Grads and Fads

The Dynamics of Human Capital Location

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ABSTRACT

The well-documented importance of educational attainment for economic growth raises a critical question for economic development practitioners: what factors cause some places to be more successful than others in disproportionately attracting and retaining college graduates? At a time when "brain drain" is a much-debated issue, and the attraction of "knowledge workers" is one of the hottest topics in economic development, there is still little evidence of what increases educational attainment in particular places. The research presented here investigates which factors accounted for the migration of, and overall changes in, the levels of college educated population in American metropolitan areas between 1990 and 2000. The study found that:

- **Key economic factors such as wages and unemployment have by far the largest impact on increasing levels of college educated population.** Metro areas with tight labor markets were much more successful at improving their educational attainment than areas with higher unemployment and lower wages.
- In particular, **college graduates are disproportionately attracted to places that offer employment in knowledge intensive industries and occupations:** the most successful metro areas had high concentrations of financial and business services industries and professional and managerial occupations.
- **Amenities and quality of life factors matter on the margin.** While a broad, composite measure of amenities (capturing both quality of life and economic factors) had a significant impact on growth in educational attainment, extensive examination of quality of life and cultural amenities indicators revealed very small or non-significant effects.
- **Young and single college graduates generally follow the same location patterns as all other college graduates, but are also attracted to larger, more diverse metropolitan areas.** Young and single college graduates, though mostly similar to all other college graduates, do seem to place more value on ethnic and cultural diversity.

It appears that college graduates are headed to places where their knowledge can be most productively deployed in the economy – places that offer concentrations of human capital intensive occupations and economic functions.

Preface and Acknowledgments

CEOs for Cities, a national leadership organization whose mission is to advance the economic competitiveness of cities, conceived a line of research to explore the key drivers of urban economic success. This work started with a project called The Changing Dynamics of Urban America. After investigating the effect of hundreds of variables on income, wage and population growth in American cities and metropolitan areas, that project found that educational attainment (and specifically the percentage of the population with a college degree or higher) is the single most important driver of urban economic growth.[1] The research presented here was then designed to identify which factors account for the production, attraction and retention of college-educated population in American metropolitan areas.

We are very grateful to CEOs for Cities, its members and staff, for their commitment to pursuing the analysis, and for their active support and guidance throughout the project. Very helpful comments, at critical stages of the work, were also provided by Bruce Katz, of the Brookings Institutions Metropolitan Policy Program, and by Joseph Cortright, of Impresa, Inc. Jack Kaplan provided outstanding research support.

The project began by building one of the most comprehensive, diverse databases of variables bearing on the economic performance of cities and metropolitan areas. Many people generously shared previously assembled and specialized data. We are particularly indebted to Janet Rothenberg Pack, Richard Voith, Stephen Malpezzi, Robert Atkinson, Saurav Dev Bhatta, Reid Ewing, Rolf Pendall, Don Chen and Ned Hill. The original database was then expanded to include new data related to potential causes and patterns of migration of the college educated. We are very grateful to Edward Glaeser and Albert Saiz, William Frey, Paul Gottlieb, Ross DeVol, Kevin Stolarick and Brian Knudsen, and Prabal Chakrabarti for generously sharing invaluable data, and to Cynthia Taeuber and Alen Amirkhanian for their excellent guidance on data sources.

I. INTRODUCTION

Extensive work has documented the importance of human capital to economic growth.[2] Labor, of course, is one of the main ingredients of economic production. Human capital refers to the stock of knowledge, skills and expertise embedded in the labor force, which directly affect labor's productivity. Educational levels directly enhance and reflect human capital, and consequently are a major component of economic productivity.[3] As a function of both technological change and increased human capital (and particularly their interaction), the value of output per hour worked in this country has increased more than 10-fold over the last 100 years.[4] Due to the interaction of human capital and technology, economies with a larger total stock of human capital experience faster growth. Similarly, education increases labor productivity and generates technological change.[5]

With globalization, continuing technology development, and the other facets of the "knowledge economy,"[6] economic productivity is becoming increasingly reliant on human capital. Furthermore, as a key component of economic growth, human capital has several unique attributes: it directly increases growth by increasing labor productivity and generating technological change, innovation and entrepreneurship.[7] It also operates indirectly, through the "knowledge spillover" effects that arise from the interaction of educated workers. This interaction, in turn, multiplies the benefits of education, as smart, experienced people exchanging ideas generate much more value together than each would alone.[8] As a result, more skilled people in denser areas are more productive and earn more,[9] and denser cities with higher levels of human capital have an advantage which continues to build on itself. Partly due to this phenomenon, we now observe a pattern of divergence between high and low performing cities both with respect to economic growth and with respect to growth in educational attainment.[10]

For present purposes, human capital has another very important attribute: unlike, for example, natural resources, but like financial capital, human capital is highly mobile. If human capital, including particularly educational levels, is the single most important ingredient for economic success, it becomes important for those concerned about urban prosperity to consider what factors affect cities' success in increasing their educational attainment. In addressing this issue, a key threshold question is what constitutes educational success: what is it that cities should try to achieve with respect to education? Intuitively, success could be measured by the total number of college graduates. However, this creates a bias towards larger cities, which have more college graduates just by virtue of their larger population. In fact, what seems to drive prosperity is not the absolute number of college graduates, but the *proportion* of college graduates relative to the total population – referred to here as *educational attainment*.[11]

Theoretically, cities can increase their educational attainment in three basic ways[12]: production, attraction and retention. Cities can produce more college graduates by increasing the number of people who complete college.[13] Alternatively, they can attract college graduates from elsewhere. Finally, urban areas can improve their retention of college-educated population by increasing the number of people who choose to stay in the area after coming from elsewhere or graduating locally.[14]

Despite general agreement on the importance of increasing educational attainment to drive economic growth, there is significant controversy about how to accomplish this objective. In recent years, academics and practitioners have focused primarily on attracting and retaining college graduates, proposing several theories to explain the location patterns of college graduates. For the most part, these theories constitute variations of one basic question: do firms follow people or do people follow firms? Based on the answer, the implications for policy practice are radically different: if people follow firms, policymakers should focus on creating a thriving economic environment; if firms follow people, policymakers should focus on improving quality of life and making their city an attractive place where productive, high-skilled workers would want to live.

Traditionally, economic development practice focused on attracting companies by creating a favorable economic environment through tax breaks, subsidies, investment in infrastructure, and so forth. The underlying assumption was that the creation of new jobs would then attract productive workers.

Beginning in the 1980s, though, researchers increasingly emphasized two new developments flowing from the effects of the knowledge economy. First, as knowledge and so human capital inputs become a more crucial component of productivity, firms may be more sensitive to picking locations which will be otherwise attractive to their educated workers, or that offer pools of educated workers. Second, as transportation costs for goods, but not people, decrease substantially, manufacturing firms have fewer reasons to highly concentrate in cities, and the benefits of concentration flow more to service firms and highly educated workers. Consequently, cities may become as much centers of consumption as of production.[15] In the practitioner and policy arenas, this focus on the economic importance of concentrations of human capital has led to a shift in emphasis away from economic factors and towards urban consumption amenities and quality of life in efforts to attract and retain the educated.

While many studies continue to suggest that economic factors such as availability of jobs and a thriving local economy still play an important role,[16] the idea that less tangible aspects of a city's "quality of life" are what really matters to the highly educated people that cities and firms seek to attract has become increasingly popular. For instance, in a widely read and appealing book on the role of creativity (and creative people) in today's economy, Richard Florida argues that lifestyle amenities are a critical factor in the location decisions of knowledge workers, and that the prosperity of urban areas depends on their ability to create a tolerant and culturally thriving social environment.[17]

The conclusions and policy recommendations that emerge from this debate range from a total disregard for quality of life issues in favor of strictly business-oriented interventions to a complete focus on consumer amenities and quality of life. While the debate is often phrased as a choice between these two alternatives, the reality is likely more complex. In particular, if changes in the economy place increasing importance on knowledge factors, it is possible that different economic factors – such as concentrations of high human

capital occupations and economic functions – deserve attention.. In turn, it may be that both firms and workers now seek pools of productively deployed human capital.

II. METHODOLOGY

We set out to investigate these issues first by gathering data on the social, economic and demographic characteristics of metropolitan areas.[18] In particular, we gathered data on the demographic composition of urban areas, on their industry and occupation mix, as well as on various quality of life indicators, including indexes compiled for the Places Rated Almanac[19] and for Richard Florida's book "The Rise of the Creative Class."[20] The project also gathered various measures of the vibrancy of the business environment and quality of the public school system, as well as a wealth of data on migration patterns compiled from the Census Bureau's County-to-County Migration dataset. We then analyzed the relationship of these variables to growth in educational attainment through a series of econometric models. To increase the likelihood that the project was identifying causal effects, the regression models followed the Barro/Glaeser approach of relating the independent variables in 1990 to growth in attainment over the period of 1990 to 2000.[21]

The work was done at the metropolitan level for all 316 MSAs and PMSAs. The focus on growth in educational attainment at the metropolitan level is due to the fact that the factors affecting attraction and retention of knowledge workers *between* metropolitan areas are likely quite different than those affecting attraction and retention *within* metropolitan areas. For example, while crime and the quality of local schools are clearly critical when choosing where to live within a metropolitan area, these factors may be less important in determining migration between metropolitan areas (since nearly all metropolitan areas have some places within them with low crime and good schools).

Since educational attainment refers to the proportion of college graduates, it is a function of the number of college graduates and of non-college graduates. Examining change in educational attainment requires looking at the combined effects of several different factors on each of these two components. In particular, as mentioned above, change depends on the *production* of new BAs (people graduating from college), on the inflow of new BAs (people moving in, or *attraction*), and on the outflow of BAs (people moving out or dying, affecting *retention*). At the same time, however, the proportionate change is affected by the same factors with respect to *non*-BAs (people who become adults without college degrees; non-BAs moving in; and non-BAs moving out or dying). Net change in attainment reflects the combination of all of these factors.

Patterns of Changing Attainment

Cities can grow in educational attainment in several distinct ways. This fact is well exemplified by the patterns of change in attainment in the most populous MSAs, shown in the table below.

MSA Name	BAs in 1990	Non-BAs in 1990	Change BAs	Change Non-BAs	Pct BA 1990	Pct BA 2000
Los Angeles-Long Beach, CA PMSA	1,223,321	4,257,511	238,485	151,389	22%	25%
New York, NY PMSA	1,407,055	4,306,445	385,620	40,177	25%	29%
Chicago, IL PMSA	1,154,571	3,567,104	428,713	109,691	24%	30%
Philadelphia, PA-NJ PMSA	727,054	2,489,045	203,542	-60,090	23%	28%
Detroit, MI PMSA	483,309	2,249,828	178,833	-7,838	18%	23%
Washington, DC-MD-VA-WV PMSA	1,022,769	1,741,877	334,836	148,377	37%	42%
Houston, TX PMSA	503,838	1,512,904	187,222	336,697	25%	27%
Boston, MA-NH NECMA	699,937	1,464,990	217,462	-59,860	32%	39%
Atlanta, GA MSA	488,927	1,382,281	351,220	403,031	26%	32%
Dallas, TX PMSA	447,341	1,218,244	206,043	306,320	27%	30%

This table reveals three key patterns by which a city can increase its level of educational attainment, reflecting what is happening in the vast majority of urban areas:

- First, urban areas can grow in both college and non-college population, but the college population grows faster in absolute numbers. This is the case of Los Angeles, New York, Chicago, and Washington DC.
- Second, the college-educated population grows while the non-college educated population shrinks. This is what happened in Philadelphia, Detroit, and Boston.
- Third, both the college educated and the non-college educated populations increase, and the non-college population grows faster in absolute numbers. In this case, the percentage of college graduates can still increase if college graduates are a greater proportion of the new population than the starting population. This is the case of Houston, Atlanta, and Dallas.

