonic across the Sunbelt states. Arizona, Florida, and Nevada, the preferred destinations of many elderly in-migrants, all reported above average income frequencies with below-average college graduation frequencies overall, with Nevada the lowest frequency of college graduates among the Sunbelt states – yet

**TABLE 7**
**INCOME AND EDUCATIONAL ATTAINMENT OF DOMESTIC IN-MIGRANTS TO THE SUNBELT STATES BETWEEN 1995 AND 2000**

| | Income > $50,000: Non-Hispanic | Dep* | Income > $50,000: Total | Dep* | Some College | Dep* | College Degree | Dep* |
|---|---|---|---|---|---|---|---|---|
| Alabama | 42.5% | -7.8% | 42.0% | -5.8% | 31.3% | -1.4% | 29.9% | -4.9% |
| Arizona | 49.8 | 8.0 | 47.7 | 7.0 | 34.2 | 7.8 | 31.3 | -0.5 |
| Arkansas | 35.9 | -22.1 | 34.9 | -21.7 | 30.2 | -4.9 | 22.7 | -27.8 |
| California | 55.9 | 21.3 | 54.0 | 21.1 | 29.8 | -6.1 | 44.8 | 42.5 |
| Florida | 46.5 | 0.9 | 45.2 | 1.4 | 31.1 | -2.0 | 29.6 | -5.9 |
| Georgia | 54.8 | 18.9 | 54.0 | 21.1 | 30.6 | -3.6 | 38.0 | 20.8 |
| Louisiana | 40.2 | -12.8 | 39.8 | -10.7 | 31.3 | -1.4 | 31.0 | -1.4 |
| Mississippi | 38.6 | -16.3 | 38.4 | -13.9 | 32.9 | 3.7 | 24.5 | -22.1 |
| Nevada | 52.4 | 13.7 | 49.1 | 10.1 | 34.1 | 7.4 | 21.5 | -31.6 |
| New Mexico | 42.7 | -7.4 | 38.5 | -13.7 | 32.4 | 2.1 | 35.0 | 11.3 |
| North Carolina | 49.8 | 8.0 | 48.4 | 8.5 | 30.4 | -4.2 | 37.4 | 18.9 |
| Oklahoma | 36.8 | -20.2 | 35.9 | -19.5 | 34.0 | 7.1 | 24.4 | -22.4 |
| South Carolina | 46.0 | -0.2 | 45.4 | 1.8 | 32.2 | 1.4 | 32.3 | 2.7 |
| Tennessee | 44.6 | -3.3 | 44.2 | -0.9 | 30.6 | -3.6 | 31.4 | -0.1 |
| Texas | 55.0 | 19.3 | 51.4 | 15.3 | 31.0 | -2.3 | 37.9 | 20.5 |
| Average | 46.1 | | 44.6 | | 31.7 | | 31.4 | |

* Departure from the average Sunbelt state

Source: U.S. Census Bureau, Census 2000 Migration DVD.

reporting high-income frequency that was 10 percent above the average Sunbelt state. Similarly, New Mexico had a high frequency of college educated in-migrants but a below average frequency of high-income in-migrants.

Data for the in-migrant streams of young, college-educated individuals demonstrate similar patterns (Table 8). For the entire 15-state Sunbelt region, the proportion of high-income ($50,000+) individuals was only slightly below that for the Non-Sunbelt region, but this aggregate measure is misleading as only two of the states – California and Texas – actually had proportions above the Non-Sunbelt average.

This examination of domestic migration data reveals that, while the Sunbelt has been the beneficiary of significant net domestic migration flows, these flows (with the exception of California, and to some degree Georgia and Texas) are not being accompanied by large numbers of people prepared to contribute to knowledge economy endeavors.

