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Industry and Labor Characteristics and Projections: The BEAM and WIA Regions

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Industry and Labor Characteristics and Projections: The BEAM and WIA Regions

Final Report

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Executive Summary

The Bluegrass Economic Advancement Movement region encompasses the Louisville and Lexington MSAs and the corridor between them. It is an area with much of the manufacturing, medical and transportation & warehousing industries of Kentucky contained within. Over 36% of the population and 38% of the Kentucky labor force live and work in this region. This report analyzes the labor market structure within the region. We also examine the labor market structure in five Workforce Investment Act Regions: Bluegrass, Lake Cumberland, Lincoln Trail, Kentuckiana Works, and Indiana Region 10. We examine employment at the industry and occupation level and project employment growth for the regions. We examine important inter-industry linkages, and how these linkages may be important for attracting and maintaining the manufacturing base, in spite of a 30 year decline in manufacturing employment. We also examine the educational attainment of the regions and consider whether the workforce has the mix of education best suited to growth. Finally, we examine the age structure of occupations important to the regions. As is well known, the baby boomer generation is approaching retirement age. While the impact of the aging population will be felt across all occupations, we examine general characteristics which point to certain types of occupations as having a preponderance of workers in these age categories.

Our main findings:

- Manufacturing employment will continue to grow at a slower rate than employment in other sectors. The predicted growth in the level of manufacturing employment is a change from the last decade, but consistent with the overall trend in manufacturing as a decreasing proportion of employment.
- Two key inputs to manufacturing in the BEAM region, and particularly Auto Manufacturing, are the Transportation & Warehousing and the Wholesale Trade industry.

The BEAM region has an important cluster in these industries, and this strength could be used to attract additional manufacturing to the region.

- The Health Care industry, already a primary employer in the region, is projected to grow quite rapidly during the next decade. While health care is not generally an input into manufacturing or other industries, access to high quality health care can be used to attract firms in other industries to the region.
- In many of the manufacturing industries, the BEAM region has a relatively high concentration of production workers and a low concentration of management. This raises concerns that these industries are not attached to the region. Attracting management requires a highly educated labor force. Without this, attracting large firms will be difficult.
- Employment of production workers is likely to grow slowly over the next decade. In contrast, while starting from a small base, transportation and materials handling employment is likely to grow quite rapidly.
- Two types of medium skill occupations are likely to have high growth. All medical technology and technologist occupations and nursing are projected to experience rapid growth. We focus on these two as they require less education (typically an associate's degree) than many of the other high growth occupations (physicians for example). Similarly, skilled workers in transportation and manufacturing, including truck drivers, welders, computer control programmers and similar occupations are predicted to grow (although at a slower rate). Again, these are occupations with medium skill and education levels.
- We find that higher paying medium skill occupations (again, truck drivers are an excellent example) are highly skewed toward baby boomers, and thus likely to experience even higher demand.
- Kentucky continues to lag behind competitor states in its production of highly educated workers. Much of the employment growth will be concentrated in occupations requiring a minimum of a bachelors degree. As noted above, attaching large firms to the region requires an educated work force. Kentucky is failing to produce a large enough pool of these workers to sustain the growth predicted.

I. Introduction

As our economy continues to evolve it is important for cities and regions to periodically examine the existing industrial structure of the local economy, how the economy is expected to grow in the future, whether the region can expect to have the resources necessary to support the predicted growth and what changes might be needed to better position the region for the future. The goal of this report is to perform this analysis for several regions in Northern and Central Kentucky and Southern Indiana. To start with we will analyze the economy of the Bluegrass Economic Advancement Movement (BEAM) region.¹ Figure 1 presents a map of the BEAM region. Overall, the counties in the BEAM region contain 36% percent of the total population in Kentucky and 38% of the total labor force in Kentucky. We will also perform some similar analysis for the Bluegrass, Lake Cumberland, Lincoln Trail and Kentuckiana Works Workforce Investment Act (WIA) regions in Kentucky and the Region 10 WIA region in Indiana.² Figure 2 presents a map of the counties in these five WIA regions. The specific analysis undertaken includes the following:

- Determine the current industrial structure in the region.
- Investigate the linkages between industries in the region.
- Examine the occupations most in demand by the industries located in the region.

¹ The counties in the BEAM region are Anderson, Bourbon, Bullitt, Clark, Fayette, Franklin, Henry, Jefferson, Jessamine, Meade, Nelson, Oldham, Scott, Shelby, Spencer, Trimble, and Woodford in Kentucky; Clark, Floyd, Harrison and Washington in Indiana.

² The counties in these other regions include Anderson, Bourbon, Boyle, Clark, Estill, Fayette, Franklin, Garrard, Harrison, Jessamine, Lincoln, Madison, Mercer, Nicholas, Powell, Scott and Woodford in the Bluegrass WIA; Adair, Casey, Clinton, Cumberland, Green, Laurel, McCreary, Pulaski, Rockcastle, Russell, Taylor, Wayne and Whitley in the Cumberland WIA; Breckinridge, Grayson, Hardin, LaRue, Marion, Meade, Nelson and Washington in the Lincoln Trail WIA; Bullitt, Henry, Jefferson, Oldham, Shelby, Spencer and Trimble in the Kentuckiana Works WIA; Clark, Crawford, Floyd, Harrison, Scott, and Washington in Indiana Region 10.

- Examine the supply of workers in occupations most in demand in the region by age and education.
- Examine the expected growth of the educational attainment of workers in the region compared to the expected increase in demand for workers with a given education.

Our main findings are:

For the BEAM region:

- The major industries in the BEAM region include several in the manufacturing sector—most notably transportation equipment manufacturing—as well as the industries in the logistics/supply chain and health care sectors.
- When compared to similar regions, firms in the manufacturing sector in the BEAM region contain a much larger share of workers in low skilled production occupations and a much smaller share of workers in higher skilled managerial or business operations occupations.
- When compared to other regions, firms in the logistic/supply chain and healthcare sectors in the BEAM region have a comparable share, or even a higher share, of workers in more skilled managerial occupations.
- Data on expected employment growth shows that the primary manufacturing industries in the BEAM region are expected to have very little employment growth and may suffer further declines between now and 2020. In contrast, the healthcare and logistic/supply chain industries are projected to experience significant employment growth over this period. The growth in these later industries is expected to occur in the occupations that demand educated workers.

For the other regions:

- Like the BEAM region, manufacturing firms in the five WIA's employ a larger share of production and low skilled occupations and a much smaller share of workers in higher skilled managerial occupations than compared even to other non-metropolitan areas.
- The Lake Cumberland, Lincoln Train and Indiana Region 10 are most comparable to other non-metropolitan areas in the U.S. The Bluegrass and Kentuckiana Works WIAs are, as expected, more comparable to the BEAM region.
- Unlike the BEAM region, the three less urban WIAs (Cumberland, Lincoln Trail, and Indiana Region 10) lack managerial employment in even logistics and hospitals even when compared to other non-metropolitan areas. Like the BEAM region, the Bluegrass and Kentuckiana Works regions have higher managerial employment in logistics and hospital industries.
- While the Bluegrass WIA appears to have high educational production, this is likely due to the concentration of universities in the region. The Kentuckiana Works WIA has education production similar to that of BEAM and lags other metropolitan areas. The other WIA's may lag significantly in educational production, although some caution must be used since students may have temporarily relocated (potentially to the Bluegrass region). Regardless, like the BEAM region, there is concern that the WIA's are not producing enough high skilled young workers to meet the demands of growing industries such as logistics and hospitals.

One of the primary challenges confronting all the regions we studied is that many of the primary industries in the area are in the manufacturing sector and manufacturing is projected to have very limited, if any, growth in employment over the next decade. Therefore, the only way to increase manufacturing employment in the area is by attracting firms that are currently located somewhere else, which is a challenging prospect. The primary way to attract these businesses is to offer them something they are not receiving in their current locations. A number of possibilities exist in this regard. One possibility currently being discussed is creating a more competitive tax structure, although at this point it is difficult to predict the success of these efforts. Previous work by Hoyt, Jepsen and Troske (2007) suggests that while tax breaks may lure some industries, they have little impact on overall employment. Another potential growth area derives from so called "on-shoring." Many firms moved manufacturing processes to other countries due to lower labor costs. Recent trends in labor costs in those regions, coupled with expenses incurred in shipping good back to the U.S. (including the weakening dollar), have made those regions less attractive. Locations in the U.S. can be attractive due to better infrastructure, and in particular better transportation infrastructure. In general, infrastructure - especially transportation - is crucial to firms making location decisions. One of the region's prominent sectors— the logistic/supply chain sector - provides excellent access to transportation. As manufacturing firms become more efficient they rely more heavily on just-in-time methods of production, which require firms to receive vital inputs on a regular and timely basis, and requires them to be able to ship their goods to their customers in an efficient and timely fashion. This is exactly the service provided by logistic/supply chain firms. Focusing on the region's strengths in the logistic/supply chain industry could allow us to attract more of the advanced manufacturing

sector. Of course, the main limitation to this strategy is the growth in educated workers needed to support the growth of the advanced manufacturing and logistic/supply chain sectors and the low projected growth of educated workers in the region. In order to meet even the projected employment growth in the region, production of college educated workers will need to increase: Kentucky and the region as a whole continue to produce fewer college graduates than projected employment growth requires. If the region wants to attract employment growth beyond the average predicted, significant growth in college graduates (and other education) is required.

II. Analysis of the BEAM Region

A. Industry Structure in the BEAM Region

We begin by examining employment in industries in the BEAM region. The U.S. Department of Commerce classifies firms according to the main industry in which they operate using the North American Industrial Classification System (NAICS). Every firm is assigned a six digit NAICS code. The first two digits represent twenty broad industries such as Manufacturing (31, 32 or 33), Transportation and Warehousing (48 or 49) and Health Care and Social Assistance (62). The third digit breaks these industries into sub-industries based on primary products. For example, Food Manufacturing is industry 311 (31 for manufacturing, 1 for food). Further digits refine the industry, for example 311111 is Dog and Cat food manufacturing. We focus, primarily, on two and three digit industry classifications.

Table 1 presents data on 86 of these NAICS three digit industries (we exclude public sector and federal government to focus on private non-farm industries). The first two columns provide the total employment in this industry in the BEAM region and in the U.S. as a whole. The third column presents employment in BEAM as a percentage of total U.S. industry

employment while the fourth column presents employment in the industry as a percentage of total employment in the BEAM region. For example, Industry 312, Beverage and Tobacco Product Manufacturing (which includes bourbon) has 3,617 workers in BEAM and 152,068 workers in the U.S. BEAM employment represents 2.38% of all U.S. employment in Beverage Manufacturing but only represents 0.37% of total employment in the BEAM region. In this table it is easy to see that industries which have a large portion of BEAM region employment are not always industries where the BEAM region has a large share of national employment. For example, Industry 722, Food Services and Drinking Places is over 9% of BEAM employment, yet the BEAM share of the national industry is only .83%. Similarly, industries where the BEAM region has a large share of national employment are not necessarily industries which employ a large share of BEAM workers. The Beverage Manufacturing industry mentioned above is one such example; 2.4% of national Beverage Manufacturing industry employment is located in the BEAM region, but only 0.37% of employment in the BEAM region is in beverage manufacturing.

A number of key findings are important to note. First, manufacturing industries as a whole account for slightly less than 14% of all employment in the BEAM Region, a total of 134,000 jobs. Manufacturing is the second largest industry in the region, ranked behind Healthcare (almost 160,000 workers) and just ahead of Retail (just over 120,000) workers. About half of those manufacturing workers, 73,434 workers, are employed in various metal manufacturing firms which includes Transportation Equipment Manufacturing (29,407), Fabricated Metal Manufacturing (14,742) and Machinery Manufacturing (10,465).

In order to identify a set of industries to focus attention upon, we examined the top industries from Table 1 based on the percentage of employment in BEAM (Table 2) and based on BEAM's share of U.S. employment (Table 3). While these two metrics result in a different list of top industries, there is some overlap. Figure 3 presents a graphical representation of this by plotting industries by both measures on the same graph (we chose the top 15 by U.S. employment share to focus the graph). Certain industries stand out. For example, industry 622, Hospitals in BEAM is both a relatively large share of U.S. Hospital employment (1.69%) and a large share of BEAM employment (5.89%). Couriers and Messengers (industry 492) firms in the BEAM region contain a large share of U.S. employment in this industry (over 25%). However, they have a relatively moderate share of total employment in the BEAM region (around 1%). Finally, firms in Transportation Manufacturing (industry 336) contain both a large share of U.S. employment in this industry as well as a large share of total employment in the region.