To sort out these complex issues, we first analyzed the overall change in educational attainment through a reduced form model (using change in the percentage of college-educated population as the dependent variable). We then looked separately at each of the components of change in educational attainment by building six additional sets of

models. The first set looked at what factors drive the log change of population with college degree or higher between 1990 and 2000 at the MSA level; the second set examined what drives the log change in non-college educated population.[22] Examining the effects on educated and on non-educated separately allows us to see which factors are more important to growth of one group than the other.[23] The two combined account for overall change in educational attainment.

The next two sets of models look more specifically at the issue of attraction and retention, by investigating the factors that influence the net *migration of college graduates*. The two dependent variables used in these models were the net migration of college graduates between 1995 and 2000[24] and the net migration of non-college graduates over the same period. Initial attempts to model factors driving net migration of college graduates revealed an overwhelming "college town" effect: cities that have a high number of colleges are "net exporters" of college graduates, while cities that have fewer colleges are "net importers" of college graduates, regardless of how successful they are (relative to each other) in retaining and attracting college educated population. In order to account for this problem, the models controlled for the percentage of the population enrolled in college, indicating the degree to which a city can be considered a college town.

Finally, the last two sets of models focus on how the factors affecting attraction and retention vary by age group. In order to get at this question, the models looked at the factors affecting the in-migration of the "young, single, and educated" cohort (defined as 25-39 year old singles with a bachelor's degree or higher) compared to the rest of the college educated adult population. The choice of this cohort is due to two main factors: first, the young and educated have been the focus of much of the debate in the literature, and are perceived as a key demographic for economic growth;[25] second, this group is the most mobile,[26] and therefore a likely target for attraction strategies.[27]

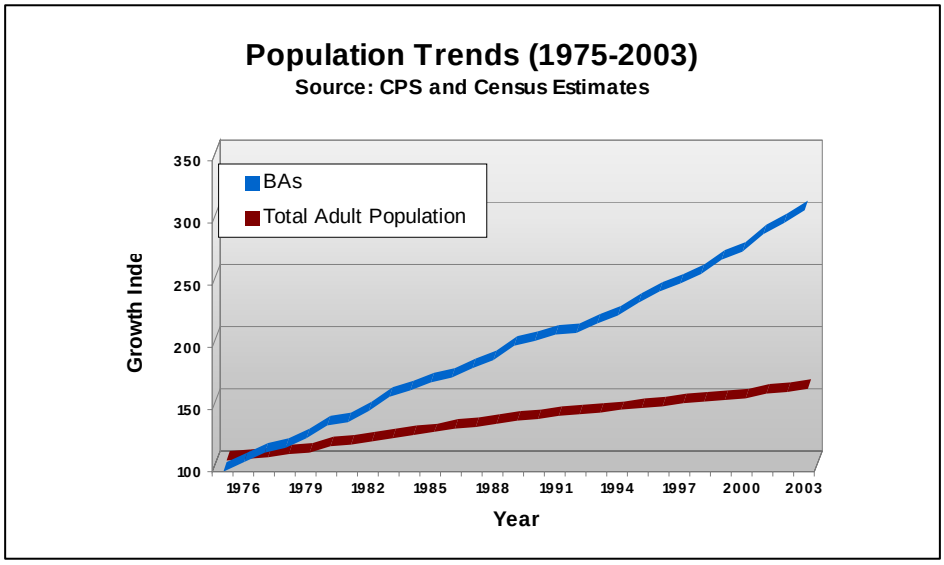
With relatively few exceptions, the findings from the overall growth (i.e. change in attainment) and from the migration models were similar. In order to ensure the robustness of the results, we report here only the findings that are consistent across these two sets of models. Detailed tables with the results of the models cited in the text are reported in Appendix A. The tables reporting the complete model results are available from the authors upon request.

III. FINDINGS

A. Context: Educational Levels Are Increasing Rapidly

1. <u>The American population is getting more educated at an astounding pace.</u>

The number of adults with a college degree or higher grew by *38%* over the 1990s. This is particularly significant considering that over the same time period, the total adult population grew by only 15%. The *production* of college-educated population is thus increasing dramatically.



As a result, the percentage of college educated population almost doubled over the past 25 years, increasing from 13.9% in 1975 to 27.2% in 2003.

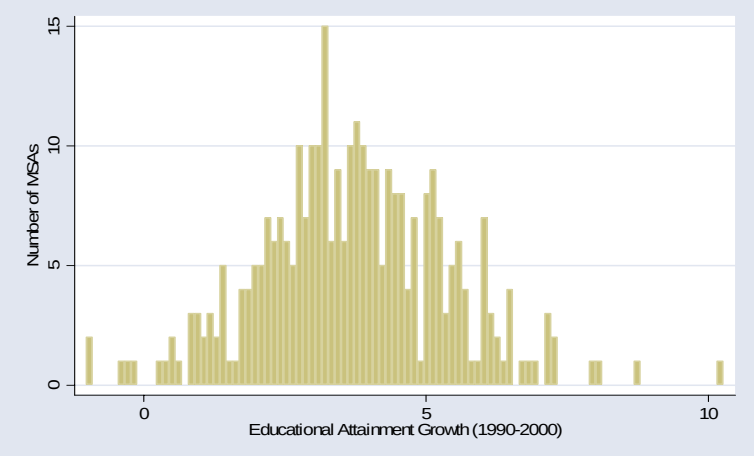
2. **Every** city is getting more educated, but there is great variation.

Every MSA in the sample experienced absolute growth in the number of college graduates, and almost all MSAs increased their percentage of college graduates as well. Only 5 metropolitan areas (Odessa-Midland TX, Merced CA, Yuma AZ, Casper WY, and Visalia-Tulare-Porterville CA) had a decrease in the proportion of college graduates between 1990 and 2000.

Table 1: Top 10 MSAs for Growth in College Graduates

MSA Name	Percent Change in BAs	Income Growth
Las Vegas, NV-AZ	124.5%	7.7%
Naples, FL	109.2%	9.3%
Wilmington, NC	106%	17.1%
Fayetteville-Springdale-Rogers, AR	89%	8.8%
Laredo, TX	85.8%	21.5%
Boise City, ID	83.8%	19.3%
Austin-San Marcos, TX	80.5%	34.6%
Kenosha, WI	78.1%	14.7%
Charlotte-Gastonia-Rock Hill, NC-SC	77.8%	19%
Provo-Orem, UT	74%	20.7%

While the population of urban areas consistently got more educated, there is great variation in the growth rates of college educated population over the 1990s: growth rates ranged from a low of 5% (Odessa-Midland TX) to a high of 125% (Las Vegas). Three cities (Las Vegas, Naples FL, and Wilmington NC) had greater than 100% increase in college grads. In contrast, 48 MSAs had a decrease in the number of non-college graduates, and 24 had a drop in total population.

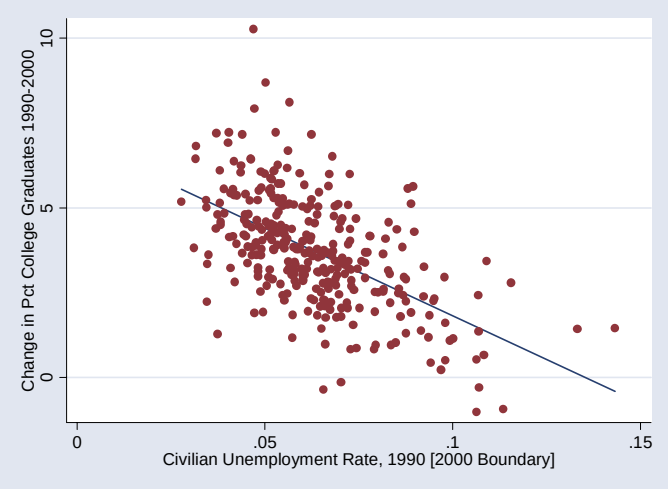


B. Key Drivers of Growth: Focus on the Economy

Very few factors have a positive effect on the growth in college graduates and a negative effect on non-college graduates, or vice versa: there is a high correlation between the growth in these two groups and, generally, the similarities are much greater than the differences in what drives location decisions of the college and non-college educated. This being said, given our interest in the proportion of college graduates, and not only in their number, we will pay particular attention to the factors that demonstrate disproportionate effects for college graduates relative to non-college graduates.

1. Labor Market Conditions are the Most Important Drivers of Growth in Educational Attainment.

Key economic variables, indicative of basic factors like labor and housing markets, had by far the largest effects in the models. In particular, college graduates are disproportionately attracted by metropolitan areas that offer higher wages and more employment opportunities.[28] The average wage per job in 1990 had a positive effect on the migration of college graduates and a negative effect on the migration and growth of non-college graduates over the subsequent decade (see Table A.1). At the same time, the unemployment rate in 1990 had a strong negative effect on growth and in-migration of college educated population. Metropolitan areas like Raleigh-Durham-Chapel Hill, NC, for instance, which had low unemployment rates in 1990 registered high growth in educational attainment during the following decade. Conversely,



as illustrated by the table below, metro areas with high unemployment registered the lowest rates of attainment growth.

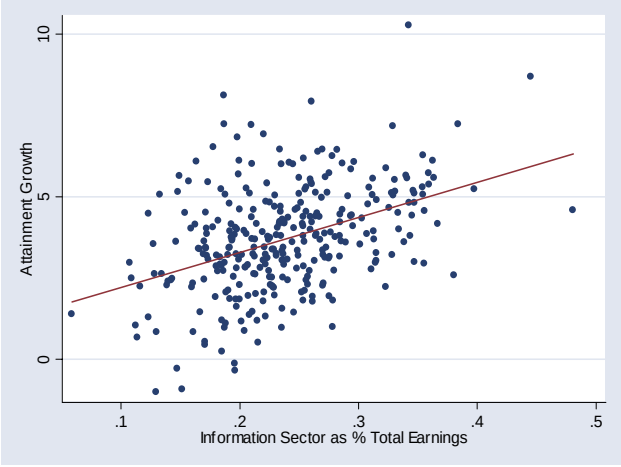
Table 2: Rank in Educational Attainment for the 10 MSAs with Highest Unemployment (Top 100 MSAs)

MSA Name	**Unemployment Rate (1990)**	**Attainment Growth Rank 1990-2000 (Top 100)**
McAllen-Edinburg-Mission, TX	14.3%	95
El Paso, TX	10.7%	96
Fresno, CA	9.8%	98
Bakersfield, CA	9.7%	99
New Orleans, LA	9.2%	76
Detroit, MI	8.9%	31
Jersey City, NJ	8.8%	19
Stockton-Lodi, CA	8.7%	97
Youngstown-Warren, OH	8.3%	84
New York, NY	8.3%	45

While in the migration model the unemployment rate had a strong negative effect on both college graduates and non-college graduates, the effect was stronger for college graduates in particular. *With respect to the debate on whether people follow jobs or firms follow people, it is at least clear that college graduates disproportionately flee places with a scarcity of jobs and migrate to metropolitan areas with tight labor markets.*

2. <u>It's not just the Economy – It's the Knowledge Economy</u>

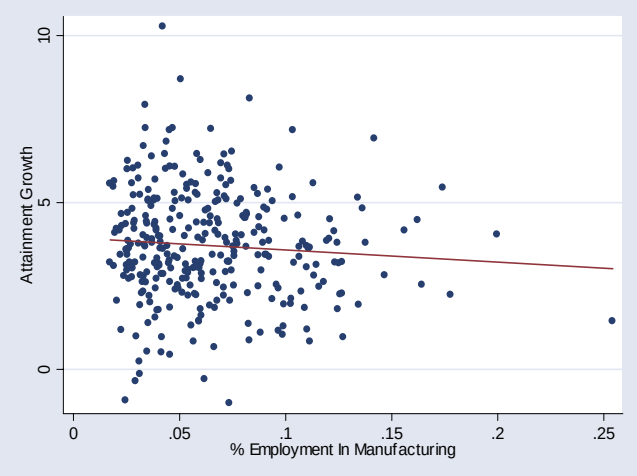
Taking a more detailed look at the economic factors, by examining what industries, occupations, and other characteristics of the economic environment have a disproportionate impact on attraction and retention of college graduates, reveals that knowledge factors are particularly important. Not surprisingly, the presence of knowledge intensive industries has a positive effect, along with a concentration of knowledge-intensive occupations. These effects are important for all college graduates, but are particularly significant for the young, single and educated group.