**TABLE 8**
**YOUNG AND COLLEGE-EDUCATED DOMESTIC IN-MIGRANTS BETWEEN 1995 AND 2000**

| | YCE In-migrants | Percent of Total 5+ In-Migration | Percent With Incomes of $50,000 or more | Departure from National Average | Departure from Sunbelt State Average |
|---|---|---|---|---|---|
| Sunbelt States | 1,361,189 | 13.0% | 29.6% | -1.1% | |
| Alabama | 35,512 | 10.9 | 24.3 | -18.8 | -17.9% |
| Arizona | 84,306 | 10.6 | 27.8 | -7.2 | -6.2 |
| Arkansas | 19,485 | 7.8 | 26.1 | -12.9 | -11.9 |
| California | 320,594 | 21.6 | 36.7 | 22.4 | 23.7 |
| Florida | 170,187 | 9.1 | 25.8 | -13.8 | -12.9 |
| Georgia | 151,572 | 15.6 | 30.1 | 0.5 | 1.6 |
| Louisiana | 30,400 | 11.8 | 24.3 | -19.0 | -18.2 |
| Mississippi | 19,781 | 8.8 | 23.0 | -23.2 | -22.4 |
| Nevada | 31,255 | 6.8 | 23.6 | -21.1 | -20.3 |
| New Mexico | 22,348 | 11.0 | 21.1 | -29.5 | -28.7 |
| North Carolina | 127,276 | 13.7 | 26.3 | -12.3 | -11.3 |
| Oklahoma | 24,993 | 8.0 | 21.9 | -27.1 | -26.3 |
| South Carolina | 49,855 | 11.3 | 23.8 | -20.6 | -19.7 |
| Tennessee | 69,399 | 12.3 | 25.2 | -15.9 | -15.0 |
| Texas | 204,228 | 14.9 | 32.6 | 8.8 | 10.0 |
| All Non-Sunbelt States | 2,017,952 | 17.2 | 30.2 | 0.7 | |
| United States | 3,379,141 | 15.2 | 30.0 | | |

Source: U.S. Census Bureau, 2000 Census IPUMS 5 percent files and 2000 Census Special Tabulations PHC-T-22, Gross and Net Migration Tables.

## LOOKING AT THE "KNOWLEDGE ECONOMY" EXPLANATION FOR ECONOMIC GROWTH /PROSPERITY IN SUNBELT MSAS

This section summarizes an initial look at alternative metrics of economic success and of the knowledge economy for the 116 MSAs in the Sunbelt that are included in the Department of Housing and Urban Development's State of the Cities Data System.[2] The metro areas included in the dataset are very diverse – in terms of whatever characteristic one might choose – ranging from huge (Los Angeles-Long Beach, CA and Houston, TX) to small (Pine Bluff, AR and Enid, OK); rapidly growing (Las Vegas, NV) to declining (Alexandria, LA); rich (West Palm Beach-Boca Raton, FL) to poor (McAllen-Edinburg-Mission, TX), etc.

The analysis looked at four alternative measures of economic success:

1. *The growth rate of the MSA population over the 1990-2000 period* – The population growth measure was included to be consistent with the Glaeser and Saiz analysis. Glaeser and Saiz could argue either (a) they used on population growth because they were looking at "urban growth" not economic growth or (b) their analysis was in the context of looking at growing areas versus declining areas. But population growth is not really a good measure of economic growth – particularly for Sunbelt regions. In the entire sample of 116, only three MSAs suffered a decline in total population, and many of the poorest areas have grown rapidly.
2. *The growth rate of total employment for the 1990-2000 period* – Job growth has more validity as a measure of economic growth. Historically, it has been one of the primary metrics used to measure regional economic growth by policy makers, economic development professionals, and economists. However, it does not do an adequate job of monitoring what is happening to the standard of living of area residents.
3. *Per capita personal income in 2000* – For this analysis per capita personal income was chosen as the proxy measure for the material standard of living of area residents.
4. *The growth rate of per capita personal income for the 1990-2000 period* – The growth rate of per capita personal income serves as a metric for the change in the material standard of living.

The following discussion focuses on the two income-related measures and secondarily on employment growth. Population growth is included to mirror Glaeser and Saiz. Table 9 lists the simple correlation coefficients between each of the four metrics. These figures show a very high correlation between population growth and employment growth. The coefficients also indicate positive correlations between per capita income and all three growth measures, but a negative relationship between income growth and population growth; although none are statistically significant at a .05 confidence level. The correlation statistics indicate that income level, income growth, and employment growth were not highly correlated among the set of 116 Sunbelt MSAs.