When selecting industries for detailed analysis we focused on these two measures, as well as examining industries that we considered to have important impacts on the region. Our selection of industries focuses upon areas where we have a so called "cluster." That is group of firms or industries which are large employers either as a percentage of employment in the region or as a percentage of national employment in the industry. We also used standard input-output analysis to examine inter-industry linkages for a number of the manufacturing industries we identified using the approach above. We focused our analysis primarily upon manufacturing industries. Table 4 presents one such analysis for Transportation Equipment Manufacturing. While Table 4 presents a basic outline, we highlight a number of key features. First, one of the

primary inputs into Transportation Equipment Manufacturing is other transportation equipment manufacturing: as is well known, major manufacturers such as Toyota rely upon suppliers to provide important inputs. In terms of analyzing employment growth both by industry and occupation, this leads to the broader, three digit NAICS industry analysis we have adopted, rather than a very detailed four or more digit analysis. As we examined the occupations, there were no important differences in types of occupations hired. While certainly the details of very specific industries differed, because a wide variety of these specific industries feed into the main industry of automobile manufacturing, aggregating to the 3 digit level provides the clearest picture of labor demand.

A more interesting feature is the importance of two other broad industries. In Table 4, Industry 42, Wholesale Trade, is crucially important for Transportation Equipment Manufacturing. Similarly Transportation by Truck, a part of Transportation and Warehousing is also a major input. Manufacturing industries in the U.S. have moved increasingly to "just in time" supply organization. Thus a key input to supply is having warehousing and suppliers and transportation bring key inputs at regular intervals. This shifts these management costs to other firms, while still providing a regular supply of key inputs. As important as parts manufacturing may be to automobile manufacturing, moving those parts from their production site to the assembly site is no longer a function internal to the firm, but rather is contracted out and serves as important input, no different than the parts manufacturers themselves. For this reason we have also chosen to add and focus upon the broad industries of Wholesale Trade (42) and Transportation and Warehousing (48-49).

The remaining report focuses on sixteen two, three and four digit industries. The two-digit industries we examine are: Wholesale Trade (Industry 42) and Transportation and Warehousing (Industry 48/49). These two industries together represent over 5% of employment in the BEAM region and as we have noted, are an important input into manufacturing. As noted, we have a high percentage of the national employment of certain industries with Transportation and Warehousing. Within the Transportation and Warehousing are two three-digit industries which we focus on: Couriers and Messengers (Industry 492) and Warehousing and Storage (Industry 493). Interestingly, our input-output analysis demonstrated that a number of important local industries - in particular the health care industry and various aspects of Transportation and Warehousing - use couriers and messengers as an extensive input. Similarly, we find that both Wholesale Trade and many manufacturing industries (at the three-digit and lower level) make important use of Warehousing and Storage. These inter-industry linkages are an important facet of our local set of resources.

The most narrowly defined industry we considered was the four-digit industry Medical Equipment Manufacturing (Industry 3391). As a four digit industry, this industry will typically have less employment than the other industries, however compared to other four-digit industries it is an important part of the BEAM industry mix.

As we noted earlier, manufacturing as a whole represents a large industry within the BEAM region (approximately 13% of employment). We have separated out seven manufacturing industries (three digit level) on which to focus our analysis: Food Manufacturing (Industry 311), Beverage Manufacturing (Industry 312), Fabricated Metal Product Manufacturing (Industry 332), Machinery Manufacturing (Industry 333), Computer and

Electronic Product Manufacturing Electronics (Industry 334), Electrical Equipment, Appliance and Component Manufacturing (Industry 335) and Transportation Equipment Manufacturing (Industry 336). These industries represent cases where the region has a strong emphasis such as automobile manufacturing (336 along with 333 and 332). Food and Beverage manufacturing represent some of our high profile industries or firms such as Bourbon and Yum! brands.

The Health Care industry is the single largest industry, by employment, at the two-digit NAICS level in the region. At the three digit level, Hospitals (Industry 622) are the second largest employer (Food Service being the largest) and Ambulatory Health Care Services (Industry 621) is the fourth largest employer in the region (Administrative and Support Services being the third). Nursing and Residential Care Facilities (Industry 623) is the sixth largest employer in the region. As we discuss below, the Health Care Industry has the highest potential for employment growth, and has high skill employment growth associated with that growth.

Overall, we are focusing on industries in four broad groups: Wholesale Trade, Transportation and Warehousing, Manufacturing and Health Care. Table 5 presents 2010 employment for each of the chosen industries. The two largest industries within our focus industries are Hospitals (Industry 622) with over 57,000 employees in the BEAM region and Ambulatory Health Care Services (Industry 623) with over 50,000. Transportation and Warehousing (Industry 48/49) with almost 50,000 workers and Wholesale Trade (Industry 42) with over 42,000 workers are the third and fourth largest industries, respectively. It should be noted that Industry 3391, Medical Equipment Manufacturing is a four-digit (less aggregated) industry, while Industry 48/49 and Industry 42 are two-digit industries (or even combinations of two-digit industries) and represent a more aggregated structure. Thus it is not entirely

appropriate to compare levels of employment across all of these chosen groups. One should also note that Couriers and Messengers (492) and Warehousing and Storage (493) are a part of the broader two digit industry Transportation and Warehousing (48-49).

B. Occupation Distribution in the BEAM Region and Selected Industries

Occupations are coded by a Standard Occupation Code developed by the Bureau of Labor Statistics. This occupation code first groups occupations into twenty-two broad two digit groups, such as Management (11), Business Operations (13), or Production Workers (51). Table 6 presents employment in each of these broad categories for the BEAM region and the U.S. as a whole. Like the industry table, we present both the percentage of the U.S. occupations and the percentage of the BEAM employment. Production workers (51) in BEAM have the highest percentage of the national industry and represent 9.75% of BEAM workers, while Education and Training Occupations (25) are among the lowest as a percentage of the nation. Office and Administrative Support occupations (43) are the largest occupation category in BEAM, with 16% of the total BEAM employment, while production workers (51) rank fourth and Transportation and Material Moving Occupations (53) are fifth as a percentage of BEAM employment. Healthcare Practitioners (29) are 7.22% of BEAM employment and represent 0.84% of the national employment in that occupation (which is slightly higher than the 0.74% which is the weighted average). While Health Care Support Occupations is only 3.85% of BEAM employment, it also represents 0.85% of national employment in that occupation.

We note that the median hourly wage for all occupations is \$14.62. Production workers are slightly below this median at \$14.59 and transportation and materials handling are further

below at \$13.61. Health Care Practitioners, by contrast have median hourly earnings of \$25.07, significantly above the overall median.

Returning to Table 5, we present the percentage of employment within each study industry in six occupation categories: Management, Business Operations, Health Care Practitioners, Health Care Support, Production, and Transport and Material Moving. Occupations such as Management and Business Operations tend to be high paying occupations requiring more education, while occupations such as production workers, health care technicians, health care support and transportation/material moving, are lower skilled, lower paid occupations.

Figures 4a and 4b show the percentage of overall employment in managerial and production occupations, respectively, for the BEAM region as well as for the U.S. as a whole and eight other metropolitan areas that are comparable to the BEAM region: (Atlanta, Birmingham, Chicago, Cincinnati, Detroit, Greenville, Nashville and Raleigh-Durham.) BEAM has a slightly lower percentage of employment in management occupations (Figure 4a) than the U.S. - 8.2% in BEAM compared to 8.7% for the US. Relative to comparable metropolitan areas the BEAM region has a lower percentage than all but Detroit and Greenville. Unlike these other cities, the BEAM region has relatively few management personnel. In Figure 4b we see that the BEAM region has a larger share of production workers than all but Detroit and Greenville. Thus we see that currently, operations located in the BEAM region tend to be more production and less management than is the case in other metros areas in the U.S.

Production occupations are clearly important, however, higher wage positions tend to be in management occupations. Further, as technology advances, fewer production workers are

used at any given plant. The fact that the BEAM region looks like Detroit in its managerial and production worker mix, and is much different than faster growing regions such as Atlanta, Raleigh-Durham and Nashville, highlights the importance of attracting or growing industries with a larger share of managerial workers.

Figures 5a and 5b, 6a and 6b and 7a and 7b present similar graphs for Transportation Equipment Manufacturing (Industry 336), Beverage and Tobacco Product Manufacturing (Industry 312) and Food Manufacturing (311), respectively. We start by discussing transportation manufacturing. Here the results are even starker than what we see in manufacturing as a whole. In Transportation Equipment Manufacturing less than 4% of workers in the BEAM region are in a managerial occupation compared to over 8% for the U.S. Cities such as Atlanta, Chicago, Cincinnati, and Raleigh-Durham all have over 10% of transportation employment in management. Figure 5b demonstrates that only Greenville even approaches the over 60% mix in production of the BEAM region. Clearly, Transportation Manufacturing in the BEAM region is predominantly focused on production. The region lacks managerial workers.

We see a similar pattern in the Beverage and Tobacco Product Manufacturing (Industry 312), although the differences are not as striking. In the BEAM region there are relatively fewer workers in the managerial occupations compared to the U.S. as a whole and the comparable metro areas, although both Birmingham and Detroit have a smaller percentage of managerial workers, and a higher percentage of workers in production occupations. In contrast, in food manufacturing the BEAM regions has a relatively high share of employment in the high skilled, high wage managerial occupations and a typical share of employment in production occupations.

In Figures 8a and 8b we present the share of workers in the Transportation and Warehousing Industry working in managerial and transport and moving occupations, respectively. Workers in transport and moving occupations in the Transportation and Warehousing industry are similar to production workers in manufacturing industries—they tend to be low skilled and receive relatively lower wages. Like Food Manufacturing (Industry 311), in Transportation and Warehousing, the BEAM region is much more comparable to other MSA's in its mix of employment. Indeed, the BEAM region (with nearly 7% of workers in managerial occupations) has relatively more managers than the US as a whole and only Atlanta (8%) and Birmingham (9%) have a larger percentage of workers in these occupations than the BEAM region. The BEAM region's percent of Transport and Moving Occupations is very comparable to other cities as well. The BEAM region has a nearly identical mix to the rest of the country (51% as compared to 50%), and is similar to Birmingham and Nashville. While BEAM has relatively more Transport and Moving workers than Chicago and Raleigh-Durham, the difference is small given the overall 50% mix in the U.S. industry. Together these graphs suggest that in the Transportation and Warehousing Industry, the BEAM region is quite comparable in its employment mix to the rest of the country.

Figures 9a-9c present the occupational distribution of workers for the Hospital Industry (622). In this industry we focus on three occupations: management occupations, practitioner/technical and support occupations with support occupations being comparable to production workers in manufacturing and practitioner/technical occupations between managerial and support occupations in terms of skills and wages. In this industry the BEAM region has a typical share of workers in managerial occupations, but a slightly above average share in

practitioner/technical occupations and a disproportionately larger share of workers in support occupations.

Overall, relative to the rest of the country, and comparable metro areas the BEAM region as a whole, and the largest industries in the region, have a larger share of workers working in low-skilled, low-wage occupations. However, there are a few notable exceptions such as food manufacturing and the transportation/warehousing industries—the latter of which is where logistic/supply chain firms are classified. In the next section of the report we use projections for how these industries will grow in the coming years to predict how the demand for skilled and unskilled workers in the region will likely change.

C. Employment Growth Projections for the BEAM Region: Industry Analysis

We begin first with broad industry growth predictions. These predictions are based upon Bureau of Labor Statistics projections. Using the American Community Survey, we construct predictions for the occupation and industry employment mix of the BEAM region in 2010 and apply the predictions from the Bureaus of Labor Statistics. Table 7 provides two-digit NAICS level predictions for employment growth in the BEAM region from 2010 through 2020. We note that employment across all industries is expected to grow by over 148,000 jobs. This represents a respectable 16.7% growth for employment in the region. Healthcare, retail and construction will add the largest number of jobs, while construction, healthcare and professional services are expected to experience the highest growth rates.