Following Matthew Drennan's classification of all traded goods and services into six broad industry groups,[29] the project tested the effect of the share of earnings in information sector industries (Financial Producer Services, Other Producer Services and Advanced Consumer Services) and in goods production and distribution industries (Primary Production, Manufacturing, and Distribution). In the growth models, the share of earnings in financial services industries

had a positive effect on college graduates, while it had no effect on non-college graduates. In the migration models, the effect was positive and significant for both groups, but it was much larger for college graduates (see Table A.2). Accordingly, metro areas like San Francisco, CA, Boulder, CO and Bloomington-Normal, IL, characterized by a very high concentration of earnings in information sector industries, experienced very high growth in educational attainment, while cities with higher concentrations in goods production and distribution did not perform as well.

These results were reinforced when we looked at the distribution of employment across more detailed industry categories.[30] In particular, the presence of knowledge-intensive industries disproportionately affected college graduates: as shown in Table A.3, employment in the Finance, Insurance, and Real Estate sector had a positive effect on growth in (and migration of) college graduates, while it was not significant for the non-college educated. Business Services was also positive and significant for both groups (see Table A.4). In general, these industry effects were much larger in the migration models,[31] and proved to be particularly significant for the attraction and retention of the young, single and educated.[32]



Having a large share of the workforce employed in knowledge-intensive occupations is also important:[33] metropolitan areas like Boston, MA or Austin, TX, that had a larger share of employment in executive and managerial occupations in 1990 experienced higher college graduates in-migration rates over the subsequent period, while cities that had a higher concentration of precision production occupations (such as Riverside, CA) attracted primarily non-college educated population. These results were even stronger for the young, single, and educated: executive and managerial occupations had a much larger impact on this group, while lower-skill occupations such as precision production and material moving had a negative and significant effect (and a non-significant effect on all other college graduates).[34]

Overall, college graduates, and especially young, single college graduates, are migrating to places with knowledge intensive industries and occupations.

3. <u>"Amenities," Broadly Defined, Matter</u>

By "amenities" we mean very broadly the characteristics of particular places for which people are willing to pay a premium.[35] This premium is measured in terms of the differential between wages and housing values:[36] places where housing values are higher than expected based on their wages are considered high amenities cities (think Honolulu,

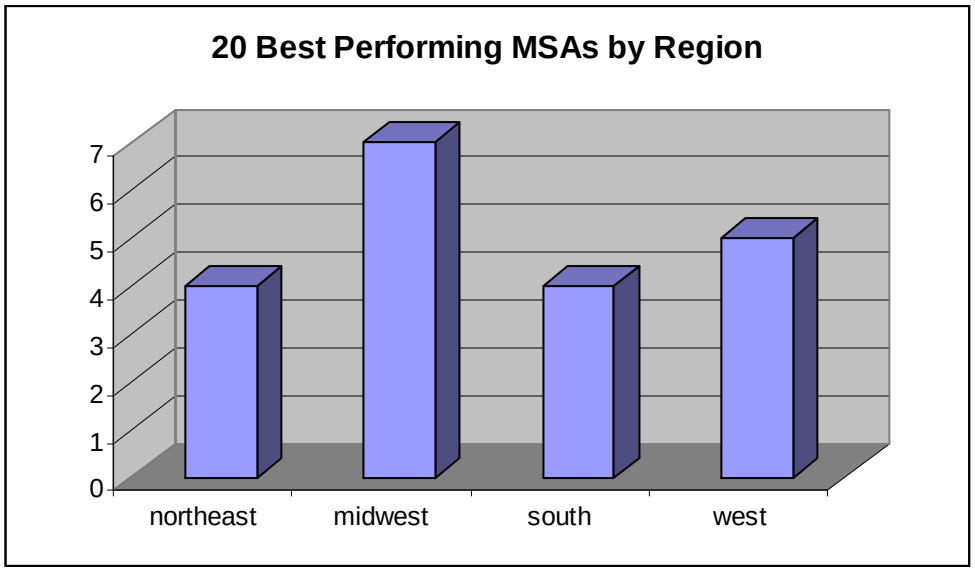
or Boston, MA); conversely, places where housing values are lower than expected are considered low amenities places (think Flint, MI, or Anchorage, AK). In other words, people will move to places that cost a lot compared to how well their jobs pay if the places offer other benefits. These other benefits -- what we are calling "amenities" – encompass both quality of life and economic factors, and can range from good weather to cultural activities to the concentration of jobs in particular sectors of the economy.

Based on this very broad measure, amenities are clearly important for the attraction and retention of college educated population, and their effect is positive and significant in all of the base models.[37] In the migration models, in particular, the effect is positive for college graduates but non-significant for non-college graduates (see Table A.1).

4. Measurable Quality of Life Factors Only Matter on the Margins

From a policy perspective, this broad measure of amenities has limited utility, since it does not indicate *which* amenities matter (for example, it does not distinguish economic and quality of life amenities), and since many aspects of amenities cannot be affected by policy (e.g. Chicago cannot decide to have Honolulu's climate and ocean amenities). Within the broad concept of amenities, the project did break out and examine numerous quality of life amenities, and found that overall, quality of life factors were not nearly as significant as the economic factors mentioned above. The model results revealed that some factors commonly perceived as important are in fact irrelevant, while others might have a marginal effect but are not as significant as commonly believed.

The weather is among the quality of life factors that are commonly considered important: sunbelt cities are usually considered successful because they are able to attract large numbers of people due to their mild climate; cities in the Midwest and in the Northeast, on the other hand, which have a colder and rainier climate, have been constantly declining in population and are considered to be at a disadvantage. The model results, reported in Table A.7, confirm that a mild climate is important for population growth, but the effects are the same for the non-college educated population as for the college-educated population.[38] In other words, cities with nice weather attract both college and non-college educated people, but since they equally attract both groups, they usually do not improve overall educational attainment. This is well exemplified by the fact that, of the 20 best performing MSAs for attainment growth, only 6 are in warm climates, while 7 are located in the Midwest and 4 are in the Northeast.



The project also tested the effects of a number of other quality of life factors such as the presence of museums, bars and restaurants, entertainment venues, and so forth. The model results revealed that these factors were generally either non-significant or only marginally important. In particular, the Recreation Score from the Places Rated Almanac was the only amenity that had a positive effect on growth in college graduates overall (and was not significant for non-BAs).[39] This measure includes a variety of quality of life factors, including restaurants, golf courses, zoos, professional sports, and coastline. While this measure was significant in the models, its impact was smaller than basic economic factors such as unemployment or industry concentrations.

To the extent that this type of amenity matters, it seems to matter more for the young, single, and educated group. Factors like amusement and recreational service establishments and the Places Rated Art Score (measuring the presence of cultural amenities such as art galleries and symphony orchestras) were positive and significant for the young, single, and educated, even though not significant for all other college graduates (or for college graduates overall).

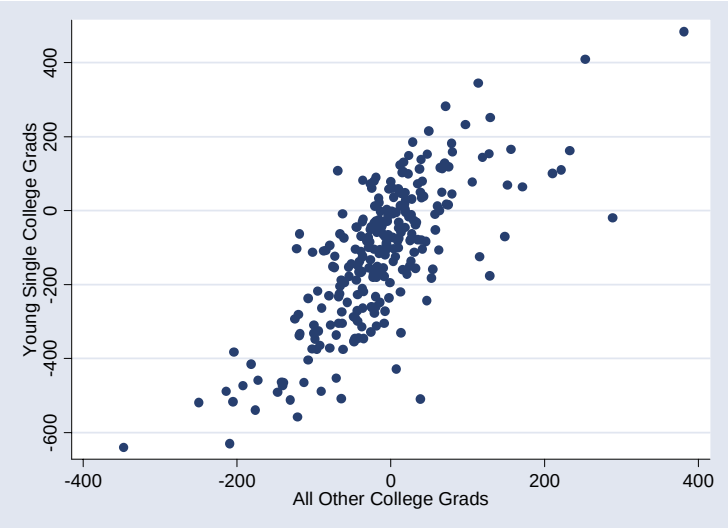
Indicators of cultural amenities and social environment developed by Richard Florida for his book *The Rise of the Creative Class* were also examined. These included the Gay Index, which measures the degree of tolerance of the urban environment by calculating the over or under-representation of gay couples relative to the nation as a whole; the percentage of occupations in the "Super Creative Core,"[40] measuring the creativity of the urban population; and the Bohemian Index, which measures the concentration of artistically creative people such as musicians, authors, actors, artists, and so forth. With the exception of the Super Creative Core, which had a moderate but disproportionate negative effect on the overall growth and migration of college educated population,[41] none of these factors had consistent and significant effects on the growth and migration of college educated population.[42]

In the growth models, the Gay Index was not significant for the college-educated or for the non-college educated. In the migration models, on the other hand, this factor had a very small[43] negative effect on the migration of non-college educated population, and no effect on the migration of college graduates (see Table A.11). If this factor has an impact on growth in educational attainment, it is not due to the fact that it disproportionately attracts college graduates, but to the fact that it disproportionately reduces the attraction and retention of non-college educated population.[44]

The Bohemian Index did not have a significant and disproportionate effect on either the growth or the migration rate of college graduates overall (see table A.10).[45] It should be noted that these factors may prove significant to location *within* a metropolitan area (as distinct from between metropolitan areas), which was not examined here.

6. The Migration Patterns of the College Educated Vary Little by Age

Contrary to the popular belief that the young and educated are attracted to a handful of "hip" cities, for the most part the young and single college graduates migrate to the same places as all other college graduates: the correlation coefficient between the migration rates of the two groups is a high 0.75. Only a few cities (outliers in the scatter plot below such as Punta Gorda, FL and San Luis Obispo, CA) seem to not fit this pattern, and generally not because they disproportionately attract the single, young and educated, but because they disproportionately attract other college graduates.



7. The Young, Single and Educated Prefer Larger, More Diverse Cities

Despite the fact that, overall, the factors driving migration of the young, single and educated have generally been similar to those affecting other graduates, one further distinction stands out: *young college graduates tend to migrate to larger and more*

diverse metropolitan areas, reflecting perhaps a higher degree of tolerance and appreciation for diversity.[46]

Several indicators of cultural and ethnic diversity proved to be positive for the young, single, and educated but either negative or non-significant for the rest of the college educated population. In particular, the percentage of Hispanics was positive and significant for the young and single, but negative for all other college graduates. On the other hand, the percentage of African Americans was negative and significant for all other graduates, but non significant for the young and single cohort, and the percentage of Whites was positive and significant for all other college graduates but not significant for the young, single, and educated. Also, culturally diverse metropolitan areas were more attractive to the young, as the percentage of foreign-born proved positive for the young and single and non-significant for everybody else.