The three alternative education-related variables used in the analysis are (1) the share of college graduates in the adult (25+) population in 2000, (2) the growth rate of that share over the 1990-2000 period, and (3) the ratio of net in-migrants to the MSA ages 25 to 39 in 2000 who were single and college graduates to the population of the MSA ages 5+ in 2000.[3] This statistic was computed from data produced for the special Census 2000 report (Franklin 2003b) discussed earlier. (Hereafter for sake of brevity, this ratio is referred to as the YSCMR – sorry no "cute"

acronym.) Table 9 also lists the simple correlation coefficients between the three education metrics and also between each of the three and the four economic measures. The correlation coefficients imply that the share of college graduates and growth of that share are not closely related, but somewhat surprisingly (at first glance anyway) that there is a statistically significant negative relationship between share of college graduates and the YSCMR. Upon closer examination of the data, it appears that this is a result of out-migration of young, single college-educated adults from "college towns" like Austin. On the other hand, the figures show a modest positive (statistically significant at the .05 percent level of confidence) correlation between the YSCMR and growth in the share of college graduates.

**Simple Correlation Evidence on the Link between Education and Economic Growth**

The correlation coefficients between the three education metrics and the four economic measures provide mixed signals. All of the coefficients are positive, but not all statistically significant. The highest correlation is found between the share of college graduates and per capita income. This could be interpreted simply as the result of a higher proportion of college grads with higher incomes or more broadly in terms of a "knowledge economy"- based argument – a more productive/innovative workforce produces a higher standard of living. The correlations are more modest between the other two education variables and per capita income but still statistically significant – providing more support for the "knowledge economy" argument. Similar positive and significant coefficients are found between both the share of college graduates and growth in that measure and job growth – supporting the idea that a more educated workforce promotes aggregate economic growth. Unfortunately, these simple statistical tests do not indicate the presence of strong links between the education measures and per capita income growth – a result not supporting the "knowledge economy" hypothesis.

## TABLE 9
## SIMPLE CORRELATION MATRIX, 116 SUNBELT METROPOLITAN AREAS

| | PG | EG | PCI | PCIG | SC | SCG |
|---|---|---|---|---|---|---|
| EG | **0.920** | | | | | |
| PCI | 0.192 | 0.096 | | | | |
| PCIG | -0.079 | 0.047 | 0.104 | | | |
| SC | **0.281** | **0.241** | **0.647** | 0.108 | | |
| SCG | **0.284** | 0.345 | **0.227** | 0.144 | 0.058 | |
| YSCMR | 0.180 | 0.102 | **0.257** | 0.140 | **-0.270** | **0.277** |

PG: population growth rate, 1990-2000
EG: employment growth rate, 1990-2000
PCI: per capita personal income, 2000
PCIG: per capita personal income growth rate, 1990-2000
SC: share of college graduates, age 25 or older, 2000
SCG: share of college graduates growth rate, age 25 or older, 1990-2000
YSCMR: young, single, college-educated net migrants, age 5 or older, 1995-2000

Note: Coefficients with statistical significance at the .05 level are in bold.

Source: Computed by authors.

## Ranking the Sunbelt MSAs

The second approach employed in the analysis was to rank the Sunbelt MSAs on the basis of each of the four economic variables and then to look at the top MSAs based on each criterion – to see who they were, whether the same MSAs appeared on multiple lists, and to look for commonality and diversity in their characteristics.

Five MSAs were highly ranked on the basis of all four metrics – Atlanta, GA, Austin-San Marcos, TX, Charlotte-Gastonia-Rock Hill, NS-SC, Dallas, TX, and Raleigh-Durham-Chapel Hill, NC. And for the three true economic variables (excluding population growth), Nashville, TN was among the top 25 on all three lists. Table 10 shows how these areas ranked in terms of the three education measures. All six areas were above average on all three education measures, with the exception of Dallas for the growth in share of college graduates – but it was in the top 10 in terms of the prevalence of college graduates and in the top three in attracting young, single college grads. To a lesser extent, this pattern prevailed for the three MSAs with the highest rankings in terms of share of college graduates – while their growth rates in share of college graduates was above average they were not as highly ranked in terms of this variable. Conversely, Raleigh-Gastonia-Rock Hill, NC-SC had the second-highest growth rate, but it was lower than the other leaders in terms of the share of college graduates.

