We Got More Educated, We Are Better Off… Right?

An Analysis of Regional Conversion of Bachelors Degree Attainment into
Positive Labor Market Outcomes

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Introduction

Human capital and knowledge are the greatest drivers of economic development in history. New ideas, new ways of doing or making things, and new technology are the direct result of increases in human cognitive capacity (Lucas 1988). Technological advances are closely related to every significant increase in economic well being and quality of life that the world has known (Romer 1990). These advances include developing new agriculture practices, the advent of electricity, and the invention of modern communications like the telephone and computer (Warsh 2006). While major jumps in human capital and technology eventually diffuse (often quickly) across the globe, economies that have higher human capacity tend to out perform places with lower human capacity. There are no perfect measures of human capital, but educational attainment has become the de facto modern proxy for human capital.

Educational attainment and new knowledge lead to new discoveries and new ideas, but more education also helps prepare individuals for the new global economy and it helps them lead healthier lives. Higher educational attainment is related to higher levels of voter participation, employment, wages and health insurance coverage. It is also associated with lower levels of incarceration, obesity, and smoking (McKinsey and Company Social Sector Office 2009). These are individual benefits that ultimately return to local, state, and national governments through increased taxes and lower service demands. As noted above educated residents are also likely to be better participants in civic life. Proponents of human capital focused economic development suggest that the

benefits of educational attainment are longer lasting and passed down between generations (Mathur 1999).

Educational attainment is very important for an individual's life outcomes as well. In an assessment of educational attainment and labor demand, Goldin and Katz (2008) found that much of the increasing disparity in incomes between the rich and poor could be attributed to increasing preferences for workers who could use technology quickly and were adaptive. This disparity has been called skills biased technological change and is projected to get larger, rather than smaller, in the future (Acemoglu 1998). Education is increasingly becoming the easiest option for families and individuals who want to improve their quality of life.

Educational attainment also matters to the national economy and regional economies. The need for educated workers at the national and regional level is also related to skills biased technological change. Recent research has shown that regional economies with higher levels of educational attainment are more adaptive and likely to grow (Glaeser 2005). Glaeser and Saiz (2003) show that cities with an educated population are more adaptive and grow at faster rates than their lower-skilled competitors. Much of this difference at the regional level is associated with being able to shrug off economic shocks and major economic restructuring more easily.

New and growing knowledge businesses demand educated workers as well. Projections estimate that 35 percent of jobs in the U.S. will require at least a bachelor's degree. Beyond that, another 40 percent of jobs will require post secondary training similar to an associate's degree. In total, 75 percent of

workers are expected to have training beyond high school. The few jobs that remain for those with a high school diploma or less will be low wage jobs with little opportunity for advancement or benefits (Symonds, Schwartz, and Ferguson 2011).

Politicians have gotten the message. President Obama has called going to college and earning a degree the surest path to the middle class (Obama 2010). Research supports policies that expand and increase levels of educational attainment. Demographic analysis shows that roughly 45 percent of earners above the median household income in 2005 held a college degree. Seventy percent of the top ten percent of income earners in 2005 holds at least a bachelors degree. Thirty-five percent of the top ten percent of income earners has a graduate degree (McKinsey and Company Social Sector Office 2009). Studies on longitudinal data show Carniero and Heckman (2001) show that children who are born to highly educated parents are more likely to succeed and be employed for much of their life. Education matters for individuals and families, the national economic position, and it is closely associated with stronger regions.

Given the documented benefits associated with increased BA attainment, local and state governments have engaged in promoting, attracting and retaining well educated workers (Cortright 2005; Markusen and Shrock 2008). They tend to center these efforts on making a locality or region a better place to live aiming to build an economically competitive workforce. For example, CEOs for Cities is currently sponsoring a competition among cities, "The Talent Dividend Prize," recognizing a city that is able to increase post secondary degree attainment (with

an emphasis on BA degrees) with a $1 million award to promote their success and programs. To date, 57 cities have registered for the competition, which concludes in 2014. As cities have focused on becoming attractive places for young and talented workers, they employ a variety of redevelopment and land management tools. For example, cities often justify downtown redevelopment, business improvement districts, attractive urban middle-income housing, and even cash payments for student loan debt to new, well-educated residents on these grounds (Chen 2012).

Decision-makers base their knowledge-based economic development policies on the idea that such approaches will have spillover benefits across the labor market. In an in depth analysis of labor markets across the United States, Moretti (2012) suggests that when a regional labor force possesses higher levels of degree attainment and numerous creative and high-technology workers, the bottom of the labor market (those without a BA or working in low-wage jobs) command higher wages. The argument holds that it is better to be a retail clerk in Silicon Valley than the Philadelphia metro area and that the attraction of educated workers is a boon to the entire regional economy.

While the current state of research seems to show strong correlations between educational attainment and economic outcomes at points in time, a growing counter- argument suggests that talent attraction and retention may be largely inefficient, a kind of traditional economic development "buffalo hunting" with new targets (Wolf-Powers 2005; Giloth and Meier 2012). Proponents of this argument assert that current research provides little or no exploration about

how increasing BA attainment in a place changes labor market outcomes for that place's residents.

In an effort to address this question I have documented an important but overlooked 20th-21st century trend, the significant increase in bachelors degree attainment in the United States. In 1990, just 20.3 percent of adult workers held a bachelor's degree or higher degree. By 2010, 28.2 percent of the working population held those credentials (Andreason, 2012). Given changes in the global economy, the nearly 40 percent expansion in national BA attainment must be seen as the beginning of a successful transition to the new economy. But growth in BA attainment was not evenly shared geographically. While 273 of 283 MSAs increased the proportion of their adult holding a BA or higher between 1990 and 2010, the attainment growth in only 78 MSAs outpaced the national growth rate (Andreason, 2012).