8. Regional Effects

Even after controlling for all of the factors described so far, the regional indicators remained highly significant. In particular, the Northeast had much lower growth in educational attainment than the West, Midwest, and South.[47] California presents another interesting regional effect, as the California variable had a very strong and disproportionate negative effect on both growth and migration of college graduates. These regional differences might reflect specific policies, such as growth control policies in California, or unique economic factors specific to those areas. That these regional differences are not explained by any of the other variables included in the models suggests that there are features of the economy and environment of these two regions that deserve further examination.

IV. CONCLUSION

Despite the recent emphasis on quality of life as the key to attracting knowledge workers, economic factors are still the main driver of growth in college-educated population. Basic issues like wages, employment, and cost of living are by far more important than cultural amenities. If a city has limited economic development dollars, and feels it has to choose between investing in creating jobs or in improving cultural amenities, the choice is clear: *focus on the economics*.[48]

At the same time, focusing on the economics reveals that the dichotomy between chasing firms and chasing educated people is misleading. Firm and educated worker location are both part of a larger dynamic: *in the knowledge economy, both firms and workers are drawn to pools of human capital deployed in knowledge-intensive occupations and economic functions*.[49] In other words, the best way to attract and retain knowledge workers is not to focus primarily on amenities for individual workers or on individual firms, but instead to focus on building an economy characterized by high-human-capital occupations and functions.

Building a human capital intensive economy will entail a mix of several different interventions, potentially aimed both at industries and workers, and tailored to the circumstances of each city. While we can identify potentially promising interventions, this research was not addressed to the efficacy of specific programs and, in particular, did not address the critical questions of capacity and cost. For example, while weather may be important, it is not a factor that leaders have the capacity to change. On the other hand, while improving quality of life factors may be less important, they may be easier and less expensive to influence. The recommendations below should be considered with this caveat in mind.

First, building a human capital intensive economy means focusing on the basics of a strong knowledge economy. This includes increasing human capital through education in all of its forms, including increasing the expertise and knowledge embedded in the workforce. This begins with elementary and secondary education, continues through college, and applies to on-the-job and other continuing skill development. Furthermore, knowledge institutions – from industry research associations to universities —are also important to anchor knowledge networks and facilitate entrepreneurship. Very important basics also include investing in innovation, from research facilities to commercialization of knowledge, and in knowledge infrastructure.[50]

Next, though, building a human capital-intensive economy means understanding the local opportunities to target specific occupations and economic functions. A city may be doing poorly, for example, either because it lacks human capital-intensive industries or because, even though it has those industries, it has only the lower human capital functions within them (i.e. it may have communications industry, but only the low-end back office functions).[51] By analyzing current occupational and functional strengths, which of the current occupational and functional concentrations are high in human capital, which are likely to grow, how they fit together and might cross-fertilize, and their susceptibility to intervention, it is possible to develop more strategic development efforts. This may lead to developing particular industry sectors, such as business services, that predominantly employ highly educated workers; or it could entail focusing on particular knowledge-intensive functions that cut across industries, such as management, market research, or data processing.

Finally, the selection of particular sectors, occupations or functions allows identifying the most efficient economic development activities to enhance them. These may be a new venture capital fund or other activities to support entrepreneurship, commercialization of knowledge and business growth in selected sectors. The analysis may lead to targeted educational activities for specific industries or functions, or to creating rich networks to increase the efficiency of the job market and facilitate knowledge spillovers with respect to particular occupations. It may mean investing in institutions such as industry research centers or professional organizations. Indeed, if the other elements are in place, investment in amenities and quality of life may be the missing ingredient. The key is to identify the interventions that will build high human capital occupations and functions in the local economy – that's where college graduates are headed.

Appendix A: Methodology, Regression Tables and Data Sources

The analytical strategy adopted by this project is to regress change from 1990 to 2000 (or from 1995 to 2000 in the migration models) on initial conditions in 1990. This modeling approach was popularized by Barro (1991)[52] in an influential paper on cross-country growth, and adopted for urban growth models by Glaeser et al. (1995).[53] By regressing subsequent growth on initial conditions, this approach rules out spurious contemporary correlation between the dependent and independent variables, and consequently is more likely to identify causal relationships.[54]

As described in the text, the project analyzed the effect of various factors on seven dependent variables. The first set of models looked at the drivers of change in the percentage of college-educated population between 1990 and 2000. In order to tease out the differential effects on change in college and non-college educated population (which could not be assessed from the "reduced form" model), the second set of models looked at log change in college educated population and log change in non college educated population between 1990 and 2000. The third set then looked at net migration of college graduates and non college graduates between 1995 and 2000. The fourth set of models looked at net migration of single college educated 25-39 year olds between 1995 and 2000 and net migration of all other college educated adults over the same period. Models for college and non-college graduates were estimated jointly by seemingly unrelated regression, which allows us to test whether coefficients are equal for the two groups. The same approach was followed to test differences between the models for young, single college graduates and all other college graduates.

The models were developed in two stages. First, the project developed a "base model" for each pair of dependent variables, including a set of core explanatory variables. These base models are intended to identify the key variables that should – based on previous theoretical and empirical research, as well as analysis of the 1990-2000 data – appear on the right-hand side of any growth regression. The variables included in the base model are the initial unemployment rate, the average wage per job, the regional dummy variables, including a dummy for metro areas located in California, and the Amenity Index. The Amenity Index was constructed based on the residuals of a regression of wages on housing values. The migration models also included a variable measuring the percentage of population enrolled in college, which helped control for the "college town effect" discussed in section II.

In the second stage of model development, the project sequentially added new variables to the base model, in order to identify which factors had a significant impact on growth in educational attainment. For instance, in order to measure the impact of a vibrant nightlife and cultural environment, the base model was integrated with variables on the number per capita of museums, eating and drinking establishments, movie theaters, and entertainment venues (see Table A.8). Space limitations do not permit describing each step of the analysis for all three sets of models. However, the most important findings are

reported in the text of the report, and the related regression tables are attached for reference.

The initial estimation sample included 316 MSAs. Due to limitations in the migration data, the models for the young, single and educated excluded PMSAs, and were thus based on 261 cases.

Table A.1: Base Model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-21.334	-1.454	0.066	-1,126.354	-827.922	-954.071	-945.169
	(4.36)**	(3.95)**	(0.24)	(4.89)**	(5.81)**	(1.78)	(3.80)**
ln(Average Wage per Job)	0.771	-0.002	-0.080	88.641	-86.984	540.192	71.702
	(0.89)	(0.05)	(2.25)*	(2.90)**	(4.61)**	(6.05)**	(1.73)
Amenity Index based on House Value-Wage Regression Residuals	0.658	0.109	0.088	79.490	6.078	181.263	110.143
	(1.80)	(4.27)**	(4.68)**	(5.03)**	(0.62)	(4.78)**	(6.27)**
California	-1.438	-0.192	-0.117	-53.736	-22.109	-140.044	-52.004
	(3.53)**	(6.32)**	(5.24)**	(2.86)**	(1.91)	(2.90)**	(2.33)*
Northeast	-0.603	-0.090	-0.059	-39.167	0.076	-116.626	-31.616
	(2.24)*	(4.29)**	(3.82)**	(3.01)**	(0.01)	(3.88)**	(2.27)*
South	-0.671	0.025	0.056	25.645	15.508	56.249	17.755
	(3.59)**	(1.68)	(5.04)**	(2.71)**	(2.65)**	(2.61)**	(1.78)
West	-0.559	0.070	0.102	35.193	20.793	45.356	17.537
	(2.10)*	(3.31)**	(6.61)**	(2.70)**	(2.58)**	(1.47)	(1.23)
Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	13.127						
	(5.82)**						
% Civilian Labor Force Employed in Educational Services	-12.304						
	(3.71)**						
% Civilian Population Enrolled in College (1990)				-1,133.438	-101.864	-2,062.624	-895.729
				(17.89)**	(2.60)**	(15.08)**	(14.14)**
Constant	-3.538	0.432	0.861	-757.181	920.115	-5,265.686	-596.433
	(0.42)	(0.88)	(2.39)*	(2.45)*	(4.81)**	(5.85)**	(1.43)

Observations	315	316	316	316	316	259	259
R-squared	0.50					0.58	0.53
Absolute value of z statistics in parentheses							
* significant at 5%; ** significant at 1%							

Table A.2: Earnings by Sector

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-15.767	-1.173	0.079	-1,053.973	-733.770	-1,081.962	-740.133
	(3.07)**	(3.12)**	(0.29)	(4.51)**	(5.09)**	(2.01)*	(2.99)**
ln(Average Wage per Job)	-0.076	-0.093	-0.129	27.633	-110.240	377.924	-25.286
	(0.08)	(1.43)	(2.69)**	(0.69)	(4.44)**	(3.66)**	(0.53)
Amenity Index based on House Value-Wage Regression Residuals	0.894	0.118	0.076	59.469	3.926	89.542	89.238
	(2.40)*	(4.03)**	(3.51)**	(3.35)**	(0.36)	(2.12)*	(4.62)**
1990 Manufacturing as % Total Earnings [reis msa]	3.346	0.180	-0.014	56.730	70.551	-213.600	133.020
	(3.67)**	(2.49)*	(0.26)	(1.28)	(2.58)**	(2.16)*	(2.94)**
1990 Distribution as % Total Earnings [reis msa]	5.124	0.181	-0.171	-378.499	-203.557	28.721	-383.081
	(2.00)*	(0.88)	(1.13)	(2.96)**	(2.58)**	(0.10)	(2.83)**
1990 Financial Producer Services as % Total Earnings [reis msa]	9.060	0.610	0.244	547.220	244.290	921.810	636.440
	(2.72)**	(2.21)*	(1.20)	(3.27)**	(2.37)*	(2.42)*	(3.65)**
1990 Other Producer Services as % Total Earnings [reis msa]	0.796	0.206	0.136	157.727	71.426	599.102	373.573
	(0.27)	(0.91)	(0.82)	(1.14)	(0.84)	(1.83)	(2.49)*
1990 Advanced Consumer Services as % Total Earnings [reis msa]	4.152	0.043	-0.364	261.505	233.646	-224.757	388.030
	(1.79)	(0.23)	(2.61)**	(2.25)*	(3.26)**	(0.93)	(3.51)**
Northeast	-0.551	-0.087	-0.055	-37.571	-0.115	-97.906	-30.724
	(2.11)*	(4.17)**	(3.59)**	(2.96)**	(0.01)	(3.47)**	(2.38)*
South	-0.347	0.034	0.047	28.099	20.322	40.292	23.434
	(1.76)	(2.12)*	(4.03)**	(2.83)**	(3.31)**	(1.87)	(2.38)*
West	-0.127	0.084	0.094	47.444	31.150	28.291	35.097
	(0.46)	(3.77)**	(5.71)**	(3.47)**	(3.69)**	(0.91)	(2.46)*
California	-1.481	-0.191	-0.110	-45.713	-22.567	-88.767	-40.117
	(3.74)**	(6.11)**	(4.80)**	(2.40)*	(1.92)	(1.90)	(1.87)

Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	13.812						
	(5.45)**						
% Civilian Labor Force Employed in Educational Services	-10.671						
	(3.02)**						
% Civilian Population Enrolled in College (1990)				-1,147.460	-87.530	-2,169.008	-869.129
				(17.36)**	(2.15)*	(15.57)**	(13.61)**
Constant	2.029	1.206	1.377	-207.525	1,100.633	-3,670.667	245.959
	(0.22)	(1.89)	(2.93)**	(0.52)	(4.48)**	(3.57)**	(0.52)
Observations	313	314	314	314	314	257	257
Absolute value of z statistics in parentheses							
* significant at 5%; ** significant at 1%							