We note here that, overall, manufacturing is predicted to experience some growth over the next 10 years. The prediction is for slightly less than 3% growth over 10 years as compared to a total employment growth in the region of over 16%. This implies that over the next 10

years, manufacturing in the BEAM region will fall from 13.8% of all BEAM employment to 12.2%. This actually is a slowing of the recent trends in Kentucky, Louisville and Lexington as shown in Figure 10 where we plot manufacturing as a percentage of employment for the U.S., Kentucky, Lexington and Louisville for the period 1990 to 2012. While the number of manufacturing jobs held steady or grew slightly from 1990 to 2000, the percentage, except for Lexington-Fayette, fell during this period. Beginning in 2000, all three regions saw manufacturing employment levels decline, while manufacturing employment as a percentage fell sharply.

A number of authors have suggested that manufacturing may grow over the next decade, reversing the trend in the last few decades. In order for manufacturing to maintain its share of employment in BEAM over the 10 year period it would need to grow at a rate of 16.7% (equal to the overall employment growth rate of the region). This is more than 5 times as much growth as the predicted growth rate of 2.88%. It would require 15,000 new jobs in manufacturing industries. By comparison, the growth for Lexington-Fayette seen in the mid-1990's added only 11,000 jobs. Noting that other areas (Kentucky as a whole and Louisville) were losing manufacturing employment during the same period. In order for manufacturing to return to its employment level in 2000, it would require 57% growth, or nearly 70,000 new jobs.

While a number of events may lead to positive employment growth - which we are predicting, in spite of a 10 year period of manufacturing employment decline - a number of factors suggest this growth will be modest. First, many have pointed out that wages in China have risen dramatically in the last few years, making China less attractive. As employers move to shift manufacturing out of China, some of those facilities may be located in the U.S., but firms

likely will also choose to locate in other countries with lower wages. While the U.S. may obtain some new employment, not all of the relocation will return to the U.S.

As we have seen over the last thirty years, new manufacturing firms located in the U.S. utilize higher technology requiring fewer workers than those same firms locating in countries where labor costs are low (firms choose a mix of capital and labor dictated by relative prices). Hence, even if a plant in China (or anywhere outside of the U.S.) is shut down and relocated to BEAM, it will not hire as many workers as were used in operations in China. For these reasons, it is extremely unlikely that manufacturing will grow at a rate much more than the 3% predicted.

In considering the long term growth of a region, it is important to note that it is not sufficient to simply grow an industry. As the data and graphs for manufacturing show, manufacturing is one of the largest sectors in terms of employment in the BEAM region, but this employment is concentrated in low-skilled, low-wage jobs. In order to have a vibrant dynamic economy (similar to that of Atlanta or Nashville), the BEAM region needs a better mix of jobs that includes managerial and other higher-skilled higher-wage jobs. Table 8 presents projected employment growth for our selected industries over the next decade based on predictions of national employment growth at the industry/occupation level from the Bureau of Labor Statistics. We use the occupational distribution in the BEAM region industries as the base. Then, using the predicted the growth of employment for that occupation in that industry nationally, we predict BEAM employment in 2020. Adding up the employment across occupations in each industry provides our prediction for employment in BEAM in 2020. The predicted growth is striking because, with the exception of Fabricated Metal manufacturing, all other manufacturing industries are predicted to have low, or even negative, employment growth.

In general, industries relying on production workers for growth show weaker growth overall. Both predicted changes in technology and continued movement of routinized jobs to other countries accounts for these predictions.

In contrast the health care and transportation and warehousing industries are predicted to have employment growth rates of well over 15%. These industries represent both structures and technologies which are less impacted by competition from workers in other countries and contain jobs that are difficult to replace with technology. While producing a product can take place anywhere in the world, distributing it to U.S. consumers must take place within the United States. Health care is also difficult to "off-shore" and hospitals and ambulatory care services use technology to enhance workers and treat larger numbers of patients.

More important than the overall growth rates, are the predicted growth rates in employment by education level since this provides an indication of the types of workers needed to meet the change in demand of workers. We base these predictions on the educational requirements needed for different occupations within each industry along with the current occupations distribution of workers in the industry. Our predictions are presented in Table 9. In addition we plot the predicted growth in the demand for workers with a B.A. or better by industry in Figure 11. A number of important conclusions can be drawn from the table and figure. First note that the industries with highest predicted growth—healthcare and logistics—also have the highest share of workers with higher education (BA plus). For example, the Hospital Industry, which currently employs almost 60,000 workers, is predicted to have 16% growth in employment. In addition, nearly 50% of the labor force in the hospital industry has at least a BA degree. Therefore, predicting an increase in demand for workers with a B.A. degree

of over 4,000 workers in the hospital industry means this industry will need to find another 4,000 workers in the BEAM region with a B.A. degree. Overall, we expect there will be a 20% growth in the demand for workers with a B.A. degree in the BEAM region, which represents that nearly 19,000 new workers with B.A. degrees will be needed to accommodate the growth in the BEAM region.

D. Employment Growth: Occupational Analysis

In this section we examine which occupations are likely to see strong growth during the next decade. We consider first broad occupational categories (two digit SOC) both overall and within each of the selected study industries. We then turn to more detailed occupation categories, focusing on strong growth, and educational requirements. Table 8 provides a broad view of occupation growth in the BEAM region. Overall, we predict the region to grow at a rate of a little over 16%. While some occupations have high growth rates, they are starting at a low base level of employment and will not be employing large numbers of workers, for example, Life, Physical and Social Sciences (19) is predicted to have 24% growth in employment, yet this will add just under 900 jobs. In contrast, Production employment has slow growth of only 5.7%, yet will add nearly 5,000 jobs. The occupation categories which are primarily responsible for adding the nearly 150,000 new jobs we expect in the BEAM region by 2020, are Office and Administrative (43), Healthcare Practitioners (29), Sales (41), Transportation and Material Moving (53), Construction (47), and Healthcare Support (31).

We turn next to industry specific occupational employment predictions. As noted above, the manufacturing industry is predicted to grow by approximately 3%, resulting in an additional 3500 new jobs over the next 10 years. As Table 10 makes clear, of these 3500 new jobs, 2500

will be in production workers. An additional 500 each will derive from Transportation and Material Moving and Installation and Maintenance jobs. Table 11 examines these production occupations in more detail revealing that over 800 of these new jobs will derive from Metal Workers and Plastic Workers, 600 will derive from Woodworkers, and over 500 will derive from Assemblers and Fabricators. Within these, four occupations account for most of the growth: computer control programmers and operators, machinists, welders, and woodworking machine setters. Many of these represent skills associated with advanced manufacturing plants. Some of these, such as machinists and welders are relatively high paying jobs in manufacturing with median hourly rates as high as \$18-\$20.

We turn next to occupations within the Transportation and Warehousing industry. Table 12 provides a broad overview of which occupations in this industry will likely grow over the next 10 years. As one would expect, the vast majority of the new jobs - nearly 6000 of the projected 9000 - will be in transportation and material moving. However, unlike manufacturing which saw no projected growth in management occupations, the Transportation and Warehousing industry will see moderate, 14.2%, growth representing 171 new management jobs. It should also be noted that nearly 1,800 office and administrative jobs will be added in this industry. As Table 13 makes clear, over half of the nearly 6000 transportation and material moving occupations growth derive from motor vehicle operators, in particular we predict the need for nearly 3,000 tractor trailer drivers. These positions typically pay in the \$18 range. The second largest occupation growth is in the material moving workers occupations, and in particular in the laborers and hand movers group. This occupation is relatively low paying, at only \$10 per hour and will likely add approximately 1,500 new workers.

Like the Transportation and Warehousing industry above, the Wholesale industry employment growth is concentrated in the Transportation and Material moving occupations, although sales is a close and significant second, see Table 14. We also note that while modest, the wholesale industry will accommodate 4.1% growth in management and 12.1% growth in business and financial operations occupations. We focus upon the transportation and materials handling occupations here. As with Transportation and Warehousing, the two main occupation groups which account for this growth are the motor vehicle drivers and the laborers and hand movers. Here, unlike the Transportation Industry, the distribution is split more evenly.

Finally, we turn to the occupations in the health care industries. Table 15 provides a broad look at the occupations which will make up the health care industry growth over the next decade. As one would expect, over 25,000 of the 47,000 new jobs in this industry are concentrated in the health practitioner and health support services occupations. Before examining these we note that over 7,000 office and administrative jobs will be added in this industry and over 1,300 management jobs. As we noted in the educational breakdown above, much of the employment growth in the Health Care Industry is focused on occupations requiring education beyond high school. We highlight a number of these occupations. The BEAM region will need over 6,000 additional nurses. Nursing requires at least an Associate's degree and has a median wage of \$27 per hour. A second large growth area is diagnostic technologists and technicians. These include a variety of technicians such as radiologic technicians and nuclear medicine technologists. Over 4,000 of these various technicians and technologists will be required. While the educational backgrounds vary, typically an associate's degree is necessary and these positions pay between \$20 and \$30 per hour. In the Healthcare Support Occupations,

we see Home Health Aids accounting for over 4,000 of those new jobs. Home Health Aids are relatively low wage workers, earning approximately \$10 per hour but require only a high school degree or equivalent. Overall, most of the health care positions are more highly skilled and hence highly paid than those found in the other industries. This is also the fastest growing industry and will account for a plurality of the new jobs in BEAM over the next decade.

E. Education Production in the BEAM Region

To start examining the supply of skilled workers in the BEAM region Table 16 shows the enrollments and completions for all post-secondary institutions in Central Kentucky and Southern Indiana. This table shows that in 2010 these institutions awarded slightly over 36,000 degrees, diplomas or certificates. Figure 12 shows the distribution by type of award. This figure shows that approximately 19,000 people obtained a B.A. or higher in the region. Of course, this shows how many people are currently receiving a degree in the region. Under a simple classical model, this would presumably be the amount necessary to meet future demand. If future workers are forward looking, and are able to access education as needed, there should be no concern about the educational system producing sufficient highly educated workers. However, there may be a variety of informational problems or limited access to capital markets (e.g. student loans) which prevent future workers from making optimal decisions about pursuing education. It is difficult to predict, even for professional economists, whether the number of people receiving a degree is growing sufficiently to meet the expected growth demand, nor does this show how we compare to other regions that we compete with for high-skilled, high-wage jobs. Our findings below, examining educational attainment in the BEAM region are quite comparable to those of the Kentuckiana Works Human Capital Score Card.

To start examining the region's ability to increase the supply of workers with a B.A. or better, in Figure 13 we show the change in Kentucky's college attainment ranking over the previous 20 years. We can see in this figure that while Kentucky has increased the number of adults with a college degree over this period (from around 15% in 1990 to around 23% in 2010) it has made limited progress relative to other states in the country. In 1990 we ranked 48th in percent of adults with a BA, exceeding only West Virginia and Arkansas. In 2010 we ranked 46th, exceeding West Virginia, Mississippi, Arizona and Nevada (but Arkansas moved ahead of us). However, Kentucky still has a long way to go if it hopes to compete with other states.

Next, Figure 14 presents the percentage of the BEAM workforce (age 25 and older) with a BA or higher and compares it to other comparable MSA's. As this figure makes clear, the BEAM region trails all of the other comparable MSAs, and the U.S. as a whole, in educational attainment. We are at least comparable to other regions—such as Detroit and Greenville—that are primarily industrial. However, we clearly trail more dynamic urban areas such as Atlanta, Chicago, Nashville, Raleigh-Durham, and we even trail MSAs such as Birmingham and Cincinnati.

Table 17 presents data on current enrollment in college, current higher education of younger workers and total education level of the workforce for selected states, selected MSA's and the BEAM region. The BEAM region as a whole has approximately 44% of 18-24 year olds either enrolled in higher education or with a B.A. The U.S. average is 46%, while the averages for the comparable MSAs range from 43% for Atlanta to 48% for Chicago and Nashville. We note that the high number for Raleigh-Durham is due to the presence of three major universities in a relatively small MSA. Clearly, even though the BEAM region is outperforming most states,

it is at the low end of comparable MSA's in enrollment in higher education. Figure 15 plots the percent of 18-24 year olds enrolled or with a BA against the percent of 25-24 year olds with a BA or higher for the BEAM region and the comparable MSA's. This graph depicts how the education of the workforce is likely to change in the next several years. What is troubling about this figure is that, while we are comparable with places like Detroit, Greenville and Birmingham in terms of the percent of 25-34 year olds with at least a B.A. degree, we badly trail all but Greenville and Atlanta in terms of the percent of 18-24 year olds currently in school. Going forward, we are only going to fall further behind every other MSA in this figure (with the exception of Greenville and Atlanta) in the percent of our workforce with a B.A. This being the case, it is simply hard to imagine how we are going to accommodate the expected growth in the demand for educated workers coming from the health care or logistic sectors (or any other sector for that matter) without a substantial increase in educated workers moving to the region.