These 78 leading regions in BA attainment growth show widely varying labor market outcomes. This paper assesses labor market outcomes for the 78 regions between 1990 and 2010. A better understanding of their success and failure can help identify the role that a number of demographic and economic factors play in

BA Attainment In America, An Overlooked Success – In Some Regions

Recent reports, of which OECD's *Education at a Glance* is one of the most prominent, have identified the U.S. as losing position in producing BA holding workers. National leadership and educational pundits are concerned with what seems like a global trend(Kolb 2011; Loveless 2011). In 2009, President Obama set the bold initiative of returning America to the top of the world in the percent of its adult population with a BA degree. Historically, the United States has had the largest proportion of BA holding adults in the world but in recent years has been eclipsed by nations including Korea, Japan, Canada, Russia, Ireland, and Norway.

Despite recent concerns about the nation's international ranking in OECD's *Education at a Glance,* the country has been incredibly successful at improving its BA attainment in the last forty years. America has a post-secondary educational system unlike anywhere else. It produces significant numbers of adults with degrees in higher education.

In 1970, only about one in ten people had earned the equivalent of a college degree.[1] By 2010, nearly one in three held a degree. The near tripling of the BA attainment rate is even more impressive when population growth enters the equation. Between 1970 and 2010, the nation's adult population (those 25 years and older) grew by almost 95 million people. During the same period the

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[1] The U.S. Census tracked educational attainment by years of schooling completed, rather than degrees earned until 1990. Starting in 1990, the Census Bureau changed questions about educational attainment to focus on the degree or credentials that individuals had actually earned instead of years completed. Prior to 1990, completing four years of college is the closest proxy to earning a BA that is available from the Census data. This analysis uses the same proxy.

nation added nearly 47 million adults who held a bachelors degree. One of every

two new adults in America between 1970 and 2010 held a bachelors degree.

Figure 1 shows the growth in the BA holding and non-BA holding workers

between 1970 and 2010.

BA and Non BA Holding Population

Year	Population
1970	~110,000,000
1980	~133,000,000
1990	~158,000,000
2000	~182,000,000
2010	~206,000,000

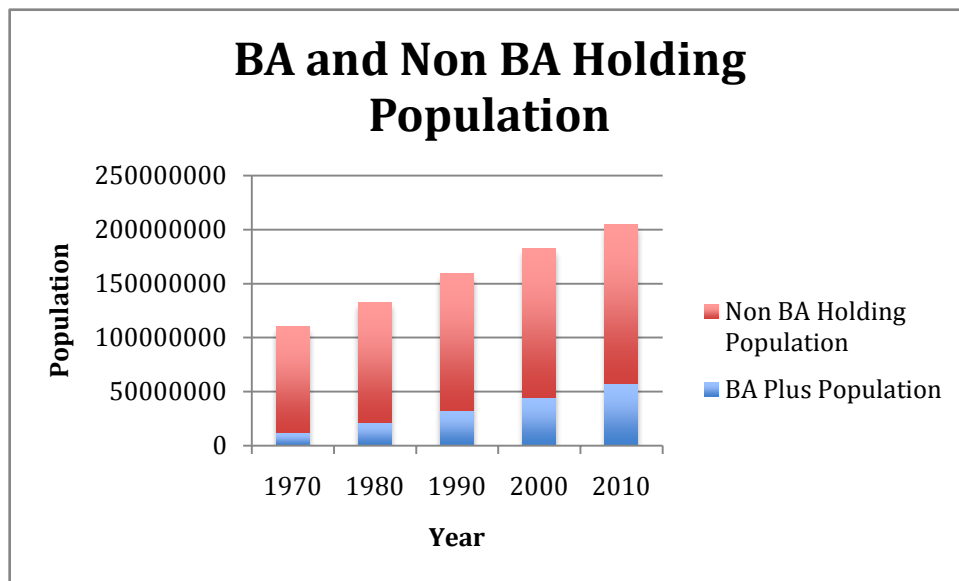Legend: Non BA Holding Population, BA Plus Population

Figure 1

Given the widespread population growth from 1970 to 2010, the increase

in percent of the population with a BA degree is impressive. The rate of growth

in the BA holding population was significantly faster over the period than that of

the entire population. Figure 2 shows the growth of the population in the U.S.