Table A.3: Employment in Finance, Insurance and Real Estate Industry

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-21.191	-1.481	0.098	-780.749	-772.347	-530.851	-838.544
	(4.35)**	(3.49)**	(0.32)	(3.06)**	(4.89)**	(1.03)	(3.42)**
ln(Average Wage per Job)	0.581	-0.091	-0.072	96.615	-50.100	401.796	36.835
	(0.67)	(1.25)	(1.36)	(2.25)*	(1.88)	(4.49)**	(0.86)
Amenity Index based on House Value-Wage Regression Residuals	0.536	0.112	0.117	99.570	24.742	122.711	95.391
	(1.45)	(3.58)**	(5.14)**	(5.31)**	(2.13)*	(3.23)**	(5.27)**
% Civilian Labor Force Employed in Finance, Insurance and Real Estate	9.045	0.948	0.291	803.600	150.812	2,237.930	563.819
	(1.89)	(2.37)*	(1.00)	(3.35)**	(1.02)	(4.63)**	(2.45)*
Northeast	-0.599	-0.080	-0.079	-37.591	-7.142	-98.291	-26.997
	(2.24)*	(3.40)**	(4.60)**	(2.66)**	(0.81)	(3.43)**	(1.98)*
South	-0.662	0.030	0.048	22.904	15.995	60.251	18.763
	(3.55)**	(1.78)	(3.92)**	(2.27)*	(2.56)*	(2.96)**	(1.94)
West	-0.469	0.079	0.100	26.586	21.426	60.965	21.469
	(1.74)	(3.24)**	(5.60)**	(1.83)	(2.38)*	(2.08)*	(1.54)
California	-1.416	-0.199	-0.118	-61.159	-17.735	-116.807	-46.150
	(3.48)**	(5.18)**	(4.21)**	(2.69)**	(1.26)	(2.55)*	(2.11)*

Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	11.777						
	(5.00)**						
% Civilian Labor Force Employed in Educational Services	-9.983						
	(2.83)**						
% Civilian Population Enrolled in College (1990)				-1,144.636	-94.281	-1,971.882	-872.867
				(17.75)**	(2.36)*	(15.10)**	(14.03)**
Constant	-2.136	1.251	0.764	-898.195	542.929	-4,059.317	-292.503
	(0.25)	(1.74)	(1.46)	(2.11)*	(2.05)*	(4.56)**	(0.69)
Observations	315	261	261	261	261	259	259
Absolute value of z statistics in parentheses							
* significant at 5%; ** significant at 1%							

Table A.4: Employment in Business Services Industry

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-22.258	-1.605	0.076	-904.280	-786.786	-873.886	-926.796
	(4.50)**	(3.95)**	(0.26)	(3.60)**	(5.11)**	(1.72)	(3.83)**
ln(Average Wage per Job)	0.492	-0.170	-0.161	88.331	-66.779	373.449	33.497
	(0.55)	(2.36)*	(3.13)**	(2.01)*	(2.48)*	(4.09)**	(0.77)
Amenity Index based on House Value-Wage Regression Residuals	0.593	0.096	0.094	102.583	20.574	129.821	98.356
	(1.60)	(3.20)**	(4.37)**	(5.54)**	(1.81)	(3.47)**	(5.50)**
% Civilian Labor Force Employed in Business Services	13.457	4.579	3.562	1,943.103	885.845	5,566.592	1,275.466
	(1.18)	(4.80)**	(5.20)**	(3.30)**	(2.45)*	(4.71)**	(2.26)*
Northeast	-0.551	-0.062	-0.062	-32.652	-3.217	-84.997	-24.369
	(2.02)*	(2.66)**	(3.72)**	(2.26)*	(0.36)	(2.92)**	(1.75)
South	-0.712	0.016	0.037	16.638	13.466	41.743	14.431
	(3.75)**	(0.94)	(3.11)**	(1.63)	(2.15)*	(2.03)*	(1.47)
West	-0.605	0.047	0.077	10.548	15.537	14.761	10.527
	(2.25)*	(1.94)	(4.45)**	(0.71)	(1.71)	(0.50)	(0.74)
California	-1.404	-0.180	-0.099	-56.791	-13.579	-103.630	-43.661
	(3.43)**	(4.80)**	(3.67)**	(2.48)*	(0.96)	(2.25)*	(1.98)*

Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	12.224						
	(5.14)**						
% Civilian Labor Force Employed in Educational Services	-10.909						
	(3.10)**						
% Civilian Population Enrolled in College (1990)				-1,149.013	-87.112	-1,980.986	-877.023
				(17.85)**	(2.21)*	(15.22)**	(14.11)**
Constant	-1.189	1.921	1.536	-835.800	683.295	-3,838.878	-269.510
	(0.14)	(2.72)**	(3.03)**	(1.93)	(2.57)*	(4.26)**	(0.63)
Observations	315	261	261	261	261	259	259
Absolute value of z statistics in parentheses							
* significant at 5%; ** significant at 1%							

Table A.5: Employment in Executive and Managerial Occupations

	(1)	(2)	(3)	(4)	(5)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-21.309	-825.186	-840.615	-383.615	-911.394
	(4.35)**	(3.17)**	(5.29)**	(0.75)	(3.65)**
ln(Average Wage per Job)	0.688	78.829	-18.086	184.580	50.648
	(0.74)	(1.50)	(0.56)	(1.75)	(0.98)
Amenity Index based on House Value-Wage Regression Residuals	0.636	100.992	35.331	78.228	104.042
	(1.69)	(4.97)**	(2.84)**	(1.95)	(5.32)**
% Civilian Labor Force Employed in Executive and Managerial Occupations	1.901	668.857	-233.355	3,532.685	209.159
	(0.25)	(2.02)*	(1.15)	(5.45)**	(0.66)
Northeast	-0.603	-38.674	-10.112	-89.318	-29.999
	(2.24)*	(2.68)**	(1.15)	(3.14)**	(2.16)*
South	-0.679	19.266	16.609	43.732	17.014
	(3.57)**	(1.87)	(2.64)**	(2.17)*	(1.73)
West	-0.564	15.879	22.316	17.402	15.882
	(2.11)*	(1.07)	(2.46)*	(0.60)	(1.12)
California	-1.423	-51.627	-25.391	-45.882	-46.429
	(3.44)**	(2.11)*	(1.69)	(0.95)	(1.98)*
Pct Pop with BA or	12.662				

Higher Education, 1990 [2000 Boundary]					
	(4.29)**				
% Civilian Labor Force Employed in Educational Services	-11.862				
	(3.14)**				
% Civilian Population Enrolled in College (1990)		-1,195.665	-94.810	-2,157.727	-901.360
		(18.37)**	(2.38)*	(16.80)**	(14.36)**
Constant	-2.863	-736.554	262.646	-2,131.361	-410.859
	(0.32)	(1.46)	(0.85)	(2.10)*	(0.83)
Observations	315	261	261	259	259
Absolute value of z statistics in parentheses					
* significant at 5%; ** significant at 1%					

Table A.6: Employment in Precision Production Occupations

	(1)	(2)	(3)	(4)	(5)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-21.233	-922.969	-708.108	-1,313.829	-873.818
	(4.02)**	(3.55)**	(4.57)**	(2.51)*	(3.53)**
ln(Average Wage per Job)	0.762	146.565	-28.641	488.854	81.884
	(0.86)	(3.51)**	(1.15)	(5.65)**	(2.00)*
Amenity Index based on House Value-Wage Regression Residuals	0.657	121.325	35.988	152.991	115.750
	(1.79)	(6.58)**	(3.28)**	(4.13)**	(6.60)**
% Civilian Labor Force Employed in Precision Production Occupations	0.290	80.486	541.259	-2,002.807	397.216
	(0.05)	(0.30)	(3.41)**	(3.75)**	(1.57)
Northeast	-0.603	-44.528	-13.005	-99.197	-35.073
	(2.24)*	(3.07)**	(1.51)	(3.41)**	(2.55)*
South	-0.674	20.883	10.387	76.330	13.772
	(3.45)**	(1.96)*	(1.64)	(3.59)**	(1.37)
West	-0.561	21.543	22.182	39.293	18.739
	(2.09)*	(1.46)	(2.52)*	(1.33)	(1.34)
California	-1.438	-70.548	-28.115	-106.404	-58.676
	(3.52)**	(3.00)**	(2.01)*	(2.26)*	(2.64)**
Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	13.206				
	(4.82)**				

% Civilian Labor Force Employed in Educational Services	-12.323				
	(3.69)**				
% Civilian Population Enrolled in College (1990)		-1,166.985	-21.223	-2,360.930	-836.566
		(15.37)**	(0.47)	(15.42)**	(11.54)**
Constant	-3.500	-1,343.836	273.818	-4,505.938	-747.113
	(0.41)	(3.15)**	(1.08)	(5.09)**	(1.78)
Observations	315	261	261	259	259
Absolute value of z statistics in parentheses					
* significant at 5%; ** significant at 1%					

Table A.7: Weather

	(1)	(2)	(3)	(4)	(5)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)
Civilian Unemployment Rate, 1990 [2000 Boundary]	-16.197	-1.755	-0.461	-1,364.935	-1,073.868
	(3.09)**	(4.57)**	(1.82)	(6.02)**	(7.84)**
ln(Average Wage per Job)	0.354	-0.007	-0.078	81.177	-87.117
	(0.38)	(0.14)	(2.36)*	(2.73)**	(4.85)**
Amenity Index based on House Value-Wage Regression Residuals	0.791	0.082	0.060	37.516	-20.623
	(1.86)	(2.80)**	(3.12)**	(2.14)*	(1.95)
January mean temperature	-0.001	0.001	0.001	1.490	0.908
	(0.10)	(1.16)	(1.37)	(2.89)**	(2.91)**
July mean temperature	-0.047	0.004	0.007	1.644	2.124
	(2.52)*	(2.53)*	(7.44)**	(1.91)	(4.08)**
Northeast	-0.700	-0.086	-0.048	-31.453	6.582
	(2.52)*	(4.15)**	(3.49)**	(2.56)*	(0.89)
South	-0.407	-0.023	-0.008	-15.904	-15.744
	(1.44)	(1.07)	(0.57)	(1.23)	(2.02)*
West	-0.754	0.072	0.115	34.505	23.475
	(2.55)*	(3.23)**	(7.80)**	(2.64)**	(2.97)**
California	-1.503	-0.191	-0.110	-51.460	-19.469
	(3.62)**	(6.31)**	(5.51)**	(2.91)**	(1.82)
Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	14.222				
	(6.02)**				
% Civilian Labor Force Employed in Educational	-14.109				

Services					
	(4.05)**				
% Civilian Population Enrolled in College (1990)				-1,049.462	-53.271
				(17.61)**	(1.48)
Constant	3.810	0.194	0.313	-838.416	749.259
	(0.40)	(0.37)	(0.90)	(2.67)**	(3.95)**
Observations	304	305	305	305	305
Absolute value of z statistics in parentheses					
* significant at 5%; ** significant at 1%					