F. Analysis of Age Distribution by Occupation in BEAM Region

It is important to realize that the predicted growth in employment is in addition to employment needed to replace existing workers. To get a sense of the number of workers that may retire in the next several years, Table 18 shows the distribution of workers in the manufacturing sector by occupation and age. This table shows that almost 20% of production workers and 25% of managerial workers are over 55 and likely to retire in the next decade. Of course this relatively large number of mature workers reflects the aging of baby boomers. This adds additional pressure to demand for workers. It is also important to recognize that replacing these workers will simply maintain the BEAM region's current supply of relatively low skilled, low-wage jobs. If the BEAM region wants to transform, then it needs to increase the supply of

educated workers in order to meet the growing demand from the healthcare and supply/chain logistic industries and to attract or grow other firms with a growing demand for skilled workers. Failure to do this will mean that these firms will either leave the region or will choose to locate in other regions with a better supply of skilled workers.

Table 19 presents the percentage of workers by age category in the BEAM region and for selected occupation groups highlighted above. We have chosen eight basic age categories to present. It should be noted that these categories are of different sizes. For example the "Oldest B" category is only 66 year olds, the oldest baby boomers. The first group are new entrants to the labor force, aged 18 to 24. While they are only 10% of the BEAM population, they are 12% of the labor force. The next category, Prime Age 1, is 25 to 34 year olds. They represent 15% of the BEAM population and 18% of the BEAM labor force. Prime Age 2 are 35 to 48 and represent the oldest non-baby boomer group and are 25% of the BEAM population and 30% of the BEAM labor force.

The Baby Boomers, as a whole (age 49 to 66) are 32% of the BEAM population and 33% of the labor force. Note that younger workers, as has always been the case, make up a larger portion of the labor force than do older workers. We see this trend particularly among the Baby Boomer group. The Prime Age Baby Boomers, age 49 to 58 are still a larger portion of the labor force than of the population as a whole: 22% of the labor force and 19.8% of the BEAM population. The 59-62 year olds, who are approaching typical historical retirement ages, are 6.8% of the population and only 6.6% of the labor force. The 62 to 65 year old group, those reaching typical retirement ages, are 4.1% of the population but only 3.4% of the Labor force: we begin to see retirement occurring. The 66 year old group is the oldest baby boomer group.

At age 66, these individuals are "beyond typical" retirement age. As is well known, because of improvements in health, current generations are working longer than historical generations. We see that here. The 66 year olds are still nearly 1% of the labor force while being 1.3% of the population. In contrast those over 66, the final group, are 16.9% of the population but only 5.5% of the labor force. We do expect baby boomers to work somewhat longer. However the fact remains, and can clearly be seen in these and other data, that retirement at ages near 65 is still quite common.

The remaining six columns of Table 19, present the demographic breakdown of two broad occupation categories and four narrower ones. We have chosen to focus on production workers and transportation and material moving, based upon the analysis above and the importance for key manufacturing industries in the region. Of importance here are cases where the percentage in a particular age group differs markedly from the percentage of the labor force. For example, 43% of truck drivers (53-3) are baby boomers yet baby boomers as a whole are only 33% of the labor force. Indeed, even 66 year olds are still nearly 2% of the truck drivers yet represent only 1% of the BEAM labor force. We would expect, then, that truck drivers are likely to be retiring soon, and this will heighten the demand for young truck drivers.

In sharp contrast to this are the woodworkers (51-7). Again, as noted above, an area of some expected growth. However, 33% of woodworkers are in the prime age 1 group, and only 22% are in the Baby boomer group. While some retirement is expected, baby boomers are less dominant in this occupation. In general, the production occupations (51) are typically reflective of the labor force as a whole. While we expect retirement from baby boomers across all occupations and industries, the production workers are not markedly invested in Baby Boomers.

Table 19 presents some special cases. Our broad analysis found two, perhaps unsurprising, regularities. First, and perhaps foremost, occupations with relatively high wages (both overall and relative to the typical educational requirements) are often dominated by older workers. This occurs for two reasons. The first is selection by the workers themselves. As individuals, these workers likely sought career paths that led them to the highest wage occupation they could find. Once in that occupation, they remain there, having found a good match for their skills and abilities. The second reason is selection by employers. Older workers are more experienced, both in general and for specific industries and occupations. This experience leads to higher productivity. Thus firms pay these workers more and retain them because of their higher productivity. The mirror image of this fact, is that occupations which are relatively low wage are dominated by younger workers. These occupations are often stepping stones in a career path. Young workers take these position as a means to earn some income while gaining experience. Indeed, both experience in the sense of learning how to work, but also experience in learning about which occupations may be good skill matches - and lead to higher wages - for the individual.

The second regularity is that occupations with high physical demands are typically dominated by younger workers while occupations with high specific skill demands are typically occupied by older workers. Like the first regularity, this is not surprising. It is also not unrelated. It occurs for a number of excellent reasons. Older workers find physically demanding occupations (some of which can have high pay) more difficult than their younger counterparts, while higher skills take time to develop.

These two regularities suggest an important pattern in assessing the impact of the baby boom on future job openings. Occupations like truck drivers are medium skilled (requiring less than a college education, but more training and skills than many other occupations). These occupations are dominated by older workers and will continue to be in demand by employers over the next decade or more. This suggest that these type of occupations may provide the best opportunities for new entrants and prime age non-baby boomers who are seeking career changes. Many of the technician fields mentioned in the previous section are similar.

III. Analysis for WIA Regions

In this section of the report we present the results from an analysis that parallels the analysis we conducted for the BEAM region, but now focuses on five WIA regions that either overlap or are contiguous to the BEAM region: the Bluegrass, Lake Cumberland, Kentuckiana Works, and Lincoln Trail regions in Kentucky and Region 10 in Indiana. Figure 2 shows the counties which make up these five regions. Since these five WIA regions are fairly similar to the BEAM region in industrial composition, throughout this analysis we focus on the same set of detailed industries that we focused on in our analysis of the BEAM region.

What we show is that largely, the five Workforce areas are similar to the BEAM region as a whole. The Kentuckiana Works Region and the Bluegrass Region are, perhaps obviously, the most similar. The Lake Cumberland, Lincoln Trail and Indiana Region10 each have specific similarities. In the analysis below we focus on identifying the broad similarities. The more detailed occupation and industry breakdowns for these regions - documented above - are simply unreliable due to the small sample sizes inherent to the small regions. However, the more detailed analysis above will certainly apply to the similar industries and occupations within these

regions. In all regions we find that Transportation Equipment Manufacturing plays a relatively large role. As we note above, some of these are parts suppliers to the larger assembly plants in Louisville and near Lexington (or elsewhere in Indiana and Western Kentucky). Many of these will require the Transportation and Wholesaling industries, and occupations, as support. Other areas have a higher concentration of Hospitals and Health care, and will find demand for technologists higher. The remaining sections highlight these similarities.

A. Occupational Distribution of Employment in the WIA Regions and Selected Industries

Tables 20 through 24 show total employment in our focus industries as well as total employment for each separate WIA region. Overall, the region with the highest employment is Kentuckiana Works with an estimated 561,000 workers. The Bluegrass Region is also quite large with an estimated 467,000 workers. The Cumberland and Lincoln Trail WIA's are quite similar in employment with approximately 132,000 and 147,000 workers respectively. The Indiana Region 10 falls between these two groups with 206,000 workers, but is still much smaller than the Bluegrass and Kentuckiana Works regions.

Next we present information on the occupational distribution of workers in the regions and compare this to the occupational distribution of workers in the entire U.S. as well as the occupational distribution of workers in non-metro areas. We include the non-metro distributions because the Cumberland, Lincoln Trail and Region 10 WIAs are more comparable to non-metro areas. For the other WIA regions we will compare them to the BEAM region as well as the occupational distribution in comparable metro areas that were presented in previous figures.

Figures 16a and 16b shows the percentage of workers in managerial and production occupations, respectively. Recall that the BEAM region as a whole has a smaller percentage of

management workers and a larger percentage of production workers than other metropolitan areas. In Figure 16a we see that both Bluegrass and Kentuckiana Works are quite comparable to the BEAM region in percentage of management workers—meaning they have a smaller percentage of managerial workers compared to comparable metropolitan areas. Similarly, Figure 16b shows that the Bluegrass and Kentuckiana Works regions have a comparable mix of production workers to that of the BEAM region as a whole. This is not surprising since there is significant overlap between the BEAM, Bluegrass and Kentuckiana Works regions.

The remaining three regions have even a smaller percentage of managers and a larger percentage of production workers in their mix than the BEAM, Bluegrass or Kentuckiana Works regions. However, these three regions have a similar percentage of managerial workers as other non-metro areas in the U.S. In management occupations, the differences are relatively small, but still the Kentucky and Indiana WIA's have a smaller percentage of management workers than other non-metropolitan areas. Similarly, the mix of production workers in the Cumberland, Lincoln Trail and Region 10 areas is slightly higher than other non-metropolitan counties. Like the BEAM region, the WIA regions have a smaller percentage of high skilled managerial workers and a higher percentage of low skilled production workers than comparable regions.

In Figure 17a we present the percent of employment in managerial occupations and in Figure 17b we present the percent of employment in production occupations for the Transportation Manufacturing Industry. As we saw for the BEAM region, these figures show that the WIA regions have a relatively low percentage of workers in managerial occupations and a relatively high percentage of workers in production occupations, although the differences

between the Cumberland, Lincoln Trail and Region 10 regions and all non-metro areas are smaller.

Figure 18a shows that the Kentuckiana Works region has a much higher percentage of managerial workers in the Beverage Manufacturing Industry than comparable regions. In fact, with the exception of Atlanta and Chicago, the Kentuckiana Works region is comparable to all the other metros areas. In contrast, the other regions all lag their comparable regions in the percentage of managerial workers in the Beverage Manufacturing Industry. Figure 18b shows that the more rural Cumberland, Lincoln Trail and Region 10 regions also have a significantly higher percentage of workers in production jobs in the Beverage Manufacturing Industry than the typical non-metro area. Figures 19a and 19b show similar patterns for the Food Manufacturing Industry—the more urban Bluegrass and Kentuckiana Works regions tend to have a larger percentage of managerial workers and a smaller percentage of production workers than comparable regions, while the opposite is true of the more rural regions.

Figures 20a and 20b show that, with the exception of the Cumberland region, all of the other regions have a relatively larger percentage of managerial workers in the Transportation and Warehousing Industry and a relatively smaller percentage of workers in the transportation and moving occupations. This corresponds closely to what we saw for the BEAM region.

Figures 21a-21c present the percent of workers in the hospital industry in managerial, practitioner/technical and support occupations, respectively. In the previous section we saw that for the BEAM region there was a relatively higher percentage of workers in the managerial and practitioner/technical occupations and a relatively smaller percentage of workers in support occupations. Figures 21a-21c show a similar pattern for the Bluegrass and Kentuckiana Works

regions as well as for the Lincoln Trail region. However, the Cumberland and Region 10 regions display the opposite pattern—a relatively smaller percentage of workers in the high-skilled occupations and a relatively larger percentage of workers in low-skilled occupations.

While there are a few differences, for the most part our analysis of the occupational distribution of workers in the WIA regions shows a similar pattern to what we saw in the BEAM region—workers tend to be concentrated in low-skill, low-wage production or support occupations with relatively few workers in higher-skilled managerial occupations. Again, however, food manufacturing and the non-manufacturing healthcare and logistics/supply chain industries are notable exceptions and represent a potential source for changing the type of employment in these regions.