## Glaeser and Saiz-like Regression Models

Our initial attempts at multivariate regression analysis using the Sunbelt MSA database mirrors some of the regression models estimated by Glaeser and Saiz. We estimated two alternative regression equations for each of our four measures (Tables 11a through d). In each of the four sets, equation A includes only the percent college educated in 1990 and the log of the 1990 level of the respective dependent variable. Equation B includes initial percent college educated, the log of the initial level of the dependent variable, the log of heating degree days, the log of

### TABLE 10
### SIX METROPOLITAN AREAS RANKED IN THE TOP 25 ON ALL THREE ECONOMIC VARIABLES

| | College Degree, Age 25+ | | Growth of Share of College Graduates, 1990 to 2000 | | YSCM Ratio | |
|---|---|---|---|---|---|---|
| **MSA** | **Share** | **Rank** | **Share** | **Rank** | | **Rank** |
| Atlanta, GA | 32.1% | 7 | 22.7% | 29 | 8.4 | 1 |
| Austin-San Marcos, TX | 36.7 | 5 | 19.6 | 46 | 1.8 | 19 |
| Charlotte-Gastonia-Rock Hill, NC-SC | 26.5 | 21 | 35.1 | 2 | 7.2 | 2 |
| Dallas, TX | 30.0 | 10 | 11.6 | 94 | 5.0 | 3 |
| Nashville, TN | 26.9 | 19 | 25.6 | 17 | 3.8 | 7 |
| Raleigh-Durham-Chapel Hill, NC | 38.9 | 2 | 22.8 | 28 | 2.0 | 16 |
| Median Sunbelt MSA | 22.3 | | 16.7 | | -0.6 | |

Source: Computed by authors based on data from the U.S. Department of Housing and Urban Development, State of the Cities Database.

average precipitation, the unemployment rate, and the shares of the labor force in (a) manufacturing, (b) trade, and (c) professional services.

Looking first at the regression results for equation A, the coefficient for the education variable was positive and statistically significant only in the equations for the two income variables. Not surprisingly the positive and significant coefficient for initial income level in Table 11c implies a strong connection between the 1990 income level and at its level in 2000. The high value of adjusted $R^2$ for the equation also emphasizes the strength of that relationship. For the income change equation (Table 11d) on the other hand, the negative and significant coefficient for initial income level implies convergence over the period with faster income growth in lower-income MSAs. It should also be noted that the value of adjusted $R^2$ shows the percent of college educated

## TABLE 11
## REGRESSION RESULTS

### a) Population Growth – Log (2000 Population) – Log (1990 Population)

| | (A) | | (B) | |
|---|---|---|---|---|
| | **Coefficient** | **Standard Error** | **Coefficient** | **Standard Error** |
| Percent College Graduates 1990 | 0.1791 | 0.1798 | **1.0441** | **0.3156** |
| Log(1990 Population) | **0.0303** | **0.0094** | 0.0162 | 0.0123 |
| Log(Average Heating Degree Days) | | | **-0.0277** | **0.0134** |
| Log(Average Precipitation) | | | **-0.0382** | **0.0158** |
| Unemployment Rate - 1990 | | | **-1.6072** | **0.7303** |
| Percent Employment by Industry | | | | |
| Manufacturing | | | -0.2827 | 0.2023 |
| Trade | | | 0.1736 | 0.5296 |
| Professional Services | | | **-1.1299** | **0.3505** |
| Observations | 116 | | 113 | |
| Adjusted R-squared | 0.106 | | 0.294 | |

### b) Employment Growth – Log (2000 Employment) – Log (1990 Employment)

| | (A) | | (B) | |
|---|---|---|---|---|
| | **Coefficient** | **Standard Error** | **Coefficient** | **Standard Error** |
| Percent College Graduates 1990 | 0.3969 | 0.2176 | **0.7654** | **0.3156** |
| Log(1990 Employment) | -0.0479 | 0.0646 | **-0.2132** | **0.1034** |
| Log(Average Heating Degree Days) | | | -0.0070 | 0.0134 |
| Log(Average Precipitation) | | | -0.0067 | 0.0158 |
| Unemployment Rate - 1990 | | | -0.7268 | 0.8594 |
| Percent Employment by Industry | | | | |
| Manufacturing | | | -0.3826 | 0.2355 |
| Trade | | | 0.2801 | 0.6165 |
| Professional Services | | | -0.7231 | 0.4080 |
| Observations | 116 | | 113 | |
| Adjusted R-squared | 0.012 | | 0.079 | |

(continued)