along with the change in the rate of the BA holders among that group. The

United States may have fallen behind countries like Canada, Korea, and Norway

in the percent of their workforce that holds a BA degree, but none have the

population growth or base of workers that the United States does. Between 1970

and 2010, the United States added more BA holding workers to its labor force

than the entire 2011 population of Canada.[2] The competitiveness of a national labor force must consider size and growth trends as well as the somewhat static current make up of the market.
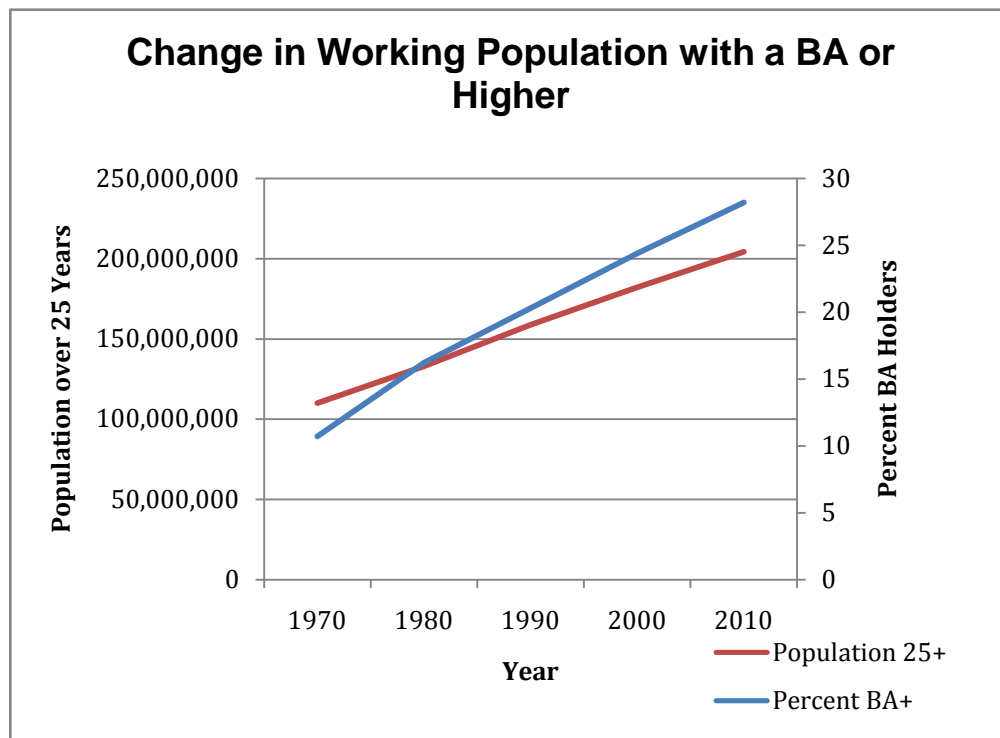

Figure 2.2

Most of the growth in BA attainment happened in the past twenty years. The total adult population of the United States grew by 45 million. Of those 45 million, over 25 million held a BA or a higher degree.

Other countries may be increasing the overall rate of their population that holds a BA degree at a rate that is faster than America's, but the American workforce is growing significantly as well. As the figures above show, even with

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[2] The World Bank estimates the population of Canada to be 34 million people.

significant population growth, the rate of workers with a BA degree grew from 20.3 in 1990 to 28.2 in 2010. The regional story is different though.

National Growth in BA Attainment at the Local Level

Regional growth in BA attainment from 1990 – 2010 in America was uneven. Most metropolitan statistical areas increased their BA attainment some, but did not meet the national growth of 7.9 percent. Of 283 metropolitan statistical areas that are comparable in jurisdictional make up between 1990 and 2010, 78 regions outpaced the national rates of growth in educational attainment between 1990 and 2010.[3] I consider these regions the "leading" regions. Of the remaining regions, 195 increased their BA+ rate, but did not meet the national gain. These may be considered the "lagging" regions. Finally, despite the widespread national growth in BA+ workers, ten regions lost proportions of their educated workers. I refer to these as the "left out" regions. Tables 1 and 2 below show the regions that had the largest and smallest gains, and the left out regions that had negative growth in BA attainment.

Largest Gains (Leader Regions)	Smallest Gains (Lagging Regions)
San Jose, CA (14.46%)	Iowa City, IA (1.58%)
Manchester, NH (13.61%)	Yuma, AZ (1.44%)
Fort Collins, CO (13.42%)	Victoria, TX (1.40%)
Charleston, SC (12.98%)	Beaumont, TX (1.27%)
Charlotte, NC (12.57%)	Salinas, CA (1.24%)
San Francisco Bay, CA (12.49%)	Terre Haute, IN (1.22%)
Columbia, MO (12.45%)	Lebanon, PA (1.06%)
Boston, MA (12.35%)	Monroe, LA (0.80%)
Johnson City, TN (11.98%)	Oxford, AL (0.57%)
Bloomington, IL (11.46%)	Bangor, ME (0.37%)
Lawrence, KS (11.45%)	Merced, CA (0.33%)
Dubuque, IA (11.32%)	Abilene, TX (0.16%)

Table 1 – Largest and Smallest Gains in BA Attainment

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[3] Jurisdictional boundaries in some cases change so significantly that it is difficult to compare regions between 1990 and 2010. Also, during the time period, a number of new metropolitan statistical areas are defined, and there is not data from 1990 for some of the MSAs that exist in 2010. One common type of new MSA is the college centered MSA. Blacksburg, VA was not an MSA in 1990. The Boulder, CO MSA splinters from the Denver MSA in 2000. Other places that see fast growth and new centers of business gravity form new MSAs as well.

MSAs with Declining BA Attainment
Longview, TX (-.23%)
Lafayette, IN (-.26%)
Lawton, OK (-.61%)
Albany, GA (-.69%)
Pine Bluff, AR (-.76%)
Springfield, OH (-1.95%)
Casper, WY (-2.34%)
Riverside-San Bernadino (-2.41%)
College Station, TX (-3.75%)
Midland, TX (-6.07%)