B. Employment Growth Projections for the Workforce Regions

Tables 20-24 present our predictions for growth in total employment in each region as well as growth in employment in our set of focus industries. Because we use national projections for industry growth, there is no difference in the projected growth rate of industries in different regions—manufacturing industries are projected to have low or negative employment growth while healthcare and transportation and warehousing are predicted to have strong employment growth. However, because each region has a different industrial mix, there are differences in predicted growth in each region and differences in the growth in the demand for skilled workers across regions. The Kentuckiana Works region is predicted to have the highest rate of employment growth primarily because there is a large share of employment in the faster growing healthcare and transportation and warehousing sectors in the Kentuckiana Works region. In contrast, the Bluegrass, Lincoln Trail and Region 10 regions are predicted to have the slowest

growth of these regions primarily because a larger share of employment in these regions is in the transportation manufacturing industry which is predicted to grow by just 0.2% over the next decade.

C. Educational Production in the Workforce Regions

One difficulty in examining the expected growth in the supply of skilled workers is that in our data students appear in the region where they are attending school, which often is not the region where they end up working. Therefore, regions such as Cumberland and Lincoln Trail, which have fewer and smaller post-secondary institutions, will have a smaller percentage of young adults in school than a region such as the Bluegrass where a large post-secondary institution is located. However, this difficulty is mitigated somewhat by comparing the educational production and attainment in the rural region with what we see in the non-metro areas of the U.S.

Consider Table 17 again, which presents the percent of 18-24 years olds with a B.A. or currently in school, the percent of 25-34 year olds with a B.A. or more, and the percent of adults age 25 years or older with at least a B.A. This table shows that in the Bluegrass Region 28.5% of adults have a B.A. or better, which is higher than all the other regions. However, while this number is comparable to the U.S. as a whole, it is substantially below the educational attainment for all the comparable metro areas with the exceptions of Greenville, SC and Detroit, MI. We see the same pattern for the Kentuckiana Works region. Looking at the educational attainment for the three rural areas we see that each has a lower percentage of adults with a college degree than the average non-metro area in the U.S. Table 17 also shows that, with the exception of the Bluegrass region, the other labor force regions have a disturbingly low percentage of 18-24 year

olds either in school or with a B.A. when compared to the comparable region. This is further evidence that the WIA regions have a limited supply of skilled workers and that they are unlikely to see the increase in the supply of skilled workers necessary to meet the increasing demand for skilled workers from the region's employers. Instead it appears likely that the region will fall even further behind the rest of the country in the educational attainment of workers.

IV. Conclusion

Our analysis of the BEAM and WIA regions has produced several findings. First, while a large share of employment in all these regions is in the manufacturing sector, and in particular in transportation manufacturing, there is also a significant amount of employment in the healthcare and logistic/supply chain sectors. Second, while employment in manufacturing industries tends to be disproportionately located in low-skilled, low-wage production and support occupations, the healthcare and logistic/supply chain sectors have a disproportionately large share of employment in more skilled higher paying occupations. Third, predictions are that employment growth over the next decade in the manufacturing industries will be slow or even negative, while employment growth in health care and supply chain/logistics is expected to exceed 20%. Finally, while the supply of workers appears sufficient to meet existing demand for relatively low-skilled workers, it is unlikely that we will have the necessary supply of skilled workers to meet the future demand for these workers in the healthcare and logistics/supply chain sectors; meaning firms in these sectors will have to look to other regions to meet their demand.

We also find that a significant number of workers in these industries are expected to retire in the coming decade. Of course the phenomenon of a large number of baby boomers retiring in the coming years has been well-known for a long time, so most companies will have

already begun to adjust to these pending retirements, so the retiring of baby boomers will have only a small impact on the labor market. In addition, if all we do is replace these retiring workers, this will only perpetuate the current focus in the region on lower-skilled, low-wage employment.

Given the forecasted growth in employment for manufacturing, the only way the BEAM or the WIA regions are going to see a significant growth in manufacturing employment is if we are able to capture a growing share of this declining industry—that is, lure existing manufacturing firms to the BEAM or WIA regions. This is obviously a difficult task and can only succeed if the region has something to offer that manufacturing firms' will value and that they are having trouble obtaining in their current location. One possibility is to try and build on our existing strength in logistics/supply chain to try and attract more advanced manufacturing firms. One of the continually growing trends in advanced manufacturing is the use of just-in-time production techniques. This type of production requires firms to obtain inputs from suppliers on a timely basis with no disruptions and requires firms to be able to ship their output to customers quickly and efficiently. Given that the BEAM and WIA regions are located in the central part of the U.S. with a well-developed system of highways, air transportation and other transportation infrastructure, it should not be surprising that many of the leading logistic/supply chain firms have located in the region. With continued investment in this infrastructure we should be able to build on our strength in logistic/supply chain and in turn use this to attract modern manufacturing firms that need logistic/supply chain services.

As the baby boomers approach retirement age, we find that they are concentrated in occupations which are more highly paid, even accounting for educational attainment. These are

often the same occupations for which we predict strong growth in overall positions. Some of these medium skill positions, for example truck drivers, offer opportunities for younger workers who are well positioned.

Of course, as this report has documented, the one area seriously lacking in the region is the education infrastructure. Based on our projections it is unlikely that we will be able to produce the number of skilled workers necessary to meet the growing demand for these workers from our existing healthcare and logistic/supply chain firms, much less meet the demand if these industries expand faster than projected. In fact, given the number of young people currently in post-secondary schooling, it appears likely that we will fall even further behind the rest of the country in the supply of skilled workers.

The focus on an educated work force cannot be understated. Kentucky and the BEAM region have made a number of dramatic strides in the last decade, raising both the number of high school graduates and the number of college graduates. It is crucial that primary and secondary education system focus on creating adults who are prepared for college attendance and can step into the labor market.

Currently the region is a leader in the growing field of logistics/supply chain due to some of the natural advantages of the region. We have the potential to use our early strength in this sector to build and expand on our existing manufacturing base. However, unless we make a significant investment in the educational infrastructure in the region, we will lose our initial advantage in logistics/supply chain and continue to be a region which specializes in low-skilled, low-wage jobs.

One can ask which government or other policies should be employed to position the BEAM region for growth in the next decade and beyond. In general, labor markets in the United States typically work well in attracting workers to industries and occupations for which demand is high. Wages and other compensation are mechanisms which accomplish this kind of allocation in a seamless and efficient manner. It is likely inefficient and undesirable to have government attempt to intervene. However, the economic adjustments inherent to the labor market include firm and worker relocation. Regions which ignore this fact, witness the Detroit area, are likely to find decreasing population and income levels.

There are three areas where government or grass roots initiatives can have an impact. The first, already well noted above is broad educational attainment. High schools need to prepare students for some form of higher education. While not everyone will achieve a Bachelor's degree, a sound background in mathematics, science, and both written and oral communications, combined with non-cognitive skills such as responsibility and organization, will position young workers to take advantage of myriad forms of education and training. The second are training subsidization programs such as Bluegrass State Skill Corporation initiatives. Both authors of this report, in other independent research, have found that tax and other government incentives targeted at employment of firms, have strong impacts on employment. Third, it is crucially important that the physical infrastructure of the region be maintained and improved. Firms and workers require transportation networks of sufficient magnitude to move goods and employees within the region. Firms and workers require sound water, sewer, electric, natural gas, and telecommunications infrastructure. While some of this is provided by the

private sector, nearly all of it is regulated by the state government. While regulations need to balance myriad needs, it is important to consider the needs of potential firms in this mix.

Table 1: Three Digit Industry Employment in BEAM

NAICS Code	Industry	Employment in BEAM	Employment US	BEAM Share of US Employment	Percent of Total BEAM Employment
113	Forestry and Logging	504	64,053	0.79%	0.05%
114	Fishing, Hunting and Trapping	2	12,005	0.02%	0.00%
115	Support Activities for Agriculture and Forestry	1,453	109,910	1.32%	0.15%
211	Oil and Gas Extraction	145	118,882	0.12%	0.01%
212	Mining (except Oil and Gas)	2,403	210,292	1.14%	0.25%
213	Support Activities for Mining	660	288,501	0.23%	0.07%
221	Utilities	5,890	676,379	0.87%	0.61%
236	Construction of Buildings	9,045	1,430,883	0.63%	0.93%
237	Heavy and Civil Engineering Construction	6,077	858,944	0.71%	0.63%
238	Specialty Trade Contractors	30,002	4,018,953	0.75%	3.09%
311	Food Manufacturing	11,743	1,424,159	0.82%	1.21%
312	Beverage and Tobacco Product Manufacturing	3,617	152,068	2.38%	0.37%
313	Textile Mills	763	119,404	0.64%	0.08%
314	Textile Product Mills	1,162	122,105	0.95%	0.12%
315	Apparel Manufacturing	818	131,349	0.62%	0.08%
316	Leather and Allied Product Manufacturing	192	31,069	0.62%	0.02%
321	Wood Product Manufacturing	7,490	394,118	1.90%	0.77%
322	Paper Manufacturing	5,094	396,412	1.29%	0.53%
323	Printing and Related Support Activities	8,763	559,870	1.57%	0.90%
324	Petroleum and Coal Products Manufacturing	150	104,484	0.14%	0.02%
325	Chemical Manufacturing	6,216	710,597	0.87%	0.64%
326	Plastics and Rubber Products Manufacturing	9,664	718,937	1.34%	1.00%
327	Nonmetallic Mineral Product Manufacturing	4,888	389,120	1.26%	0.50%
331	Primary Metal Manufacturing	3,548	356,020	1.00%	0.37%
332	Fabricated Metal Product Manufacturing	14,742	1,422,414	1.04%	1.52%
333	Machinery Manufacturing	10,465	988,758	1.06%	1.08%
334	Computer and Electronic Product Manufacturing	2,788	794,003	0.35%	0.29%
335	Electrical Equipment, Appliance, and Component Manufacturing	5,434	343,766	1.58%	0.56%

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Table 1 continued: Three Digit Industry Employment in BEAM

NAICS Code	Industry	Employment in BEAM	Employment US	BEAM Share of US Employment	Percent of Total BEAM Employment
336	Transportation Equipment Manufacturing	29,407	922,275	3.19%	3.03%
337	Furniture and Related Product Manufacturing	3,686	377,610	0.98%	0.38%
339	Miscellaneous Manufacturing	3,364	596,650	0.56%	0.35%
423	Merchant Wholesalers, Durable Goods	25,562	3,459,542	0.74%	2.64%
424	Merchant Wholesalers, Nondurable Goods	14,691	2,355,420	0.62%	1.51%
425	Wholesale Electronic Markets and Agents and Brokers	2,174	364,527	0.60%	0.22%
441	Motor Vehicle and Parts Dealers	15,652	1,864,995	0.84%	1.61%
442	Furniture and Home Furnishings Stores	3,352	494,187	0.68%	0.35%
443	Electronics and Appliance Stores	3,112	497,403	0.63%	0.32%
444	Building Material and Garden Equipment and Supplies Dealers	12,135	1,405,528	0.86%	1.25%
445	Food and Beverage Stores	22,360	3,274,421	0.68%	2.31%
446	Health and Personal Care Stores	9,235	1,160,671	0.80%	0.95%
447	Gasoline Stations	9,091	970,979	0.94%	0.94%
448	Clothing and Clothing Accessories Stores	9,366	1,771,616	0.53%	0.97%
451	Sporting Goods, Hobby, Book, and Music Stores	4,229	626,057	0.68%	0.44%
452	General Merchandise Stores	29,962	2,923,809	1.02%	3.09%
453	Miscellaneous Store Retailers	6,603	855,250	0.77%	0.68%
454	Nonstore Retailers	4,446	609,693	0.73%	0.46%
481	Air Transportation	6,492	246,122	2.64%	0.67%
483	Water Transportation	1,287	60,626	2.12%	0.13%
484	Truck Transportation	12,841	1,421,514	0.90%	1.32%
485	Transit and Ground Passenger Transportation	1,255	497,269	0.25%	0.13%
486	Pipeline Transportation	201	53,528	0.38%	0.02%
487	Scenic and Sightseeing Transportation	98	26,676	0.37%	0.01%
488	Support Activities for Transportation	7,782	636,092	1.22%	0.80%
492	Couriers and Messengers	13,247	492,232	2.69%	1.37%
493	Warehousing and Storage	6,650	699,711	0.95%	0.69%
511	Publishing Industries (except Internet)	5,915	882,670	0.67%	0.61%

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Table 1 continued: Three Digit Industry Employment in BEAM