Table A.8: Quality of Life Factors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-29.162	-2.717	-0.762	-1,452.766	-866.525	-1,433.229	-1,081.825
	(4.96)**	(6.69)**	(2.53)*	(5.48)**	(5.36)**	(2.49)*	(3.88)**
ln(Average Wage per Job)	-0.578	-0.139	-0.135	35.127	-121.015	340.472	20.533
	(0.56)	(2.27)*	(2.98)**	(0.88)	(4.97)**	(3.40)**	(0.42)
Amenity Index based on House Value-Wage Regression Residuals	-0.152	-0.010	0.022	43.208	-6.863	96.134	95.334
	(0.33)	(0.31)	(0.95)	(2.16)*	(0.56)	(2.13)*	(4.36)**
Eating and drinking establishments per capita	101.776	61.487	46.865	20,753.444	12,795.245	-1,816.576	9,048.054
	(0.39)	(3.20)**	(3.28)**	(1.66)	(1.67)	(0.07)	(0.70)
Motion picture establishments per capita	-1,389.755	-62.337	58.686	-109,388.781	-83,067.723	414,805.464	-191,838.472
	(0.64)	(0.39)	(0.50)	(1.04)	(1.30)	(1.75)	(1.67)
Health establishments per capita	507.837	18.390	-12.353	19,854.171	10,057.836	-4,446.743	26,382.624
	(2.12)*	(1.04)	(0.94)	(1.73)	(1.43)	(0.18)	(2.15)*
Membership organizations per capita	-650.419	-138.468	-97.861	-52,557.549	-36,256.162	-46,990.386	-33,146.188
	(1.83)	(5.22)**	(4.98)**	(3.07)**	(3.47)**	(1.29)	(1.89)
Amusement and recreational service establishments	-0.000	0.000	0.000	0.003	0.018	0.496	0.105
	(0.37)	(0.68)	(0.72)	(0.14)	(1.23)	(4.38)**	(1.91)
Museums	0.015	-0.000	-0.001	-0.060	-0.568	-5.764	-2.031
	(1.29)	(0.49)	(1.47)	(0.11)	(1.66)	(2.92)**	(2.13)*
Northeast	-0.558	-0.067	-0.037	-35.797	1.865	-89.319	-32.061

	(1.91)	(3.25)**	(2.41)*	(2.66)**	(0.23)	(3.04)**	(2.26)*
South	-0.579	0.045	0.067	33.693	16.180	62.988	16.693
	(2.72)**	(2.93)**	(5.85)**	(3.27)**	(2.58)*	(2.80)**	(1.54)
West	-0.633	0.080	0.117	30.478	15.362	44.260	4.779
	(2.15)*	(3.71)**	(7.37)**	(2.18)*	(1.80)	(1.39)	(0.31)
California	-0.958	-0.138	-0.096	-38.471	-17.570	-109.128	-47.655
	(2.20)*	(4.62)**	(4.30)**	(1.99)*	(1.49)	(2.31)*	(2.09)*
Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	13.247						
	(5.56)**						
% Civilian Labor Force Employed in Educational Services	-12.313						
	(3.51)**						
% Civilian Population Enrolled in College (1990)				-1,115.389	-103.435	-2,003.361	-876.128
				(17.22)**	(2.62)**	(15.24)**	(13.78)**
Constant	10.029	1.857	1.472	-211.244	1,269.298	-3,282.391	-82.633
	(0.98)	(3.01)**	(3.21)**	(0.52)	(5.13)**	(3.25)**	(0.17)
Observations	284	285	285	285	285	233	233
Absolute value of z statistics in parentheses							
* significant at 5%; ** significant at 1%							

Table A.9: Recreation Score

	(1)	(2)	(3)	(4)	(5)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)
Civilian Unemployment Rate, 1990 [2000 Boundary]	-23.054	-1.570	-0.003	-1,077.724	-829.527
	(4.68)**	(4.18)**	(0.01)	(4.60)**	(5.69)**
ln(Average Wage per Job)	0.737	-0.046	-0.103	77.751	-90.762
	(0.83)	(0.85)	(2.60)**	(2.34)*	(4.38)**
Amenity Index based on House Value-Wage Regression Residuals	0.523	0.082	0.075	72.324	1.260
	(1.36)	(2.93)**	(3.64)**	(4.16)**	(0.12)
Recreation Score	0.000	0.000	0.000	0.013	0.004
	(2.47)*	(2.51)*	(1.02)	(2.32)*	(1.29)
Northeast	-0.565	-0.081	-0.055	-30.438	2.755
	(2.10)*	(3.77)**	(3.46)**	(2.29)*	(0.33)
South	-0.706	0.024	0.056	25.762	15.208
	(3.80)**	(1.59)	(5.02)**	(2.71)**	(2.57)*
West	-0.883	0.060	0.111	28.190	19.472
	(3.21)**	(2.71)**	(6.74)**	(2.04)*	(2.27)*

California	-1.123	-0.171	-0.117	-48.699	-19.410
	(2.69)**	(5.36)**	(4.97)**	(2.48)*	(1.59)
Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	11.858				
	(5.23)**				
% Civilian Labor Force Employed in Educational Services	-11.449				
	(3.41)**				
% Civilian Population Enrolled in College (1990)				-1,109.061	-99.966
				(16.83)**	(2.44)*
Constant	-3.354	0.831	1.075	-673.749	950.172
	(0.39)	(1.55)	(2.72)**	(2.02)*	(4.57)**
Observations	301	302	302	302	302
Absolute value of z statistics in parentheses					
* significant at 5%; ** significant at 1%					

Table A.10: Bohemian Index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-21.004	-1.615	-0.030	-1,094.367	-881.564	-859.680	-871.834
	(3.77)**	(4.00)**	(0.10)	(4.35)**	(5.62)**	(1.46)	(3.19)**
ln(Average Wage per Job)	-0.969	-0.072	-0.099	34.422	-74.030	463.339	-54.640
	(0.92)	(1.16)	(2.15)*	(0.86)	(2.95)**	(4.21)**	(1.07)
Amenity Index based on House Value-Wage Regression Residuals	0.386	0.053	0.040	38.836	-4.399	107.757	57.324
	(0.90)	(1.67)	(1.69)	(1.97)*	(0.36)	(2.28)*	(2.62)**
Bohemian Index	0.676	0.031	-0.000	28.203	-15.131	51.718	52.592
	(2.04)*	(1.35)	(0.03)	(1.93)	(1.66)	(1.45)	(3.19)**
Northeast	-0.481	-0.073	-0.046	-33.955	-4.280	-115.866	-19.790
	(1.60)	(3.16)**	(2.67)**	(2.37)*	(0.48)	(3.61)**	(1.33)
South	-0.827	0.031	0.066	26.376	13.698	61.699	17.266
	(3.71)**	(1.82)	(5.23)**	(2.45)*	(2.04)*	(2.53)*	(1.53)
West	-0.982	0.094	0.138	44.259	32.129	43.132	19.664
	(3.11)**	(3.98)**	(7.89)**	(2.99)**	(3.48)**	(1.22)	(1.21)
California	-1.035	-0.176	-0.110	-34.527	-28.056	-61.171	-20.852
	(2.37)*	(5.31)**	(4.45)**	(1.68)	(2.19)*	(1.20)	(0.88)
Pct Pop with BA or	14.082						

Higher Education, 1990 [2000 Boundary]							
	(4.69)**						
% Civilian Labor Force Employed in Educational Services	-15.151						
	(3.79)**						
% Civilian Population Enrolled in College (1990)				-1,146.723	-62.691	-2,152.778	-952.503
				(14.50)**	(1.27)	(12.84)**	(12.27)**
Constant	13.377	1.109	1.047	-246.394	806.174	-4,550.811	607.569
	(1.31)	(1.81)	(2.30)*	(0.62)	(3.24)**	(4.16)**	(1.20)
Observations	241	241	241	241	241	189	189
Absolute value of z statistics in parentheses							
* significant at 5%; ** significant at 1%							

Table A.11: Gay Index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-22.388	-1.452	0.041	-1,124.100	-831.487	-1,041.389	-971.969
	(4.60)**	(3.94)**	(0.15)	(4.88)**	(5.89)**	(2.00)*	(4.00)**
ln(Average Wage per Job)	0.509	-0.004	-0.056	75.533	-66.254	410.013	31.747
	(0.59)	(0.08)	(1.47)	(2.24)*	(3.20)**	(4.22)**	(0.70)
Amenity Index based on House Value-Wage Regression Residuals	0.525	0.108	0.098	74.783	13.523	124.399	92.690
	(1.43)	(4.00)**	(4.97)**	(4.50)**	(1.33)	(3.00)**	(4.78)**
Gay Index	0.325	0.001	-0.012	5.703	-9.019	69.417	21.306
	(2.47)*	(0.10)	(1.62)	(0.90)	(2.33)*	(2.92)**	(1.92)
Northeast	-0.589	-0.090	-0.061	-38.205	-1.445	-114.067	-30.831
	(2.21)*	(4.26)**	(3.99)**	(2.93)**	(0.18)	(3.93)**	(2.27)*
South	-0.673	0.025	0.055	25.326	16.013	57.336	18.089
	(3.63)**	(1.68)	(5.03)**	(2.68)**	(2.76)**	(2.75)**	(1.86)
West	-0.545	0.070	0.103	34.518	21.861	40.818	16.144
	(2.07)*	(3.30)**	(6.69)**	(2.64)**	(2.73)**	(1.37)	(1.16)
California	-1.623	-0.192	-0.115	-54.953	-20.185	-115.282	-44.404
	(3.95)**	(6.32)**	(5.16)**	(2.92)**	(1.75)	(2.43)*	(2.00)*
Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	11.150						

	(4.70)**						
% Civilian Labor Force Employed in Educational Services	-11.321						
	(3.42)**						
% Civilian Population Enrolled in College (1990)				-1,149.776	-76.026	-2,251.971	-953.845
				(17.47)**	(1.88)	(15.30)**	(13.86)**
Constant	-0.769	0.451	0.633	-629.171	717.664	-3,995.325	-206.522
	(0.09)	(0.86)	(1.64)	(1.85)	(3.44)**	(4.11)**	(0.45)
Observations	315	316	316	316	316	259	259
Absolute value of z statistics in parentheses							
* significant at 5%; ** significant at 1%							

Table A.12: Super Creative Core Index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Change in Pct Pop w College Degree (2000pct - 1990pct) [2000 Boundaries]	Log Change in Number of College Grads 1990-2000 [2000 Boundary]	Log Change in Number of Non-BA Adults 1990-2000 [2000 Boundary]	Net Migration Rate for BA+ Adults (denom: 95 BA pop)	Net Migration Rate for <BA Adults (denom: 95 <BA pop)	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-21.211	-1.878	-0.037	-1,222.606	-879.255	-1,034.434	-1,034.256
	(3.78)**	(4.73)**	(0.12)	(4.98)**	(5.84)**	(1.78)	(3.88)**
ln(Average Wage per Job)	-0.543	0.007	-0.098	140.443	-47.583	541.499	95.550
	(0.51)	(0.13)	(2.42)*	(3.68)**	(2.03)*	(4.95)**	(1.90)
Amenity Index based on House Value-Wage Regression Residuals	0.509	0.084	0.041	60.645	-4.449	133.300	94.555
	(1.19)	(2.81)**	(1.81)	(3.28)**	(0.39)	(2.96)**	(4.58)**
Super Creative Core	-3.984	-0.659	-0.038	-744.957	-590.239	-52.268	-880.523
	(0.54)	(2.57)*	(0.19)	(3.26)**	(4.21)**	(0.09)	(3.42)**
Northeast	-0.595	-0.089	-0.046	-42.841	-1.670	-127.512	-31.299
	(2.00)*	(4.03)**	(2.78)**	(3.13)**	(0.20)	(4.08)**	(2.18)*
South	-0.880	0.026	0.066	31.528	19.329	58.953	20.274
	(3.93)**	(1.55)	(5.24)**	(2.93)**	(2.92)**	(2.39)*	(1.79)
West	-0.939	0.103	0.139	60.879	39.615	51.825	41.318
	(2.90)**	(4.40)**	(7.93)**	(4.07)**	(4.32)**	(1.44)	(2.50)*
California	-1.156	-0.203	-0.110	-58.746	-32.050	-85.601	-62.709
	(2.64)**	(6.37)**	(4.61)**	(2.97)**	(2.64)**	(1.71)	(2.73)**
Pct Pop with BA or Higher Education, 1990 [2000 Boundary]	17.771						
	(5.21)**						
% Civilian Labor Force	-15.672						