Table 2 – Metropolitan Statistical Areas with Negative Growth in BA Attainment

Not every region can grow at above average rates, but the story of BA

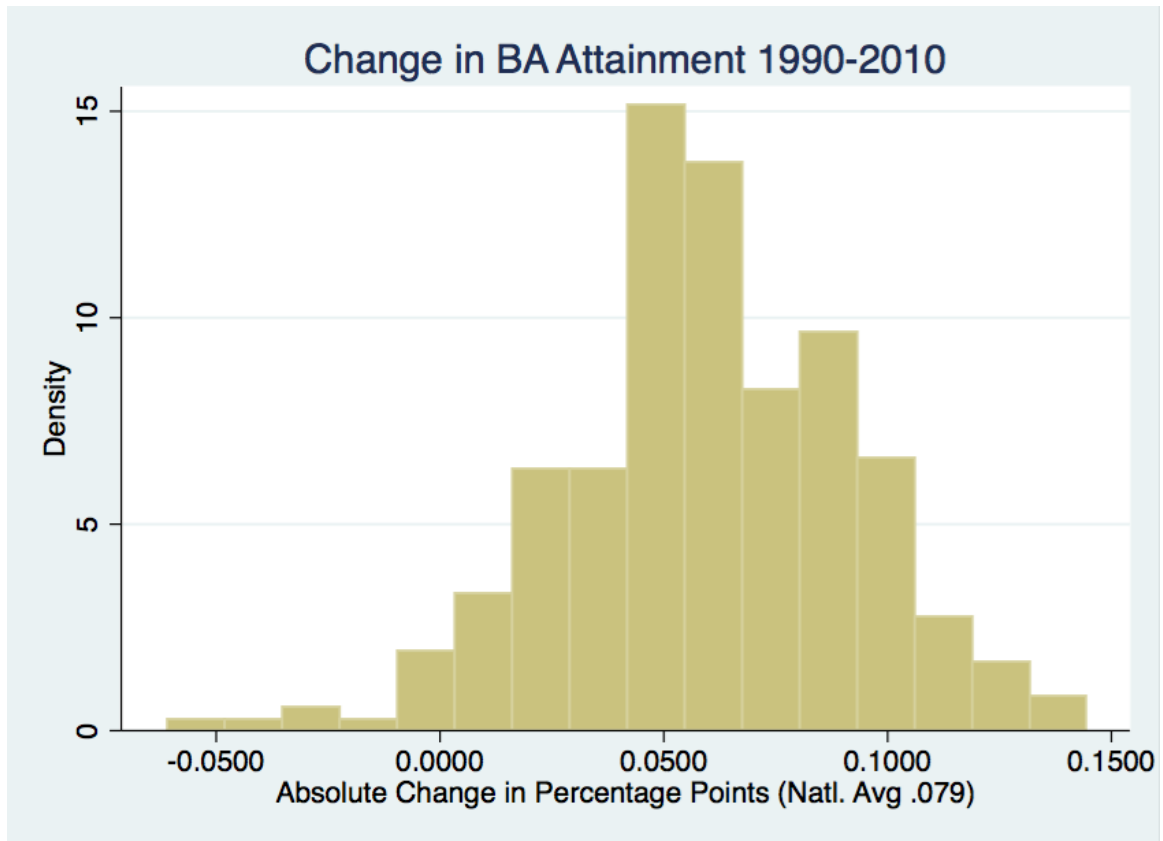attainment growth is more concentrated than would be expected.

Figure 3 – Distribution of Change in MSAs

Figure 3 shows that the majority of metropolitan statistical areas in the United States grew their population, but not near the national growth rate. Only 27.5 percent of regions grew above the national average, if the distribution were normal, 50 percent of regions would have been above average.

There are several reasons that BA attainment could be concentrated in some regions rather than others. Theoretically since the comparison between regions is on a percentage basis, if large regions were the sole "above average" cohort, they would drive the national average above the regional average growth. A t-test shows that this is a partial explanation. Table 2 shows the results.

One-sample t test

	Observations	Mean	Std. Err.	Std. Dev.	95% CI
x	78	1,176,143	219,697.5	1,940,316	738,699-1,613,617

Degrees Freedom	77
Ho Mean	566,997
T =	2.77
Pr(T>t)	0.0035

Table 2 – T-test comparing 78 leader regions to entire sample

While larger regions seem more likely to increase the BA attainment in their respective areas, successful regions come in all shapes and sizes. The largest leader region is the New York City metropolitan area with an adult workforce of over 12 million people and the smallest leader region is Dubuque, Iowa with just under 62,000 people.

Additionally leader regions, like the entire sample of regions, have varying economic bases. Some of the smaller regions in the sample are largely "university regions" – these places include Charlottesville, VA, Columbia, MO, and Lawrence, KS – all regions that are easily identified with large, highly ranked

universities. This is not necessarily a characteristic of sure success though –

Iowa City and Bangor Maine lagged the nation in BA growth. College Station,

home to Texas A&M University was one of the few regions that saw negative

growth in BA attainment between 1990 and 2010. Large regions, southern, and

Sunbelt regions were also evenly distributed among those that attracted, lagged

and lost BA attainment. Similar trends seem to be the case in the question of

conversion into labor market outcomes. Given the relatively even geographical

and economic base distribution of the successful regions (with a caveat that

leader regions are somewhat larger than the general population of regions):

Under what conditions does increased degree attainment lead to positive outcomes -- increases in per capita income and labor force participation, and decreases in poverty and unemployment -- across the regional labor market?

I use a cluster analysis to identify regions that experienced similar success

and other characteristics. The cluster analysis will then be used in conjunction

with a discriminant analysis to identify the reasons why the regions cluster

together. This presents a research strategy to identify similar outcomes and the

characteristics that bind the clusters together.

Methods

Cluster analysis coupled with discriminant analysis provides an ideal analytical technique to explore why certain outcomes happen and what drives them. Cluster analysis and discriminant analysis as individual statistical techniques are well developed and used widely. Alone, they have some weaknesses. The methods are considered inductive or exploratory methods. When the methods are coupled, the analysis remains an inductive technique, but provides a method for beginning to draw some inference among why certain things group together and what drives the grouping.