NAICS Code	Industry	Employment in BEAM	Employment US	BEAM Share of US Employment	Percent of Total BEAM Employment
512	Motion Picture and Sound Recording Industries	1,590	323,351	0.49%	0.16%
515	Broadcasting (except Internet)	1,973	275,587	0.72%	0.20%
517	Telecommunications	7,906	1,230,981	0.64%	0.82%
518	Internet Service Providers and Data Processing Services	4,600	401,733	1.15%	0.47%
519	Other Information Services	959	148,011	0.65%	0.10%
521	Monetary Authorities - Central Bank	7	15,114	0.05%	0.00%
522	Credit Intermediation and Related Activities	22,945	2,978,067	0.77%	2.37%
523	Securities, Commodity Contracts, etc.	3,494	938,903	0.37%	0.36%
524	Insurance Carriers and Related Activities	23,918	2,311,848	1.03%	2.47%
525	Funds, Trusts, and Other Financial Vehicles	13	6,616	0.20%	0.00%
531	Real Estate	8,551	1,749,057	0.49%	0.88%
532	Rental and Leasing Services	4,855	575,380	0.84%	0.50%
533	Lessors of Nonfinancial Intangible Assets	64	32,955	0.19%	0.01%
541	Professional, Scientific, and Technical Services	48,981	8,555,428	0.57%	5.05%
551	Management of Companies and Enterprises	18,789	2,605,580	0.72%	1.94%
561	Administrative and Support Services	56,819	7,881,583	0.72%	5.86%
562	Waste Management and Remediation Services	3,008	393,572	0.76%	0.31%
611	Educational Services	21,553	2,688,742	0.80%	2.22%
621	Ambulatory Health Care Services	50,459	6,921,817	0.73%	5.20%
622	Hospitals	57,111	3,381,979	1.69%	5.89%
623	Nursing and Residential Care Facilities	30,957	3,642,369	0.85%	3.19%
624	Social Assistance	21,060	3,019,142	0.70%	2.17%
711	Performing Arts, Spectator Sports, and Related Industries	3,521	493,600	0.71%	0.36%
712	Museums, Historical Sites, and Similar Institutions	821	141,481	0.58%	0.08%
713	Amusement, Gambling, and Recreation Industries	7,733	1,537,407	0.50%	0.80%
721	Accommodation	11,331	1,813,941	0.62%	1.17%
722	Food Services and Drinking Places	90,983	10,900,000	0.83%	9.38%
811	Repair and Maintenance	10,658	1,360,386	0.78%	1.10%
812	Personal and Laundry Services	11,391	1,559,996	0.73%	1.17%
813	Religious, Grantmaking, and Similar Organizations	25,949	3,094,844	0.84%	2.68%

Table 2: Top 15 Industries (3 Digit NAICS) in BEAM by Total Employment

NAICS	Industry	Employment	BEAM Share of US Industry	Percent of BEAM Employment
722	Food Services and Drinking Places	90,983	0.83%	9.38%
622	Hospitals	57,111	1.69%	5.89%
561	Administrative and Support Services	56,819	0.72%	5.86%
621	Ambulatory Health Care Services	50,459	0.73%	5.20%
541	Professional, Scientific, and Technical Services	48,981	0.57%	5.05%
623	Nursing and Residential Care Facilities	30,957	0.85%	3.19%
238	Specialty Trade Contractors	30,002	0.75%	3.09%
452	General Merchandise Stores	29,962	1.02%	3.09%
336	Transportation Equipment Manufacturing	29,407	3.19%	3.03%
813	Religious, Grantmaking, Civic, Professional, and Similar Organizations	25,949	0.84%	2.68%
423	Merchant Wholesalers, Durable Goods	25,562	0.74%	2.64%
524	Insurance Carriers and Related Activities	23,918	1.03%	2.47%
522	Credit Intermediation and Related Activities	22,945	0.77%	2.37%
445	Food and Beverage Stores	22,360	0.68%	2.31%
611	Educational Services	21,553	0.80%	2.22%

Source: IPUMS Microdata from 5-year average of American Community Survey, 2006-2010

Table 3: Top 15 Industries (3 Digit NAICS) in BEAM by BEAM Share of US Industry

NAICS	Industry	Employment	BEAM Share of US Industry	Percent of BEAM Employment	US Industry percent of US Employment
336	Tranportation Manufacturing (Automotive)	29,407	3.19%	3.03%	0.79%
492	Couriers and Messengers (Logistics)	13,247	2.69%	1.37%	0.42%
481	Air Transportation (Logistics)	6,492	2.64%	0.67%	0.21%
312	Beverage Manufacturing	3,617	2.38%	0.37%	0.13%
483	Water Transportation (Logistics)	1,287	2.12%	0.13%	0.05%
321	Wood Manufacturing	7,490	1.90%	0.77%	0.34%
622	Hospitals (Health Care)	57,111	1.69%	5.89%	2.88%
335	Electric Manufacturing	5,434	1.58%	0.56%	0.29%
323	Printing Activity	8,763	1.57%	0.90%	0.48%
326	Plastic Manufacturing	9,664	1.34%	1.00%	0.61%
115	Support for Ag.	1,453	1.32%	0.15%	0.09%
322	Paper Manufacturing	5,094	1.29%	0.53%	0.34%
327	Mineral Manufacturing	4,888	1.26%	0.50%	0.33%
488	Support for Transportation (Logistics)	7,782	1.22%	0.80%	0.54%
518	Internet Service	4,600	1.15%	0.47%	0.34%

Source: IPUMS Microdata from 5-year average of American Community Survey, 2006-2010

Table 4: Input Industries for Transportation Equipment Manufacturing

NAICS	Description	Percentage of Total Indirects
336	Motor vehicle parts manufacturing	17%
42	Wholesale trade businesses	13%
55	Management of companies and enterprises	9%
484	Transport by truck	4%
331	Iron and steel mills and ferroalloy manufacturing	3%
521	Monetary authorities and depository credit intermediation activities	2%
331	Steel product manufacturing from purchased steel	2%
331	Aluminum product manufacturing from purchased aluminum	2%
517	Telecommunications	2%
522	Nondepository credit intermediation and related activities	2%

Source: Minnesota IMPLAN Group (MIG) and Author's Calculations

Table 5: Focus Industries of Study - Employment and Selected Occupation Distribution

Industry Code	Industry	Total Workers	Percent Management	Percent Operations	Percent Health Care Practitioners	Percent Health Care Support	Percent Production	Percent Transport and Material Moving
311000	Food Manufacturing	11,743	7.95%	3.21%	0.05%	0.00%	45.53%	21.38%
312000	Beverage Manufacturing	3,617	11.30%	4.29%	0.00%	0.00%	29.24%	22.55%
325000	Chemical Manufacturing	6,216	13.63%	2.54%	1.15%	0.00%	34.75%	9.44%
332000	Fabricated Metal Manufacturing	14,742	7.76%	2.54%	0.00%	0.00%	53.61%	7.80%
333000	Machinery Manufacturing	10,465	10.77%	2.35%	0.20%	0.00%	49.12%	5.90%
334000	Computer /Electronic Manufacturing	2,788	14.11%	5.62%	0.00%	0.00%	25.95%	3.50%
335000	Appliance Manufacturing	5,434	10.62%	4.21%	0.05%	0.00%	45.90%	9.48%
336000	Transportation Equipment Manufacturing	29,407	3.70%	2.68%	0.23%	0.00%	62.05%	9.15%
339100	Medical Equipment Manufacturing	1,636	12.76%	0.88%	0.53%	0.63%	47.25%	5.91%
492000	Couriers and Messengers (Logistics)	13,247	6.86%	3.99%	0.07%	0.00%	3.82%	45.47%
493000	Warehousing and Storage	6,650	8.48%	1.77%	0.00%	0.00%	6.04%	44.00%
621000	Ambulatory Health Care Services (Health Care)	50,459	6.03%	1.96%	38.85%	19.81%	0.53%	0.78%
622000	Hospitals (Health Care)	57,111	5.08%	1.32%	53.33%	12.67%	0.51%	0.35%
623000	Nursing and Residential Care Facilities (Health Care)	30,957	5.82%	1.43%	19.05%	32.89%	1.56%	0.15%
420000	Wholesale Trade	42,427	7.52%	4.60%	0.58%	0.02%	4.13%	20.86%
48-490	Transportation and Warehousing (Logistics and Supply Chain)	49,853	6.90%	2.12%	0.10%	0.00%	2.63%	50.80%
	Total Listed Industries (excluding 492 and 493 which are included in 48/49)	316,855	7.13%	2.63%	17.81%	8.66%	15.42%	16.68%
	Total All Industries	706,375	8.19%	4.02%	5.63%	2.33%	8.77%	7.40%

Source: American Community Survey - 2 Year Author's Calculation

Table 6: Employment by Occupation in the U.S. and BEAM Region

Standard Occupational Classification (SOC) Code – 2 Digit Level	SOC Occupation Title	Total Employment by Occupation - US 2010	Total Employment by Occupation – BEAM 2010	Occupation as Percent of US Employment	BEAM Occupation Employment as percent of US Occupation Employment
00	All Occupations	120,072	882,901	0.74%	100.00%
11	Management Occupations	5,527	36,760	0.67%	4.16%
13	Business and Financial Operations Occupations	5,714	35,832	0.63%	4.06%
15	Computer and Mathematical Occupations	2,991	17,078	0.57%	1.93%
17	Architecture and Engineering Occupations	2,214	13,971	0.63%	1.58%
19	Life, Physical and Social Science Occupations	1,079	3,619	0.34%	0.41%
21	Community and social Service Occupations	1,912	9,235	0.48%	1.05%
23	Legal Occupations	976	5,009	0.51%	0.57%
25	Education, Training, and Library Occupations	8,674	16,359	0.19%	1.85%
27	Arts, Design, Entertainment , Sports and Media Occupations	1,631	10,653	0.65%	1.21%
29	Healthcare Practitioners and Technical Occupations	7,431	63,719	0.86%	7.22%
31	Healthcare Support Occupations	3,981	33,954	0.85%	3.85%
33	Protective Service Occupations	3,198	7,612	0.24%	0.86%
35	Food Preparation and Serving Related Occupations	10,495	94,207	0.90%	10.67%
37	Building and Grounds Cleaning and Maintenance Occupations	3,609	23,500	0.65%	2.66%
39	Personal Care and Service Occupation	3,286	21,124	0.64%	2.39%
41	Sales and Related Occupations	12,119	103,485	0.85%	11.72%
43	Office and Administrative Support Occupations	20,196	148,215	0.73%	16.79%
45	Farming, Fishing, and Forestry Occupations	169	1,328	0.79%	0.15%
47	Construction and Extraction Occupations	4,768	35,871	0.75%	4.06%
49	Installation, Maintenance, and Repair Occupations	4,663	39,355	0.84%	4.46%
51	Production Occupations	7,526	86,094	1.14%	9.75%
53	Transportation and Material Moving Occupations	7,699	72,857	0.95%	8.25%

Source: American Community Survey – 2 Year Author’s Calculation

Table 7: Employment Growth by NAICS 2-Digit Industry Code, BEAM Region

NAICS Code – 2 Digit	NAICS Code Description	BEAM Employment by 2-Digit NAICS Code 2010	BEAM Projected Employment by 2-Digit NAICS Code 2020	Beam Projected Growth in Total Employment by 2- Digit NAICS Code	Beam Projected Percent Growth in Employment by 2- Digit NAICS Code
11	Agriculture	502	530	28	5.66%
21	Mining	2,403	2,505	102	4.25%
22	Utilities	5,890	5,550	-340	-5.78%
23	Construction	45,124	60,217	15,093	33.45%
31-33	Manufacturing	122,146	125,675	3,529	2.89%
42	Wholesale Trade	40,253	43,706	3,453	8.58%
44	Retail Trade	120,452	141,258	20,806	17.27%
48-49	Transportation and Warehousing	43,203	52,349	9,145	21.17%
51	Information	17,384	17,232	-151	-0.87%
52	Finance and Insurance	50,370	53,807	3,437	6.82%
53	Real Estate Rental and Leasing	13,406	15,270	1,864	13.90%
54	Professional, Scientific, and Technical Services	48,981	62,177	13,195	26.94%
56	Administrative and Support and Waste Management and Remediation Services	59,827	72,694	12,867	21.51%
61	Educational Services	21,553	25,324	3,771	17.50%
62	Health Care and Social Assistance	159,587	206,529	46,942	29.41%
71	Arts, Entertainment, and Recreation	11,254	13,261	2,007	17.83%
72	Accommodation and Food Services	91,212	99,755	8,543	9.37%
81	Other Services (Except Public Administration)	29,354	33,316	3,962	13.50%