Employed in Educational Services							
	(3.42)**						
% Civilian Population Enrolled in College (1990)				-854.424	122.935	-2,083.780	-594.593
				(7.79)**	(1.83)	(8.16)**	(5.07)**
Constant	9.476	0.426	1.037	-1,225.203	564.328	-5,267.561	-776.827
	(0.91)	(0.79)	(2.56)*	(3.23)**	(2.42)*	(4.83)**	(1.55)
Observations	241	241	241	241	241	189	189
Absolute value of z statistics in parentheses							
* significant at 5%; ** significant at 1%							

Table A.13: Effect of Ethnic Diversity on Young, Single and Educated

	(1)	(2)
	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-1,580.678	-559.767
	(2.56)*	(2.06)*
ln(Average Wage per Job)	574.876	158.111
	(6.24)**	(3.90)**
Amenity Index based on House Value-Wage Regression Residuals	186.438	148.776
	(4.59)**	(8.33)**
Pct Pop Black Non-Hispanic	96.355	-136.950
	(0.94)	(3.04)**
Pct Pop Hispanic	167.016	-49.244
	(2.19)*	(1.47)
Pct Pop Asian Non-Hispanic	-448.920	-547.449
	(2.08)*	(5.77)**
Northeast	-116.696	-49.957
	(3.89)**	(3.79)**
South	44.400	33.733
	(1.80)	(3.11)**
West	38.852	9.450
	(1.30)	(0.72)
California	-129.876	-50.152
	(2.78)**	(2.44)*
% Civilian Population Enrolled in College (1990)	-2,043.759	-864.226
	(15.40)**	(14.80)**
Constant	-5,578.393	-1,457.546
	(6.01)**	(3.57)**
Observations	259	259
Absolute value of z statistics in parentheses		
* significant at 5%; ** significant at 1%		

Table A.14: Effect of Immigration on Young, Single and Educated

	(1)	(2)
	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990	-1,851.806	-967.703

[2000 Boundary]		
	(3.05)**	(3.39)**
ln(Average Wage per Job)	481.459	70.228
	(5.42)**	(1.68)
Amenity Index based on House Value-Wage Regression Residuals	113.370	108.438
	(2.59)**	(5.28)**
Pct Foreign Born, 1990 [2000 Boundary]	718.479	18.034
	(2.86)**	(0.15)
Northeast	-101.851	-31.245
	(3.45)**	(2.25)*
South	63.801	17.945
	(3.04)**	(1.82)
West	50.417	17.664
	(1.69)	(1.26)
California	-151.985	-52.304
	(3.24)**	(2.37)*
% Civilian Population Enrolled in College (1990)	-2,076.841	-896.086
	(15.69)**	(14.39)**
Constant	-4,660.740	-581.248
	(5.20)**	(1.38)
Observations	259	259
Absolute value of z statistics in parentheses		
* significant at 5%; ** significant at 1%		

Table A.15: Effect of Metro Area Size on Young, Single and Educated

	(1)	(2)
	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-1,238.428	-981.180
	(2.40)*	(3.99)**
ln(Average Wage per Job)	301.449	41.468
	(2.91)**	(0.84)
Amenity Index based on House Value-Wage Regression Residuals	140.800	105.018
	(3.75)**	(5.88)**
Log of Population, 1990 [2000 Boundary]	42.966	5.441
	(4.05)**	(1.08)
Northeast	-109.225	-30.679
	(3.81)**	(2.25)*
South	49.058	16.844
	(2.38)*	(1.72)
West	56.673	18.970
	(1.92)	(1.35)
California	-131.185	-50.882
	(2.85)**	(2.32)*
% Civilian Population Enrolled in College (1990)	-1,988.819	-886.382
	(15.11)**	(14.14)**
Constant	-3,421.363	-362.867

	(3.52)**	(0.78)
Observations	259	259
Absolute value of z statistics in parentheses		
* significant at 5%; ** significant at 1%		

Table A.16: Effect of Art Score on Young, Single and Educated

	(1)	(2)
	Net Migration Rate for Young, Single, Educated	Net Migration Rate for All Other BAs
Civilian Unemployment Rate, 1990 [2000 Boundary]	-1,009.439	-962.252
	(1.90)	(3.86)**
ln(Average Wage per Job)	378.725	63.933
	(3.54)**	(1.28)
Amenity Index based on House Value-Wage Regression Residuals	147.411	107.931
	(3.71)**	(5.80)**
Art Score	0.080	0.004
	(2.71)**	(0.28)
Northeast	-112.853	-31.001
	(3.83)**	(2.25)*
South	61.396	18.461
	(2.88)**	(1.85)
West	47.940	17.456
	(1.50)	(1.16)
California	-108.114	-49.127
	(2.19)*	(2.12)*
% Civilian Population Enrolled in College (1990)	-2,022.028	-884.630
	(14.48)**	(13.53)**
Constant	-3,696.505	-521.113
	(3.46)**	(1.04)
Observations	250	250
Absolute value of z statistics in parentheses		
* significant at 5%; ** significant at 1%		

Table A.17: Variables, Data Sources, and Summary Statistics

Variable	Data source	Mean	Median	SD	Min	Max	N
% Adults w/ BA or higher 1990	Census	.1977453	.1873221	.0632999	.0949065	.439862	316
% Civilian Labor Force Employed in Business Services	Census	.0410306	.0401102	.0084963	.021866	.0678316	316
% Civilian Labor Force Employed in Educational Services	Census	.0875029	.0773067	.0343958	.0440974	.2793618	316
% Civilian Labor Force Employed in Executive and Managerial Occupations	Census	.1065613	.1039675	.0202123	.0619567	.1881813	316
% Civilian Labor Force Employed in Finance, Insurance and Real Estate	Census	.0570098	.0530036	.0185753	.0263471	.1560328	316
% Civilian Labor Force Employed in Precision Production Occupations	Census	.1082344	.1064508	.0180241	.0607566	.1718437	316

Variable	Data source	Mean	Median	SD	Min	Max	N
% Foreign Born 1990	Census	.0509565	.0309083	.0601298	.0039367	.4514851	316
% Population Asian Non-Hispanic 1990	Census	.0193215	.0099992	.0400979	.0012384	.6001954	316
% Population Black Non-Hispanic 1990	Census	.1015967	.0665922	.1014155	.0002777	.4550155	316
% Population Enrolled in College 1990	Glaeser and Saiz (2004)	.0729826	.0540082	.0569636	0	.3500085	316
% Population Hispanic 1990	Census	.0718805	.0215908	.1300471	.0024544	.9387942	316
Advanced Consumer Services as % Total Earnings, 1990	Regional Economic Information System (REIS)	.0987316	.0954248	.0300917	.0063966	.3378949	316
Amenity Index	Author's Calculations	-5.93e-10	-.0476283	.3219833	-.7836577	1.265179	316
Amusement and Recreational Services	Glaeser and Saiz (2004)	167.7727	65	345.6934	2	3739	286
Art Score, 1993	Places Rated Almanac	507.0296	281	789.2249	46	9681	304
Bohemian Index	Florida (2002)	.9243564	.8815232	.3657384	.3157816	2.902179	242
Change in Pct Pop w College Degree (2000pct - 1990pct)	Calculations Based on Census	3.713126	3.673176	1.652455	-1.014896	10.26218	316
Civilian unemployment rate 1991	Census	.0633464	.0611324	.0179245	.0277825	.1432961	316
Distribution as % Total Earnings, 1990	REIS	.0776952	.0771955	.0292002	.009099	.1922396	316
Eating and Drinking Establishments per Capita	Glaeser and Saiz (2004)	.0014308	.0015313	.0005738	5.08e-06	.0036192	286
Financial Producer Services as % Total Earnings, 1990	REIS	.0509366	.0449429	.0257055	.0132881	.2449404	316
Gay Index 1990	Florida (2002)	.6529087	.4650193	.7060582	0	8.750589	316
Health Establishments per Capita	Glaeser and Saiz (2004)	.0015203	.0016271	.0006167	4.19e-06	.0027254	286
January Mean Temperature 1990	Glaeser and Saiz (2004)	34.90619	33.8	12.95734	4.3	71.4	316
July Mean Temperature 1990	Glaeser and Saiz (2004)	76.1127	75.9	5.688068	58.4	93.7	316
ln (Avg Wage per Job 1990)	Glaeser and Saiz (2004)	9.953627	9.938951	.1327855	9.614538	10.42549	316
Log Change in Number of College Grads 1990-2000	Calculation based on Census	.313436	.309631	.1159778	.0512111	.8088282	316
Log Change in Number of Non-BA Adults 1990-2000	Calculation based on Census	.0914248	.0820818	.0928451	-.0739982	.5635613	316
Log of Population 1990	Calculations based on Census	12.66072	12.46763	1.047332	10.94615	15.99734	316
Net Migration Rate for BA+ Adults	Calculations based on Census	-21.85194	-16.42529	93.08627	-426.5319	387.9048	316
Net Migration Rate for <BA Adults	Calculations based on Census	3.388393	-.4572779	41.68352	-170.1651	190.1627	316
Net Migration Rate for Young, Single, Educated	Calculations based on Census	-81.34812	-62.71	194.7541	-641.0071	483.209	316

Variable	Data source	Mean	Median	SD	Min	Max	N
Net Migration Rate for All Other BAs	Calculations based on Census	-2.23908	-9.149629	448.603	-6037.715	3946.52	316
Motion Picture Establishments per Capita	Glaeser and Saiz (2004)	.0001036	.0001038	.0000574	0	.0006121	286
Manufacturing as % Total Earnings, 1990	REIS	.1978951	.1859104	.1064871	.0146439	.5724185	316
Membership Organizations per Capita	Glaeser and Saiz (2004)	.0008302	.000832	.0003677	4.48e-06	.0020247	286
Museums	Glaeser and Saiz (2004)	6.517483	3	13.03213	0	134	286
Other Producer Services as % Total Earnings, 1990	REIS	.0877945	.0806054	.0361312	.0191401	.2336603	316
Recreation Score 1993	Places Rated Almanac	1612.24	1479	744.8011	200	3940	304
Super Creative Core 1990	Florida (2002)	.0895566	.0847621	.0260495	.0435454	.1857829	242
Unemployment Rate, 1990	Census	.0633464	.0611324	.0179245	.0277825	.1432961	316

[1] Findings on the other variables, and broader examination of the drivers of urban economic prosperity, are reported in Robert Weissbourd and Christopher Berry, The Changing Dynamics of Urban America, CEOs for Cities (2004), available at <www.ceosforcities.org>.

[2] For a review of the literature on education and economic growth at the nation, state, and metropolitan area level, see Michael Fogarty and Paul Gottlieb, "Educational Attainment and Metropolitan Growth," *Economic Development Quarterly*, Vol. 17 No. 4 (2003), 325-336.

[3] Moreover, unlike human capital, educational levels are directly quantifiable, and so are often taken as a proxy for human capital in empirical analysis.

[4] See Paul Romer, "Endogenous Technological Change," *The Journal of Political Economy*, Vol. 98 No. 5 (October 1990), S71-S102, citing Angus Maddison, Phases of Capitalist Development, Oxford University Press (Oxford, 1982).