The combined cluster-discriminant analysis has been used to identify clusters of competitive industries (Hill and Brennan 2000). Hill and Brennan's (2000) analysis focused on identifying the most competitive industry clusters in northeast Ohio and identifying why those regions were competitive. Cluster analysis is used to identify what the groupings of industries are. Discriminant analysis then answers the "why are these elements in the same group" question.

The approach that Hill and Brennan (2000) developed for industrial cluster analysis helped solve many of the weaknesses of cluster analysis. Cluster analysis provides a method to identify what cases are similar, but provides no explanation as to why those cases are similar. There are numerous applications of cluster analysis alone that show how areas group. The analyst or practitioner is then left to infer why those places are collected together. Sometimes the cluster analysis easily separates the cases and the groupings are easily

intelligible.[4] This might be because the data focuses on certain efforts or interventions that have well understood assumptions around directions of causality or normative positions that make identification of cluster drivers a simple tool.

For this analysis I define improvement in the labor markets across the following four different outcomes:

1. An increase in relative labor force participation between 1990 and 2010 (relative to standardized national economic conditions)
2. A decrease in relative poverty rate from 1990 to 2010 (relative to standardized national economic conditions)
3. An increase relative to the nation in per capita income
4. A positive change in relative unemployment (relative to standardized national economic conditions)

Cluster Analysis

This analysis is about finding similar outcomes between regions. There is no *a priori* assumption that there are set outcomes or certain ways that regions see changes in the labor market as a result of BA attainment growth. For example, an easy way to classify the 78 leader regions across the four outcome measures would be to simply identify whether or not they saw improvement on them or not. Table 3 shows this information, but it also raises a number of questions about classification.[5] Is a metropolitan area that experienced

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[4]For example, Pendall, Puentes, and Martin used cluster analysis to identify different forms of land use regulatory regimes. The clusters in the analysis were broken down into five different categories from low to high levels of regulation. They were able to further refine their clusters by the types of tools that differentiate the clusters. The analysis had some a priori assumptions about the types of tools involved and therefore the "second stage" disciminant analysis was not necessary.

[5] See Appendix for group membership by metropolitan region.

increased per capita only the same as a city that only experienced a decrease in its unemployment rate? Not necessarily. A reduction in unemployment could be related to discouragement among job seekers rather than a positive shift in the local economy. The two outcomes are related, but it may not be appropriate to assume that the outcomes are the same.

Four of Four	Three of Four	Two of Four	One of Four	None
21	13	17	15	12

Table 3 – Number of Regions that Experienced Changes in Labor Market

This "batching" method of classification also ignores magnitude of success. A region that sees a slight improvement on one outcome metric is evaluated in the same way that a region that made significant strides on the same metric. Cluster analysis addresses these issues.

Cluster analysis identifies the appropriate number of groups for regional outcomes. Hierarchical cluster analysis analyzes the entire possible number of final clusters – starting from completely heterogeneous clusters (where each region is its own cluster) to one completely homogeneous cluster (where all 78 clusters are grouped together). It is up to the analyst to identify the appropriate number of clusters. As Hill and Brennan (2000) note, "There is not purely objective method to determine the optimal or 'correct' cluster solution. The critical question is when to stop clustering (73)." The most common method for making the decision of when to stop clustering is by studying the agglomeration coefficient (Everitt, Landau, and Leese 2009). The agglomeration coefficient is a measure of the difference between the groups that are added to an individual cluster solution. Change in the agglomeration coefficient answers the basic

question of how different the next region is to those that have been clustered together.

Given the flexibility of hierarchical cluster analysis, sometimes it is helpful to look at several different cluster solutions as well. For example Hill and Brennan identify three cluster solutions in examining industrial clusters in northeast Ohio. The first is three groups of industries (a three cluster solution), made up of a nine cluster solution referred to as nine "sets" of industries, which is made up of 15 clusters of industries (a 15 cluster solution). The authors identified ideal cluster solutions by studying the agglomeration coefficient, the slope of the agglomeration coefficient, and the acceleration rate of the agglomeration coefficient. Marked differences in these metrics signal that the previous cluster is an ideal solution (Hill and Brennan 2000, 74).

Results and Discussion

The cluster analysis for the 78 leader regions suggests four potential solutions. The agglomeration schedule analysis identified a 15 cluster solution, an eight cluster solution, a 5 cluster solution and a three cluster solution. Table 4 shows the final fifteen stages of the agglomeration schedule resulting from the cluster analysis, with the propose solutions bolded.

Stage	Number of Clusters	Coefficient	Slope	Acceleration
63	**15**	**245**	**1.03**	**0**
64	14	359	1.47	42
65	13	548	1.53	4
66	12	744	1.36	-11.3
67	11	796	1.07	-21.2
68	10	881	1.11	3.4
69	9	1235	1.40	26.8
70	**8**	**2551**	**2.07**	**47.2**
71	7	3390	1.33	-35.7
72	6	5593	1.65	24.2
73	**5**	**6327**	**1.13**	**-31.4**
74	4	12712	2.01	77.6
75	**3**	**33725**	**2.65**	**32**
76	2	73739	2.19	-17.6
77	1	126193	1.71	-21.7

Table 4 – Agglomeration Schedule from Cluster Analysis

Of the four possible solutions, two seem most helpful for the deeper analysis. The fifteen cluster solution, with an average of 5 MSAs per cluster, provides groupings of "sister regions" that experienced similar outcomes in BA change and labor market outcomes. The five cluster solution, with an average of 15 MSAs per cluster, provides a broader grouping of regions that is more in line with an array of very successful to less successful regions. The 15 cluster solution, my preferred solution for understanding local context in the role that BA attainment plays in changing the labor market, is listed in Appendix B.