Source: American Community Survey – Author’s Calculation

Table 8: Employment Growth by Occupation in the BEAM Region

Standard Occupational Classification (SOC) Code – 2 Digit Level	SOC Occupation Title	Total Employment by Occupation – BEAM 2010	Total Projected Employment by Occupation - BEAM 2020	Growth in BEAM Employment by Occupation	Percent Growth in BEAM Employment by Occupation
00	All Occupations	882,901	1,027,528	144,627	16.38%
11	Management Occupations	36,760	40,736	3,976	10.82%
13	Business and Financial Operations Occupations	35,832	42,599	6,766	18.88%
15	Computer and Mathematical Occupations	17,078	21,283	4,205	24.62%
17	Architecture and Engineering Occupations	13,971	15,593	1,622	11.61%
19	Life, Physical and Social Science Occupations	3,619	4,516	897	24.79%
21	Community and social Service Occupations	9,235	12,437	3,202	34.67%
23	Legal Occupations	5,009	5,491	482	9.62%
25	Education, Training, and Library Occupations	16,359	19,932	3,574	21.85%
27	Arts, Design, Entertainment , Sports and Media Occupations	10,653	11,971	1,318	12.37%
29	Healthcare Practitioners and Technical Occupations	63,719	81,213	17,494	27.45%
31	Healthcare Support Occupations	33,954	44,570	10,617	31.27%
33	Protective Service Occupations	7,612	9,189	1,576	20.71%
35	Food Preparation and Serving Related Occupations	94,207	104,206	9,999	10.61%
37	Building and Grounds Cleaning and Maintenance Occupations	23,500	27,457	3,957	16.84%
39	Personal Care and Service Occupation	21,124	28,404	7,280	34.46%
41	Sales and Related Occupations	103,485	120,835	17,350	16.77%
43	Office and Administrative Support Occupations	148,215	167,363	19,148	12.92%
45	Farming, Fishing, and Forestry Occupations	1,328	1,463	136	10.21%
47	Construction and Extraction Occupations	35,871	46,506	10,635	29.65%
49	Installation, Maintenance, and Repair Occupations	39,355	45,875	6,520	16.57%
51	Production Occupations	86,094	91,052	4,958	5.76%
53	Transportation and Material Moving Occupations	72,857	84,837	11,980	16.44%

Table 9: BEAM Employment Education Projections

Industry	2010				2020				Growth Rate			
	Total Workers	Up To HS	Some College	BA plus	Total Workers - Projection	Up To HS	Some College	BA plus	Total Workers	Up to HS	Some College	BA Plus
Food Manufacturing	11,743	6,262	3,474	2,007	11,931	6,362	3,529	2,040	1.6%	1.6%	1.6%	1.6%
Beverage Manufacturing	3,617	1,664	1,076	878	3,581	1,648	1,065	869	-1.0%	-1.0%	-1.0%	-1.0%
Chemical Manufacturing	6,216	2,716	1,818	1,682	5,775	2,523	1,689	1,562	-7.1%	-7.1%	-7.1%	-7.1%
Fabricated Metal Manufacturing	14,742	7,702	4,374	2,667	16,482	8,611	4,890	2,981	11.8%	11.8%	11.8%	11.8%
Machinery Manufacturing	10,465	4,892	3,130	2,442	10,308	4,818	3,083	2,406	-1.5%	-1.5%	-1.5%	-1.5%
Computer /Electronic Manufacturing	2,788	942	843	1,004	2,389	807	722	860	-14.3%	-14.3%	-14.3%	-
Appliance Manufacturing	5,434	2,582	1,630	1,222	4,988	2,370	1,496	1,122	-8.2%	-8.2%	-8.2%	-8.2%
Transportation Equipment Manufacturing	29,407	16,259	8,663	4,486	29,466	16,292	8,680	4,495	0.2%	0.2%	0.2%	0.2%
Medical Equipment Manufacturing	1,636	767	494	375	1,662	779	501	381	1.6%	1.6%	1.6%	1.6%
Couriers and Messengers (Logistics)	13,247	5,765	4,508	2,974	16,824	7,322	5,725	3,777	27.0%	27.0%	27.0%	27.0%
Warehousing and Storage	6,650	2,989	2,322	1,339	8,399	3,775	2,932	1,692	26.3%	26.3%	26.3%	26.3%
Ambulatory Health Care Services (Health Care)	50,459	11,833	19,172	19,440	72,913	17,099	27,703	28,090	44.5%	44.5%	44.5%	44.5%
Hospitals (Health Care)	57,111	12,789	19,898	24,407	66,534	14,899	23,181	28,434	16.5%	16.5%	16.5%	16.5%
Nursing and Residential Care Facilities (Health Care)	30,957	9,937	11,691	9,324	39,099	12,551	14,765	11,776	26.3%	26.3%	26.3%	26.3%
Wholesale Trade	42,427	16,545	14,145	11,737	48,197	18,795	16,068	13,333	13.6%	13.6%	13.6%	13.6%
Transportation and Warehousing (Logistics and Supply Chain)	49,853	22,740	17,035	10,060	60,023	27,380	20,510	12,112	20.4%	20.4%	20.4%	20.4%
Total Listed Industries (excluding 492 and 493 which are included in 48/49)	316,855	117,631	107,441	91,729	373,348	134,934	127,885	110,461	17.8%	14.7%	19.0%	20.4%
Total All Industries	706,375	268,660	217,081	214,866	845,387	321,532	259,801	257,151	19.7%	19.7%	19.7%	19.7%

Source: ACS and Author's Calculations

Table 10: BEAM Manufacturing Employment Growth by Occupation

Standard Occupational Classification (SOC) Code – 2 Digit Level	SOC Occupation Title	BEAM Employment by Occupation for all Manufacturing Industries – 2010	BEAM Employment by Occupation for all Manufacturing Industries – 2020	Beam Projected Growth by Occupation for all Manufacturing Industries	Beam Projected Percent Growth by Occupation for all Manufacturing
00	All Occupations	122,146	125,675	3,529	2.9%
11	Management Occupations	5,737	5,714	(23)	-0.4%
13	Business and Financial Operations Occupations	3,011	3,074	62	2.1%
15	Computer and Mathematical Occupations	1,242	1,209	(33)	-2.7%
17	Architecture and Engineering Occupations	6,332	6,265	(67)	-1.1%
19	Life, Physical and Social Science Occupations	650	625	(25)	-3.9%
21	Community and social Service Occupations	-	-	-	.
23	Legal Occupations	16	15	(1)	-6.6%
25	Education, Training, and Library Occupations	-	-	-	.
27	Arts, Design, Entertainment , Sports and Media Occupations	423	417	(6)	-1.3%
29	Healthcare Practitioners and Technical Occupations	146	145	(1)	-0.8%
31	Healthcare Support Occupations	3	3	0	1.7%
33	Protective Service Occupations	97	99	2	1.8%
35	Food Preparation and Serving Related Occupations	349	343	(6)	-1.6%
37	Building and Grounds Cleaning and Maintenance Occupations	687	699	12	1.7%
39	Personal Care and Service Occupation	4	4	0	0.3%
41	Sales and Related Occupations	3,435	3,476	40	1.2%
43	Office and Administrative Support Occupations	10,528	10,308	(220)	-2.1%
45	Farming, Fishing, and Forestry Occupations	323	341	18	5.5%
47	Construction and Extraction Occupations	2,076	2,250	174	8.4%
49	Installation, Maintenance, and Repair Occupations	6,527	6,934	406	6.2%
51	Production Occupations	67,625	70,147	2,522	3.7%
53	Transportation and Material Moving Occupations	11,942	12,500	558	4.7%

Source: ACS and Author's Calculations

Table 11: BEAM Manufacturing Employment Growth by Production Occupations

Standard Occupational Classification (SOC) Code – 3 Digit Level	SOC Occupation Title	BEAM Employment by Production Occupations in Manufacturing 2010	BEAM Employment by Production Occupations in Manufacturing 2020	Beam Projected Growth by Production Occupations in Manufacturing	Beam Projected Growth by Percent for Production Occupations in Manufacturing
51-0000	Production Occupations	67,625	70,147	2,522	3.7%
51-1000	Supervisor's, Production Workers	4,436	4,558	122	2.8%
51-2000	Assembler's and Fabricators	18,847	19,391	544	2.9%
51-3000	Food Processing Workers	3,107	3,269	161	5.2%
51-4000	Metal Workers and Plastic Workers	19,389	20,272	883	4.6%
51-6000	Textile, Apparel, and Furnishings Workers	674	666	-8	-1.2%
51-7000	Woodworkers	2,730	3,333	603	22.1%
51-8000	Plant and System Operators	602	545	-57	-9.5%
51-9000	Other Production Occupations	16,297	16,476	180	1.1%

Source: ACS and Author's Calculations

Table 12: BEAM Transportation/Warehousing Employment Growth by Occupation

SOC Code – 2 Digit Level	SOC Occupation Title	BEAM Employment by Occupation for all Transportation and Warehousing Industries - 2010	BEAM Employment by Occupation for all Transportation and Warehousing Industries - 2020	Beam Projected Growth by Occupation for all Transportation/Warehousing Industries	Beam Projected Percent Growth by Occupation for all Transportation/Warehousing Industries
00	Total	43,203	52,349	9,145	21.2%
11	Management Occupations	1,208	1,379	171	14.2%
13	Business and Financial Operations Occupations	718	940	222	30.9%
15	Computer and Mathematical Occupations	163	201	38	23.3%
17	Architecture and Engineering Occupations	189	233	44	23.5%
19	Life, Physical, and Social Science Occupations	2	2	(0)	-19.4%
23	Legal Occupations	7	7	(0)	-3.4%
25	Education, Training, and Library Occupations	22	22	0	1.8%
27	Arts, design, Entertainment, Sports, and Media Organizations	16	18	3	16.5%
29	Healthcare Practitioners and Technical Occupations	6	9	3	43.4%
33	Protective Service Occupations	58	72	13	22.9%
35	Food Preparation and Serving Related Occupations	54	64	10	19.5%
37	Building and Grounds Cleaning and maintenance Occupations	133	158	25	18.8%
39	Personal Care and Service Occupations	395	487	92	23.4%
41	Sales and Related Occupations	663	816	153	23.1%
43	Office and Administrative Support Occupations	9,393	11,181	1,788	19.0%
45	Farming, Fishing, and Forestry Occupations	8	12	3	35.8%
47	Construction and Extraction Occupations	83	100	17	20.4%
49	Installation, Maintenance, and Repair Occupations	3,310	3,948	637	19.3%
51	Production Occupations	401	480	79	19.7%
53	Transportation and Material Moving Occupations	25,915	31,693	5,777	22.3%

Source: ACS Survey and Author's Calculations

Table 13: BEAM Transportation/Warehousing Employment Growth by Transportation and Material Moving Occupations

Standard Occupational Classification (SOC) Code – 3 Digit Level	SOC Occupation Title	BEAM Employment by Transportation and Material Moving Occupations in Transportation/Warehousing 2010	BEAM Employment by Transportation and Material Moving Occupations in Transportation/Warehousing 2020	Beam Projected Growth by Transportation and Material Moving Occupations in Transportation/Warehousing	Beam Projected Growth by Percent for Transportation and Material Moving Occupations in Transportation/Warehousing
53-0000	Transportation and Material Moving Occupations Supervisors, Transportation and Material Moving	25,915	31,693	5,777	22.3%
53-1000	Workers	1,347	1,765	418	31.0%
53-2000	Air Transportation Workers	2,505	2,589	84	3.4%
53-3000	Motor Vehicle Operators	13,841	16,937	3,096	22.4%
53-4000	Rail Transportation Workers	54	58	5	8.6%
53-5000	Water Transportation Workers	889	1,187	298	33.5%
53-6000	Other Transportation Workers	659	775	117	17.7%
53-7000	Material Moving Workers	6,475	8,217	1,742	26.9%