[5] For example, Edward Denison (Trends in American Economic Growth, 1929-82, The Brookings Institution, Washington, D.C., 1985) finds that approximately half of the growth rate in real GDP between 1929 and 1982 was due to a combination of R&D and education. Also see, e.g., Paul Romer, "Endogenous Technological Change," *The Journal of Political Economy*, Vol. 98 No. 5 (October 1990), S71-S102, and Vijay Mathur, "Human Capital-Based Strategy for Regional Economic Development," *Economic Development Quarterly*, Vol. 13 No. 3 (August, 1999), 203-216.

[6] See discussion in The Changing Dynamics of Urban America, section III.A.

[7] See Vijay Mathur, "Human Capital-Based Strategy for Regional Economic Development," *Economic Development Quarterly*, Vol. 13 No. 3 (August, 1999), 203-216.

[8] See Michael Fogarty and Paul Gottlieb, "Educational Attainment and Metropolitan Growth," *Economic Development Quarterly*, Vol. 17 No. 4 (2003), 325-336.

[9] Edward Glaeser and Janet Kohlhase, "Cities, Regions and the Decline of Transport Costs," Discussion Paper 2014, Harvard Institute of Economic Research (July 2003).

[10] For a review of the economic literature on these topics see, e.g., Edward Glaeser and Albert Saiz, "The Rise of the Skilled City," Harvard Institute of Economic Research (December 2003), and Edward Glaeser and Christopher Berry, "The Divergence of Human Capital Levels across Cities," Harvard Institute of Economic Research (September 2005)

[11] Cities that gain college graduates at the same rate as non-college graduates are growing in population and are not growing proportionately more educated. In light of the Changing Dynamics finding that population and income growth are not correlated, growing in numbers but not overall levels of college educated may not be enough to drive growth.

[12] Theoretically, cities can increase their educational attainment a fourth way: by driving away the non-college educated population. Indeed, Glaeser and Berry examined just this possibility, hypothesizing that

the relative elasticity of housing supply across cities might account for their increasing divergence in levels of human capital. Their theory posits that if increasing proportions of skilled workers drive up demand for housing, a city with inelastic housing supply will see higher housing costs, forcing unskilled workers elsewhere. While the authors did find that urban housing supply is more inelastic than in the past, they did not find that increasing inelasticity drove the observed divergence in human capital levels across cities. Glaeser and Berry (2005).

[13] As discussed in The Changing Dynamics of Urban America, increasing production presents major opportunities, particularly considering the number of people who start but do not complete college. Increasing college attendance and graduation entails a whole discrete set of educational system issues, however, beyond the scope of this project, which is focused instead primarily on attraction and retention.

[14] From a theoretical point of view, attraction and retention are two sides of the same coin. However, for the purposes of economic development practice these two means of increasing educational attainment are often separated, as they may entail different policies and strategies.

[15] See Edward Glaeser, Jed Kolko, and Albert Saiz, "Consumer City," NBER Working Paper 7790 (July 2000), and Edward Glaeser and Janet Kohlhase, "Cities, Regions and the Decline of Transport Costs," Discussion Paper 2014, Harvard Institute of Economic Research (July 2003).

[16] See, e.g., Paul Gottlieb, "Economy Versus Lifestyle in the Inter-Metropolitan Migration of the Young," *International Journal of Economic Development*, Vol. 5 No. 3 (June 2003); Governing Magazine, "The Creative Clash" (June 2004); Louis Tornatzky et al., "Where Have All the Students Gone? Interstate Migration of Recent Science and Engineering Graduates," Southern Technology Council (1998); and Indiana's Human Capital Retention Project, "Graduate Migration from Indiana's Post-Secondary Instittutions," (March 1999), available at <www.indianafiscal.org>.

[17] See Richard Florida, The Rise of the Creative Class and How It's Transforming Work, Leisure, Community, and Everyday Life, Basic Books (New York, NY 2002).

[18] The project relied largely on the database assembled for The Changing Dynamics of Urban America. For a more detailed description of the database, see The Changing Dynamics of Urban America, Appendix A.

[19] See David Savageau and Richard Boyer, Places Rated Almanac, MacMillan (New York, NY 1993).

[20] Richard Florida, The Rise of the Creative Class and How It's Transforming Work, Leisure, Community, and Everyday Life, Basic Books (New York, NY 2002).

[21] See Appendix A for details on the methodology.

[22] Note that "population" throughout the models, refers to population over age 25: the post-college age population. Change was measured as logarithmic change (or log change) and not as percentage change. See Charles Jones, Introduction to Economic Growth, 2nd Edition, W.W. Norton & Company, (New York, NY, 2002) p. 203-204, for an explanation of why log change is used in this type of analysis.

[23] Models for college and non-college graduates were estimated jointly by seemingly unrelated regression, which allows us to test whether coefficients are equal for the two groups. The same approach was followed to test differences between the models for young, single college graduates and all other college graduates. See Arnold Zellner, "An Efficient Method for Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias," *Journal of the American Statistical Association*, Vol. 57 (1962), 348-368.

[24] Net migration is calculated as the difference between people (in this case college graduates) moving in and people moving out.

[25] See, e.g., Joseph Cortright and Carol Coletta, "The Young and the Restless," available at <http://www.westside-alliance.org/pages/hm-pages/publication.html>.

[26] See Rachel Franklin, "Migration of the Young, Single, and College Educated: 1995-2000," Census 2000 Special Report, Census Bureau (November 2003).

[27] An additional advantage of focusing on this group is that migration data for this cohort is readily available in a dataset recently released by the Census Bureau.

[28] This finding is supported by Gottlieb and Joseph (2006), who examined the location decisions of 5,530 University graduates surveyed in April 1995 across a host of personal and place variables. The authors found that metropolitan employment growth in the ten years prior to an individual's year of graduation was a significant factor in location decision. See Paul Gottlieb and George Joseph, "College-to-Work Migration of Technology Graduation and Holders of Doctorates within the United States," Journal of Regional Science, 2006.

[29] See Matthew Drennan, The Information Economy and American Cities, Johns Hopkins University Press (Baltimore, London 2002), and The Changing Dynamics of Urban America.

[30] The more detailed categories follow the Census classification of 17 major industry groups.
[31] Throughout the text, observations on the difference in the size of the effect on various groups are based on an analysis of standardized regression coefficients. The tables reporting these results are available from the authors upon request.
[32] In particular, the effect of these variables on the young, single and educated was almost twice as large as the effect on all other college graduates (the standardized coefficient for FIRE industries was 0.213 for young and single and 0.123 for all other college graduates, and the standardized coefficient for business services was 0.22 for the young and single and 0.115 for all other college graduates).
[33] This finding is based on the migration models, and does not apply to the growth models. However, it is worth mentioning given its significance for the attraction of college graduates overall and of the young, single and educated in particular. See Tables A.5 and A.6.
[34] In particular, the standardized coefficient for the percentage of the population employed in executive and managerial occupations was 0.117 for the migration of all college graduates, but 0.317 for the young and single. The standardized coefficient of the concentration of precision production occupations on the young and single was -0.188.
[35] See Edward Glaeser, Jed Kolko, and Albert Saiz, "Consumer City," NBER Working Paper 7790 (July 2000).
[36] Id.
[37] The impact of this broad category of amenities was measured using an "Amenities Index" constructed based on the residuals of a regression of wages on housing values.
[38] The models tested a variety of climate indicators, ranging from the average temperature in January and July, to the number of cooling and heating degree days, to the Places Rated Almanac's Climate Score. None of these measures proved to have a disproportionate effect on the growth or migration of college graduates.
[39] See Table A.8 for details.
[40] The Super Creative core includes computer and mathematical occupations, architecture and engineering occupations, life, physical, and social science occupations, education, training, and library occupations, and art, design, entertainment, sport, and media occupations.
[41] See Table A.12 for details.
[42] The Bohemian Index only proved to be positive and significant for growth and migration of college graduates in a model that also included the Gay Index and the Super Creative Core. However, the effect disappeared after controlling for initial educational attainment. These results are consistent with the findings and argument presented by Edward Glaeser in "Review of Richard Florida's *The Rise of the Creative Class*," Harvard Business School (2004), available at <www.creativeclass.org>.
[43] The standardized coefficient was 0.04
[44] However, it should be noted that we cannot conclude with confidence that the Gay Index had any impact on overall growth in educational attainment, given that the results are not consistent across all sets of models.
[45] These indicators proved to have consistent and significant effects only in the age models: the Gay Index had a positive and significant effect on the young, single and educated (and no effect on all other college graduates), while the Bohemian Index had a positive and significant effect on all other college graduates (and no effect on the young, single and educated). However, the significance of these measures in the age models should not be given much weight, given the lack of impact on the overall growth in educational attainment.
[46] The model results supporting this point are reported in Tables A.13-16.
[47] In particular, while the South and the West had a positive effect on both college graduates and non-college graduates, consistent with the high rate of overall population growth in these two regions, the Northeast had a negative and disproportionate effect on the growth and migration of college-educated population.
[48] The exception might be where a city with strong economic indicators is lagging in cultural amenities, so that investment in improving amenities could yield a high return.
[49]It may be helpful to step back and remember that we are focused on increasing educational attainment for the purpose of economic development. In today's economy, advances in technology and the globalization of the marketplace make knowledge inputs (as distinct, for example, from natural resources) an increasingly critical component of economic growth. This, in turn, places a premium on human capital:

the higher level of skills, expertise – and education -- embedded in the labor force. Attracting college educated people without the right mix of economic functions and occupations (or vice versa), even if possible, would not help - what truly matters for economic growth is the concentration of educated workers *deployed* in knowledge-intensive and productive functions and occupations.

Human capital is particularly productive when deployed in dense urban environments, where concentration generates knowledge spillovers and further stimulates economic growth. This conclusion is supported by the twin trends of functional specialization in cities and increased labor mobility. The premium on knowledge inputs, and particularly human capital, has led to a shift from industry concentration to increasing functional specialization in cities, as firms take advantage of these spillovers by concentrating facilities that perform knowledge-intensive functions (e.g. headquarters) and rely on high human capital occupations (e.g. software engineers) in the same place. At the same time there is less firm-employee loyalty. Workers change jobs more often,and are less committed to specific firms, and firms are less interested in internal training. Consequently, firms are more dependent on regional labor pools, and workers are increasingly attracted by networks of jobs and occupations rather than by specific firms. Due to these two concurrent trends (functional specialization and labor mobility), workers don't necessarily follow firms or vice versa: rather, both are attracted primarily by regional labor pools and networks of knowledge occupations. See Gilles Duranton and Diego Puga, "From Sectoral to Functional Urban Specialization," NBER Working Paper 9112 (2002), available at http://www.nber.org/papers/w9112; Robert Weissbourd and Christopher Berry, The Changing Dynamics of Urban America, <ceosforcities.org>; and Ann Markusen, "Targeting Occupations in Regional and Community Economic Development," *Journal of the American Planning Association*, volume 70, #3 (summer, 2004).

[50] See The Changing Dynamics of Urban America, p91.

[51] The authors have undertaken this type of analysis by examining extensive Public Use Micro-Sample (PUMS) data available from the Census bureau, which reveals not only the presence of occupational and industry concentrations, but also how occupations are distributed across industries in particular places.

[52] Robert Barro, "Economic Growth in a Cross Section of Countries," *The Quarterly Journal of Economics*, Vol. 106, Issue 2 (1991), pp. 407-43.

[53] Edward Glaeser, Jose Scheinkman, and Andrei Shleifer, "Economic Growth in a Cross-Section of Cities," *Journal of Monetary Economics*, Vol. 36 (1995), 117-143.

[54] See Edward Glaeser, "Cities, Information, and Economic Growth," *Cityscape*, Proc. of the Regional Growth and Economic Development Conference, Vol. 1, No. 1 (August 1994) for further discussion of the advantages of this modeling strategy.