The fifteen cluster solution shows a number of interesting trends. Three regions make up individual clusters. Sioux Falls, South Dakota, with a well above average per capita income jump makes up its own cluster (number 9). Savannah, Georgia also with a significant income jump makes up its own cluster solution (number 14). Finally, the Albany-Schenectady, New York region saw a significant drop in income from 1990 to 2010 and makes up its own cluster solution (number 15). Table 5 provides summary statistics on each cluster solution.

Cluster	Avg BA Change	Avg Unemp Ch.	Avg LF Change	Avg PCI Change	Avg Pov Change	LF Size
1	10.9%	3.1%	0.0%	4,461	2.9%	159,047
2	10.5%	2.0%	1.5%	3,391	2.3%	672,003
3	9.9%	1.1%	0.4%	1,278	-0.2%	443,157
4	9.4%	2.4%	2.5%	2,096	1.2%	571,774
5	10.8%	1.8%	2.8%	2,507	1.4%	859,689
6	9.7%	-0.1%	0.7%	779	-0.6%	2,453,472
7	9.8%	-1.4%	-1.9%	-186	-2.0%	655,097
8	9.7%	-1.2%	-0.6%	1,902	-1.6%	869,649
9	10.5%	-3.0%	-3.4%	8,234	-1.4%	148,817
10	8.8%	-0.2%	2.1%	-789	-0.7%	1,088,355
11	10.4%	-2.0%	-5.5%	-6,683	-3.9%	1,872,437
12	9.3%	0.2%	0.4%	-1,574	-1.0%	2,460,997
13	8.8%	-1.4%	-1.6%	-2,900	-1.8%	4,369,150
14	10.9%	0.0%	3.8%	14,041	8.3%	223,202
15	9.8%	1.5%	2.1%	-9,187	-16.8%	588,842

Table 5 – Summary Statistics on Cluster Solutions

The difference in BA attainment growth between clusters is not a major influence on how clusters were determined, but clusters began to form around how the labor market has changed in association with change in the BA rate. For example, cluster 1 is made up of the Manchester-Nashua MSA, Charlottesville VA MSA, and the Bismark ND MSA. All are college-centered regions and, on

average, saw improvement on all labor force metrics except for labor force participation. Given that college regions often have a built in population that is out of the labor market, it could be difficult for the areas in this cluster to make significant progress on the metric.

Cluster 13 is on the other end of the spectrum from the three college towns discussed above. Los Angeles, Detroit, and St. Louis make up the cluster – which had negative changes in the labor force health across the board. The outcome seems plausible in every region, but for different reasons. Los Angeles, a region seeing a relatively healthy and growing economy, may see some of the negative changes in the labor market because of the quickly growing population of foreign-born residents and workers and their families. Detroit and St. Louis on the other hand likely see many of these outcomes because of the long and slow reactions to economic restructuring and deindustrialization.

The next stages of the analysis – the discriminant analysis works to help identify what drives the groupings into clusters, and ultimately, what contributes to some regions seeing positive changes in the labor market and others seeing negative ones. As cluster 13 shows, sometimes, similar outcomes can be driven by different factors. The analysis aims to identify the major trends in this phenomenon. In this analysis I will test the following six hypotheses that come out of the cluster analysis:

Residential Segregation and Bridging Capital - *Regions that have more dispersed (less segregated) gains in educational attainment will convert the gains more often than places that have segregated pockets of highly educated people.*
Residential Segregation and Bridging Capital - *Higher levels of civic participation and leadership orientations that are oriented towards serving the broad population lead to better conversion of gains in educational attainment.*

In-migration of Young People and Empty Nesters - *In migration of young adults (25-34) and retirees (65+) drives conversion of gains in education into positive labor market outcomes.*

Industry Mixes that Bias Towards Skill - *Regions with high levels of STEM industries will convert gains in educational attainment into positive labor market outcomes.*

Large, Dominant Demand Draws - *Regions with large demand draws including the federal government or a dominant industry (20 percent of regional employment or a location quotient over 2.5) or a university driven region has a fixed advantage of converting gains into positive labor market outcomes.*

Strong Anchor Institutions - *Quantity of students and quality of institutions are positive predictors of whether or not a region converts gains in educational attainment into labor market outcomes.*

Early analysis suggests that the residential segregation of BA workers from non-BA holding workers is an important factor in whether or not a region is successful in converting significant increases in the BA attainment rate into a stronger labor market as well. Other important factors in the analysis include standard economic and demographic variables as well (like the percent of foreign-born workers in a region). Another early suggestive trend is that instead of young workers and retirees driving improvement in the labor market, they contribute to non-improvement on the labor market metrics. This analysis must be built out further though before any definitive conclusions can be drawn from it.

Policy Implications

While attracting, retaining and building the number of BA degree holding workers in an area can mean increase competitiveness in the global economy and improved living conditions for those workers, this work shows that increasing BA attainment is not always related with an improved labor market. Should policy makers who are interested in improving job opportunities and the economic position of their community move away from talent attraction programs and business and industrial development? The answer is somewhat complicated because of the various challenges that any municipal leader faces. They must ensure that they create an environment that is attractive to business interests because they must maintain a tax base and core of businesses that contribute to the community.

In many cities, this has meant focusing infrastructure investments on portions of the city that new (and many traditional) knowledge based businesses and workers locate. In Philadelphia this includes major investments in Center City while other portions of the city languish. Do these businesses that focus on BA holding workers hire non-BA holding workers? Yes, but not in enough numbers to make significant changes on labor market wide metrics.