## TABLE 11 (continued)
## REGRESSION RESULTS

### c) Income Level – Log (2000 Per Capita Income)

| | (A) | | (B) | |
|---|---|---|---|---|
| | **Coefficient** | **Standard Error** | **Coefficient** | **Standard Error** |
| Percent College Graduates 1990 | **0.3339** | **0.1209** | 0.2410 | 0.1814 |
| Log(1990 Population) | **0.8979** | **0.0359** | **0.8211** | **0.0511** |
| Log(Average Heating Degree Days) | | | **0.0365** | **0.0077** |
| Log(Average Precipitation) | | | **0.0364** | **0.0091** |
| Unemployment Rate - 1990 | | | -0.5296 | 0.4244 |
| Percent Employment by Industry | | | | |
| Manufacturing | | | -0.2040 | 0.1163 |
| Trade | | | 0.1615 | 0.3044 |
| Professional Services | | | -0.1559 | 0.2015 |
| Observations | 116 | | 113 | |
| Adjusted R-squared | 0.895 | | 0.924 | |

### d) Income Growth – Log (2000 Per Capita Income) – Log (1990 Per Capita Income)

| | (A) | | (B) | |
|---|---|---|---|---|
| | **Coefficient** | **Standard Error** | **Coefficient** | **Standard Error** |
| Percent College Graduates 1990 | **0.3339** | **0.1209** | 0.2410 | 0.1814 |
| Log(1990 Employment) | **-0.1201** | **0.0359** | **-0.1789** | **0.0511** |
| Log(Average Heating Degree Days) | | | **0.0365** | **0.0077** |
| Log(Average Precipitation) | | | **0.0364** | **0.0091** |
| Unemployment Rate - 1990 | | | -0.5296 | 0.4244 |
| Percent Employment by Industry | | | | |
| Manufacturing | | | -0.2040 | 0.1163 |
| Trade | | | 0.1615 | 0.3044 |
| Professional Services | | | -0.1559 | 0.2015 |
| Observations | 116 | | 113 | |
| Adjusted R-squared | 0.082 | | 0.341 | |

Note: Coefficients with statistical significance at the .05 level are in bold.

Source: Computed by authors.

was able to explain little of the pattern of income change among Sunbelt MSAs – at least in the simpler regression model.

For the more complex version (Equation B), the results with respect to the percent college educated was reversed. Positive and statistically significant coefficients were found in the population growth (Table 11a) and employment growth (Table 11b) but not in the income equations. In the population change equation, no significant link was indicated between initial population size and the growth rate, but for the employment and income change equations, the negative and significant coefficient implies convergence with faster growth in the smaller MSAs.

As in the Glaeser and Saiz analysis, all the explanatory variables except the education variable were included in the equations as controls, with the major focus of the exercise to look at the impact of the stock of human capital (as measured by percent college educated) on economic growth. However, it is interesting to note in passing the differences in the results with respect to the climate variables. Glaeser and Saiz used a national sample for their analysis and found that "warm, dry places grew much more quickly than cold, wet places." (2003, p. 10) Since our sample included only Sunbelt MSAs, we were not sure what to expect, and the results varied among the four sets of equations. In the population change equation (Table 11a) – equivalent to the Glaeser and Saiz models – the two climate variables had negative and significant coefficients – consistent with their results. In the employment growth equation, no statistically significant links were indicated. But in the two income equations, the coefficients of both climate variables were positive and significant – implying higher levels of per capita income and faster income growth in warmer, wetter places (the Southeast) versus warmer, drier places (the Southwest).

## COMMENTARY

A review of domestic migration data reveals that while the Sunbelt has been the beneficiary of significant net domestic migration flows, these flows (with the exception of California, and to some degree Georgia and Texas) are not necessarily being accompanied by large numbers of people prepared to contribute to knowledge economy endeavors. Interestingly, the net population flows received by states such as Arizona, Florida and Nevada may indeed provide net benefits – even if they come from an elderly demographic. The challenge will be whether these states can continue to benefit as the Baby Boom generation ages.