While talent focused efforts may have pulled many cities from the brink and begun a small urban renaissance, many other workers are left out. At the regional level, even some of the strongest economies did not see positive changes in the labor force. For example, the San Jose region saw now positive changes on any of the four metrics. San Jose has a high demand for skilled

workers, but also has a local resident population that does not hold degrees and cannot access these jobs. The innovative economy of the region has helped many, but not the local lower skilled workers. Would a training program or an effort to help locals without college degrees earn one improve the situation? Potentially.

A college-centered region faces a different dilemma. As the cluster analysis shows, these places often see moderate gains on the labor force metrics, except for on labor force participation. The resident (and worker) populations stay on the smaller side as well. In turn many college graduates must leave the region where they were educated. These regions might see improvements on the labor force participation rates if they worked to get more of the college and university students into apprentice and internship programs. These types of programs are one of the strong ways to encourage local university students to stay after graduation because students become involved in the local employment and labor force and build a network, even as interns. These highly educated workers might then someday start a business that could increase the potential economic frontier for the college region.

Local context drives whether or not increasing BA attainment means a stronger labor force. Talent attraction and retention is an important goal of any municipality, but when it comes to improving the labor market, it is not a surefire method of improving things like poverty, unemployment, incomes, and labor force participation. The programs often are focused on bringing workers in from another place with little attention to existing workers (or jobless workers and

potential workers). Bringing in workers from outside of a region may help improve some of the labor force metrics, but it is unlikely to change the labor force participation or the unemployment rate much. BA attainment is also not a one size fits all. Different regional economies hold different skills demands for workers (Rothwell 2012). Policy makers would be well served to consider their context as the develop talent based programs.

Local economic trends or demographics often play a major role in whether or not a region sees improvements in the labor force in conjunction with increasing BA attainment. Talent policies should be leavened with programs that meet the local population's needs. For example, Los Angeles may need to work to link Hispanic workers to better job opportunities through language education or introducing them to job networks. Detroit and St. Louis face a different challenge that is not solved through bringing more BA holding workers into the region as there are many displaced and dislocated workers who need training. In these regions local context suggests that talent development policies should also help dislocated and displaced workers in need of retraining and new skills.

At the individual level, BA attainment almost universally means better life outcomes. It is also a very important factor in improving the competitiveness and productivity of a region. Increased regional BA attainment does not necessarily solve problems for those without a degree though. In those regions, talent development should be leavened to address local context.

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Appendix A – Labor Market Outcomes for Leader Regions

The Best (Four Points out of Four) (21 out of 78 [27%])

Savannah, GA Metro Area
Provo-Orem, UT Metro Area
Peoria, IL Metro Area
Baltimore-Towson, MD Metro Area
New York-Northern New Jersey-Long Island, NY-NJ-PA Metro Area
Madison, WI Metro Area
Des Moines-West Des Moines, IA Metro Area
Appleton, WI Metro Area
Lawrence, KS Metro Area
Pittsburgh, PA Metro Area
Eau Claire, WI Metro Area
Manchester-Nashua, NH Metro Area
Bloomington-Normal, IL Metro Area
Duluth, MN-WI Metro Area
Springfield, MA Metro Area
La Crosse, WI-MN Metro Area
Dubuque, IA Metro Area
Johnstown, PA Metro Area
Billings, MT Metro Area
Fargo, ND-MN Metro Area
Bismarck, ND Metro Area

Very Good (Three of Four Points) (13 of 78 [17%])

Worcester, MA Metro Area
Fort Collins-Loveland, CO Metro Area
Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area
Charlottesville, VA Metro Area
Omaha-Council Bluffs, NE-IA Metro Area
Kansas City, MO-KS Metro Area
Boston-Cambridge-Quincy, MA-NH Metro Area
Buffalo-Niagara Falls, NY Metro Area
Knoxville, TN Metro Area
Virginia Beach-Norfolk-Newport News, VA-NC Metro Area
Scranton--Wilkes-Barre, PA Metro Area
State College, PA Metro Area
Springfield, IL Metro Area

Mixed – (Two of Four Points) (17 of 78 [22%])

Hagerstown-Martinsburg, MD-WV Metro Area
Charleston-North Charleston-Summerville, SC
Metro Area
Allentown-Bethlehem-Easton, PA-NJ Metro Area
York-Hanover, PA Metro Area
Bremerton-Silverdale, WA Metro Area
Columbus, OH Metro Area
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
Metro Area
Milwaukee-Waukesha-West Allis, WI Metro Area
Minneapolis-St. Paul-Bloomington, MN-WI Metro
Area
Colorado Springs, CO Metro Area
Albany-Schenectady-Troy, NY Metro Area
Harrisburg-Carlisle, PA Metro Area
Columbia, MO Metro Area
San Diego-Carlsbad-San Marcos, CA Metro Area
Norwich-New London, CT Metro Area
Johnson City, TN Metro Area
Rochester, NY Metro Area

Only Experienced One Positive Outcome (One of Four Points) (15 of 78 [19%])

Tampa-St. Petersburg-Clearwater, FL Metro Area
Sioux Falls, SD Metro Area
Wilmington, NC Metro Area
Miami-Fort Lauderdale-Pompano Beach, FL
Metro Area
Jacksonville, FL Metro Area
San Jose-Sunnyvale-Santa Clara, CA Metro Area
Chicago-Joliet-Naperville, IL-IN-WI Metro Area
Bellingham, WA Metro Area
Cincinnati-Middletown, OH-KY-IN Metro Area
Louisville/Jefferson County, KY-IN Metro Area
Cleveland-Elyria-Mentor, OH Metro Area
Providence-New Bedford-Fall River, RI-MA
Metro Area
St. Louis, MO-IL Metro Area
Roanoke, VA Metro Area
Athens-Clarke County, GA Metro Area