The data relating to the migration of the subpopulation of young, single, college-educated adults at the MSA level show that some Sunbelt MSAs were just as appealing to this demographic group as the leading cities in other parts of the U.S. Based on comparisons in terms of the YSCMR (recall this is the ratio of net migration of young, single, college educated persons to the total 5+ population ), Sunbelt MSAs like Atlanta (8.4 per 1,000 persons 5+), Charlotte-Gastonia-Rock Hill, NC-SC (7.2), and Dallas (5.0) compare favorably with Denver (8.2), San Francisco (7.2), Portland (5.4), Seattle (5.3), and Washington, DC (3.6). But only 39 percent of the entire set of Sunbelt MSAs in the dataset had positive net migration of this subpopulation prized by proponents of the knowledge economy.

Another potentially negative trend for proponents of the knowledge economy was the widening of the gap among Sunbelt MSAs with respect to share of college graduates. Berry and Glaeser (2005) found a divergence in human capital levels across U.S. cities, and a similar situation occurred within the Sunbelt region in the 1990s. The variance for the proportion of college educated in the adult population across the 116 Sunbelt MSAs in the dataset increased from 27.0 in 1990 to 35.3 in 2000.

Initial analysis of the experience of the Sunbelt with respect to the link between a college-educated workforce and economic growth/success produced mixed results. Simple correlation statistics showed a strong relationship between the share of college graduates and per capita personal income, and a modest link with employment growth, but no statistically significant correlation with income growth. Similar mixed signals were found in examination of the rankings – all but two of the top MSAs in terms of income had above-average shares of college

graduates, but 16 of the top 25 in terms of income growth were below average in terms of share of college grads.

Except for the correlation between share of college grads and per capita income, the degree of explanatory power (measured by $R^2$) of the education variable in explaining variance in the economic measures was small – two to 12 percent depending on the particular combination of variables. Of course, this kind of result is not unusual in cross-section analysis. For example, the $R^2$ for the regression model of share of population growth as a function of share of college graduates in the Glaeser and Saiz analysis was .11. Unfortunately, this level of explanatory power is not particularly encouraging to policy makers searching for the right economic development strategy.

The results of our initial regression analysis also provided only minimal support for the link between percent college educated and economic growth. Of the three "true" economic variables included in the analysis, the education variable was indicated to have a positive and significant impact only in the case of employment growth (for the more complex model including a set of control variables), and the equation was only able to explain about eight percent of the variance in employment growth across the sample of Sunbelt MSAs.

In summary, the results of this initial exploratory analysis show some support for proponents of the knowledge economy. At the same time, they fail to show that expanding the college-educated workforce is the only ingredient necessary to insure economic success as some boosters of the knowledge economy seem to believe.

Clearly the Sunbelt is a diverse set of states and MSAs facing the same challenges as do many areas in the rest of the nation. Considerably more work will need to be done to understand these challenges and to fully understand what determines where knowledge economy workers will choose to locate and how much they will add to regional economies.

## ENDNOTES

The research on which this paper is based is part of a broader research agenda, known as the Productivity and Prosperity Project (for brevity often referred to by the acronym "P3"), supported by Arizona State University through its Office of the University Economist. Its mission is to study the determinants of regional growth and prosperity with a focus on innovation and the knowledge economy. Those interested in learning more about the project can look at its website: http://economist.asu.edu/p3. The authors wish to thank Ms. Burcu Eke for the many hours that she spent tabulating the IPUMS and other data used in the analysis and performing the statistical tests whose results are presented in the paper.

1. The geographic area defined as the Sunbelt for this study is based on U. S. Census Bureau definition. It is composed of 13 states (North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Tennessee, Arkansas, Oklahoma, Texas, New Mexico, and Arizona) plus Clark County, NV (Las Vegas), and a nine-county region of Southern California (Imperial, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura). Some parts of the analysis are based on state-level data. In those cases the Sunbelt region is defined to include the 13 states plus all of the states of California and Nevada.
2. The 116 MSAs in the dataset include two multi-state MSAs for which some portion of the area lies outside the formal Census definition of the Sunbelt region. In some cases, HUD's State of the Cities database included two or more PMSAs that are part of a single CMSA as separate observations. The authors have chosen not to include a complete list of the 116 MSAs but would be happy to provide one on request. All of the data in the dataset were compiled from the HUD database, with the exception of the per capita personal income data compiled from the BEA REIS CD and the climate measures from the U.S. Census Bureau's *City-County Databook*.
3. Data for this variable was not available in the Census report for seven MSAs in the dataset.
4. This situation is partly the result of the positive relationship between city size and living costs. Unfortunately, it was not possible to adjust the nominal income figures because cost of living indexes for all the MSAs in the dataset were not readily available.

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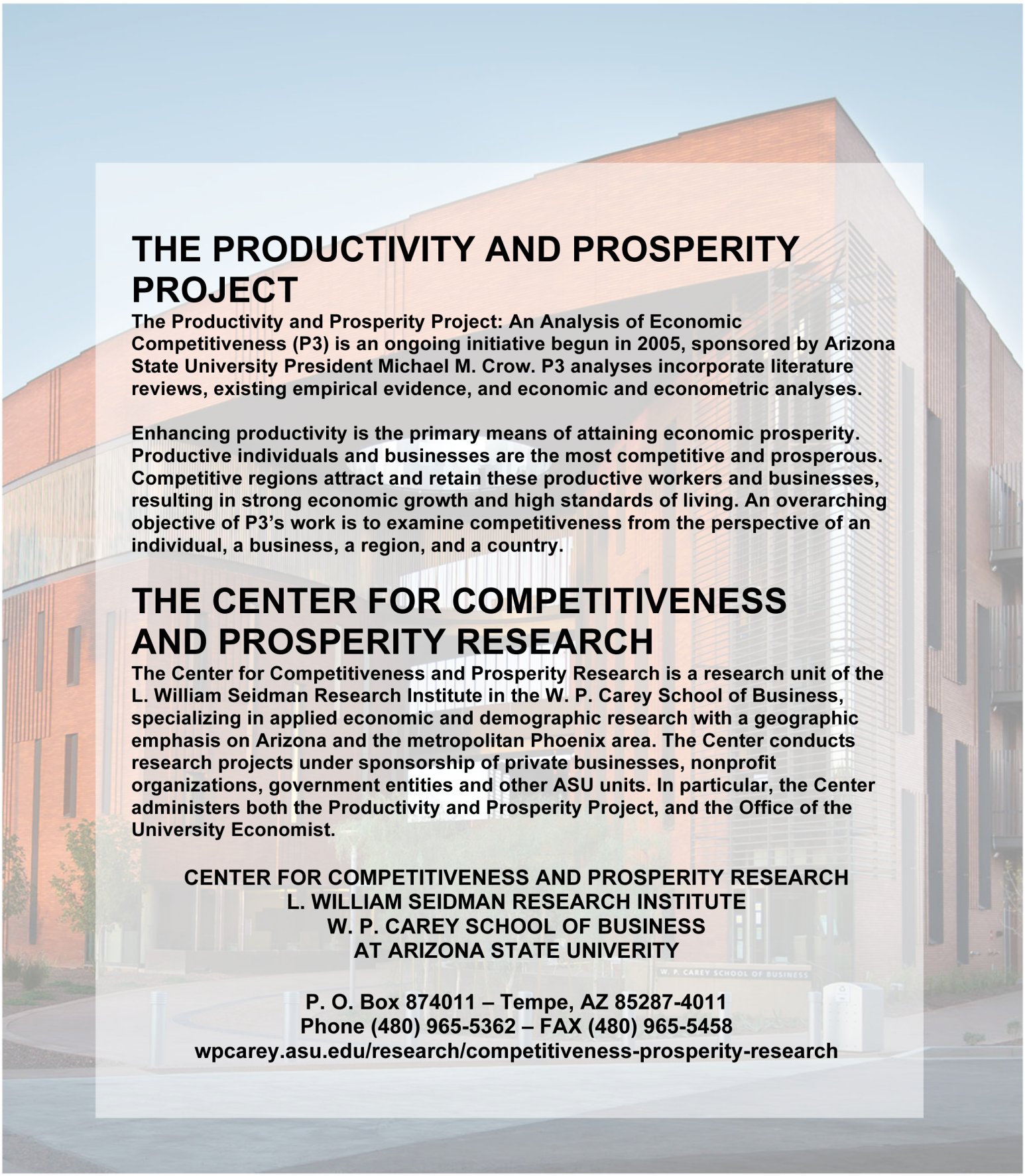

# THE PRODUCTIVITY AND PROSPERITY PROJECT

**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.**

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**L. WILLIAM SEIDMAN RESEARCH INSTITUTE**
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**AT ARIZONA STATE UNIVERITY**

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**Phone (480) 965-5362 – FAX (480) 965-5458**
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