Didn't Get What Is Expected At All (Zero Economic Outcomes) (12 of 78 [15%])

Charlotte-Gastonia-Rock Hill, NC-SC Metro Area
Detroit-Warren-Livonia, MI Metro Area
Naples-Marco Island, FL Metro Area
Portland-Vancouver-Hillsboro, OR-WA Metro Area
Asheville, NC Metro Area
Greenville-Mauldin-Easley, SC Metro Area
San Francisco-Oakland-Fremont, CA Metro Area
Indianapolis-Carmel, IN Metro Area
Hartford-West Hartford-East Hartford, CT Metro Area
Los Angeles-Long Beach-Santa Ana, CA Metro Area
Seattle-Tacoma-Bellevue, WA Metro Area
Nashville-Davidson--Murfreesboro--Franklin, TN Metro Area

Appendix B

Cluster Membership

Case	15 Clusters
1:Manchester-Nashua, NH Metro Area	1
19:Charlottesville, VA Metro Area	1
27:Bismarck, ND Metro Area	1
2:Fort Collins-Loveland, CO Metro Area	2
5:Bloomington-Normal, IL Metro Area	2
10:Fargo, ND-MN Metro Area	2
28:Billings, MT Metro Area	2

35:Charleston-North Charleston-Summerville, SC Metro Area	2
47:Virginia Beach-Norfolk-Newport News, VA-NC Metro Area	2
48:Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area	2
78:Bremerton-Silverdale, WA Metro Area	2
3:Columbia, MO Metro Area	3
4:Johnson City, TN Metro Area	3
9:Harrisburg-Carlisle, PA Metro Area	3
12:Knoxville, TN Metro Area	3
14:Worcester, MA Metro Area	3
20:State College, PA Metro Area	3
21:Colorado Springs, CO Metro Area	3
31:Peoria, IL Metro Area	3
32:Appleton, WI Metro Area	3
33:Hagerstown-Martinsburg, MD-WV Metro Area	3
53:Minneapolis-St. Paul-Bloomington, MN-WI Metro Area	3
6:Lawrence, KS Metro Area	4
15:Madison, WI Metro Area	4
25:La Crosse, WI-MN Metro Area	4
56:Pittsburgh, PA Metro Area	4
58:Springfield, MA Metro Area	4
65:Kansas City, MO-KS Metro Area	4
68:Norwich-New London, CT Metro Area	4
74:Scranton--Wilkes-Barre, PA Metro Area	4
7:Dubuque, IA Metro Area	5
16:Provo-Orem, UT Metro Area	5
24:Eau Claire, WI Metro Area	5

34:San Jose-Sunnyvale-Santa Clara, CA Metro Area	5
49:Boston-Cambridge-Quincy, MA-NH Metro Area	5
50:Baltimore-Towson, MD Metro Area	5
62:Johnstown, PA Metro Area	5
75:Duluth, MN-WI Metro Area	5
8:Wilmington, NC Metro Area	6
22:Omaha-Council Bluffs, NE-IA Metro Area	6
55:Philadelphia-Camden-Wilmington, PA-NJ-DE-MD Metro Area	6
57:New York-Northern New Jersey-Long Island, NY-NJ-PA Metro Area	6
63:Buffalo-Niagara Falls, NY Metro Area	6
67:Allentown-Bethlehem-Easton, PA-NJ Metro Area	6
76:York-Hanover, PA Metro Area	6
77:Des Moines-West Des Moines, IA Metro Area	6
11:Asheville, NC Metro Area	7
17:Athens-Clarke County, GA Metro Area	7
23:Bellingham, WA Metro Area	7
30:Roanoke, VA Metro Area	7
36:Charlotte-Gastonia-Rock Hill, NC-SC Metro Area	7
39:Portland-Vancouver-Hillsboro, OR-WA Metro Area	7
66:Cincinnati-Middletown, OH-KY-IN Metro Area	7
69:Greenville-Mauldin-Easley, SC Metro Area	7
13:Columbus, OH Metro Area	8
18:Providence-New Bedford-Fall River, RI-MA Metro Area	8
45:Jacksonville, FL Metro Area	8

51:Milwaukee-Waukesha-West Allis, WI Metro Area	8
26:Sioux Falls, SD Metro Area	9
29:Springfield, IL Metro Area	10
42:Tampa-St. Petersburg-Clearwater, FL Metro Area	10
46:Nashville-Davidson--Murfreesboro--Franklin, TN Metro Area	10
71:Cleveland-Elyria-Mentor, OH Metro Area	10
72:Louisville/Jefferson County, KY-IN Metro Area	10
37:San Francisco-Oakland-Fremont, CA Metro Area	11
38:Seattle-Tacoma-Bellevue, WA Metro Area	11
43:Naples-Marco Island, FL Metro Area	11
40:Miami-Fort Lauderdale-Pompano Beach, FL Metro Area	12
44:San Diego-Carlsbad-San Marcos, CA Metro Area	12
54:Chicago-Joliet-Naperville, IL-IN-WI Metro Area	12
60:Indianapolis-Carmel, IN Metro Area	12
61:Rochester, NY Metro Area	12
70:Hartford-West Hartford-East Hartford, CT Metro Area	12
41:Los Angeles-Long Beach-Santa Ana, CA Metro Area	13
64:St. Louis, MO-IL Metro Area	13
73:Detroit-Warren-Livonia, MI Metro Area	13
52:Savannah, GA Metro Area	14
59:Albany-Schenectady-Troy, NY Metro Area	15