Source: ACS Survey and Author's Calculations

Table 14: BEAM Wholesale Trade Employment Growth by Occupation

Standard Occupational Classification SOC Code – 2 Digit Level	SOC Occupation Title	BEAM Employment by Occupation for the Wholesale Trade Industry– 2010	BEAM Employment by Occupation for the Wholesale Trade Industry– 2020	Beam Projected Growth by Occupation for the Wholesale Trade Industry	Beam Projected Percent Growth by Occupation for the Wholesale Trade Industry
00	Total	40,253	43,706	3,453	8.6%
11	Management Occupations	2,449	2,550	101	4.1%
13	Business and Financial Operations Occupations	1,695	1,901	205	12.1%
15	Computer and Mathematical Occupations	1,465	1,589	124	8.5%
17	Architecture and Engineering Occupations	405	421	16	3.9%
19	Life, Physical, and Social Science Occupations	84	94	10	11.5%
23	Legal Occupations	16	16	1	5.4%
25	Education, Training, and Library Occupations	3	3	0	6.1%
27	Arts, Design, Entertainment, Sports, and Media Occupations	317	359	42	13.4%
29	Healthcare Practitioners and Technical Occupations	77	85	8	10.8%
31	Healthcare Support Occupations	10	11	1	9.5%
33	Protective Service Occupations	25	28	2	9.9%
35	Food Preparation and Serving Related Occupations	31	34	3	11.3%
37	Building and Grounds Cleaning and Maintenance Occupations	203	237	34	16.8%
39	Personal Care and Service Occupations	3	3	0	9.0%
41	Sales and Related Occupations	9695	10595	900	9.3
43	Office and Administrative Support Occupations	9282	9716	434	4.7
45	Farming, Fishing , and forestry Occupations	325	360	35	10.7
47	Construction and Extraction Occupations	152	171	19	12.5
49	Installation, Maintenance, and Repair Occupations	3034	3287	253	8.3
51	Production Occupations	2322	2534	213	9.2
53	Transportation and Material Moving Occupations	8644	9690	1046	12.1

Source: American Community Survey and Author's Calculations

Table 15: BEAM Health Care Employment Growth by Occupation

Standard Occupational Classification (SOC) Code – 2 Digit Level	SOC Occupation Title	BEAM Employment by Occupation for the Wholesale Trade Industry– 2010	BEAM Employment by Occupation for the Wholesale Trade Industry– 2020	Beam Projected Growth by Occupation for the Wholesale Trade Industry	Beam Projected Percent Growth by Occupation for the Healthcare Industry
00	Total	159,587	206,529	46,942	29.4%
11	Management Occupations	5,630	7,019	1,388	24.7%
13	Business and Financial Operations Occupations	2,249	2,802	553	24.6%
15	Computer and Mathematical Occupations	938	1,282	344	36.7%
17	Architecture and Engineering Occupations	53	61	9	16.5%
19	Life, Physical, and Social Science Occupations	733	1,047	314	42.9%
21	Community and Social Service Occupations	8,222	11,150	2,928	35.6%
23	Legal Occupations	18	26	9	49.6%
25	Education, Training , and Library Occupations	5,263	6,893	1,630	31.0%
27	Arts, Design, Entertainment, Sports, and Media Occupations	327	445	118	36.2%
29	Healthcare Practitioners and technical Occupations	5,535	70,139	14,788	26.7%
31	Healthcare Support Occupations	31,596	41,670	10,074	31.9%
33	Protective Service Occupations	705	845	140	19.8%
35	Food Preparation and Serving Related Occupations	5,194	6,130	936	18.0%
37	Building and Grounds Cleaning and Maintenance Occupations	4,471	5,219	748	16.7%
39	Personal Care and Service Occupations	9,441	14,406	4,965	52.6%
41	Sales Related Occupations	488	638	150	30.7%
43	Construction and Extraction Occupations	25,467	32,542	7,076	27.8%
45	Farming, Fishing, and Forestry Occupations	2	2	1	32.2%
47	Construction and Extraction Occupations	159	195	36	22.6%
49	Installation, Maintenance, and Repair Occupations	1,273	1,590	317	24.9%
51	Production Occupations	949	1,146	197	20.7%
53	Transportation and material Moving Occupations	987	1,369	382	38.7%

Source: ACS Survey and Author's Calculations

Table 16: Enrollments and Completions at Post-Secondary Institutions in the BEAM Region, Academic Year 2010

Institution	Enrollment	Completions	Institution	Enrollment	Completions
University of Kentucky	27,108	5,466	Centre College	1,242	293
University of Louisville	21,234	4,467	Ivy Tech Community College-Southeast	2,964	291
Jefferson Community and Technical College	15,258	3,234	Berea College	1,613	289
Bluegrass Community and Technical College	14,164	3,203	Brown Mackie College-Louisville	2,080	272
Eastern Kentucky University	16,567	3,054	Sullivan College of Technology and Design	719	261
Somerset Community College	9,247	1,991	ITT Technical Institute-Louisville	993	233
Elizabethtown Community and Technical College	7,887	1,862	Transylvania University	1,110	229
Sullivan University	6,085	1,299	Spencerian College-Lexington	621	213
Indiana University-Southeast	7,178	1,021	Daymar College-Louisville	729	169
National College-Lexington	2,418	810	Hanover College	1,006	163
Bellarmino University	3,342	700	ITT Technical Institute-Lexington	559	125
Ivy Tech Community College-South Central	5,014	577	Employment Solutions-College for Technical Education	130	113
The Southern Baptist Theological Seminary	2,913	557	Saint Catharine College	880	107
Galen College of Nursing-Louisville	948	545	Louisville Presbyterian Theological Seminary	230	56
Spencerian College	1,161	532	Strayer University-Kentucky	1,143	56
Lindsey Wilson College	2,554	522	Mid-America College of Funeral Service	84	45
Georgetown College	1,851	510	Ottawa University-Jeffersonville	144	43
University of the Cumberlands	3,300	487	University of Phoenix-Louisville Campus	230	37
Spalding University	2,346	479	Louisville Bible College	110	25
Campbellsville University	3,428	478	Lexington Theological Seminary	61	23
Midway College	1,606	359	Daymar College-Louisville	187	18
ATA College	567	342	DeVry University-Kentucky	162	3
Asbury University	1,623	321	Daymar College-Online	354	1
Kentucky State University	2,851	304	MedTech College-Lexington Campus	214	0
Asbury Theological Seminary	1,582	298	Total	179,797	36,483

Source: US Department of Education, IPEDS; for 49 institutions identified in the greater BEAM region.

Table 17: 2010 Educational Attainment

Region	Percent of 18-24 Year Olds in School or with a BA	Percent of 25-31 Year Olds with a BA or More	Percent of Adults Age 25 and Above with a BA or More
Kentucky	41.4	24.4	15.4
Ohio	47.4	29.1	18.2
Michigan	50.4	28.6	18.9
Illinois	50.5	36.6	22.6
Indiana	46.6	26.6	16.7
Tennessee	40.9	26.2	17.2
Mississippi	41.6	20.8	14.4
Alabama	43	23.9	16.4
North Carolina	44.6	29.3	19.7
Georgia	41.3	28.8	19.9
South Carolina	42.6	26.3	18.2
U.S.	46.8	31	27.9
BEAM Region	43.9	31	25.8
Atlanta, GA MSA	43	35.8	34.9
Birmingham, AL MSA	46.4	31.3	31.3
Chicago, IL MSA	48.5	39.2	33.8
Cincinnati, OH MSA	48.1	33.3	30.4
Detroit, MI MSA	45.1	30.6	26.7
Greenville, SC MSA	43.2	30.9	24.2
Nashville, TN MSA	48.4	34.1	31
Raleigh-Durham, NC MSA	61.4	44.6	42.6
Bluegrass	57.2	32.7	28.2
Cumberlands	27.9	14.1	12.1
Kentuckiana Works	38.7	32.1	27.1
Lincoln Trail	25.7	15.9	14.5
Region 10	30.3	21.2	16.2
Not in Metro Area	38.7	18	17.7

Table 18: Estimated Age Distribution of Manufacturing Workers in BEAM Region

Occupation	Age less than 35	Age 35- 55	Age 55+	Total
Production	9,687	33,662	10,898	54,246
Office and Administrative Support	2,058	6,296	5,207	13,561
Management, Business, Science, and Arts	1,937	8,113	2,906	12,956
Transportation and Material Moving	3,148	5,812	2,543	11,503
Sales and Related	969	2,785	1,695	5,449
Installation, Maintenance, and Repair Workers	484	3,148	1,332	4,964
Architecture and Engineering	1,574	3,148	1,090	5,812
Financial Specialists	121	605	605	1,332
Business Operations Specialists	484	969	484	1,937
Building and Grounds Cleaning and Maintenance	121	727	484	1,332
Computer and Mathematical	242	969	363	1,574
Arts, Design, Entertainment, Sports, and Media	363	727	242	1,332
Construction and Extraction	121	2,058	242	2,422
Protective Service	0	242	121	363
Life, Physical, and Social Science	242	484	121	848
Community and Social Services	0	0	121	121
Legal	0	242	0	242
Education, Training, and Library	0	121	0	121
Healthcare Practitioners and Technical	0	121	0	121
Healthcare Support	0	0	0	0
Food Preparation and Serving	363	242	0	605
Total	21,916	70,471	28,455	120,842

Source: IPUMS Microdata from 5-year average of American Community Survey, 2006-10.

Table 19: Percentage of Workers by Age Category in the BEAM Region and for Selected Occupation Groups

Category	Age	Percent of BEAM	Percent of Labor Force in BEAM	Percent of Production Occupations SOC 51	Percent of Assemblers and fabricators SOC 512	Percent of Metal and Plastics Workers SOC 514	Percent of Woodworkers SOC 517	Percent of Transportation and Material Moving Occupations SOC 53	Percent of Motor Vehicle Operators SOC 533
New Entrants	18 to 24	10.5	12.44	9.2	9.3	10.2	6.8	14.5	5
Prime Age 1	25 to 34	15.2	18.8	17.6	17	21.9	33.1	17	14.1
Prime Age 2	35 to 48	25.4	30.1	34.5	39.5	29.2	30.5	28.8	27.5
Baby Boomers	49 to 66	32	33.1	35.6	32.4	36	22.1	33.6	43
Prime Age B	49 to 58	19.8	22.2	24.8	23.6	25.5	15.3	22.9	27.8
Approaching 1	59 to 62	6.8	6.6	6.6	5.2	6.5	3.4	6.3	8
Approaching 2	62 to 65	4.1	3.4	3.3	2.6	3.4	2.5	3.4	5.3
Oldest B	66	1.3	0.9	0.9	1	0.6	0.9	1	1.9
Older than Baby Boom	over 66	16.9	5.5	3.2	1.8	2.7	7.6	6.1	10.2

Source: ACS and Author's Calculations

Table 20: Bluegrass Employment Education Projections

Industry	2010				2020 Projections				Growth Rate			
	Total Workers	Up To HS	Some College	BA plus	Total Workers - Projection	Up To HS	Some College	BA plus	Total Workers	Up to HS	Some College	BA Plus
Food Manufacturing	1,667	874	492	301	1,694	888	500	306	1.6%	1.6%	1.6%	1.6%
Beverage Manufacturing	1,657	808	489	361	1,641	799	484	357	-1.0%	-1.0%	-1.0%	-1.0%
Chemical Manufacturing	2,808	1,184	824	800	2,609	1,100	766	743	-7.1%	-7.1%	-7.1%	-7.1%
Fabricated Metal Manufacturing	3,347	1,743	1,007	598	3,742	1,948	1,126	668	11.8%	11.8%	11.8%	11.8%
Machinery Manufacturing	5,848	2,770	1,685	1,391	5,760	2,729	1,660	1,370	-1.5%	-1.5%	-1.5%	-1.5%
Computer /Electronic Manufacturing	4,389	1,215	1,318	1,857	3,761	1,041	1,129	1,591	-14.3%	-14.3%	-14.3%	-14.3%
Appliance Manufacturing	3,932	1,858	1,352	722	3,609	1,706	1,241	662	-8.2%	-8.2%	-8.2%	-8.2%
Transportation Equipment Manufacturing	18,452	9,903	5,442	3,103	18,489	9,923	5,453	3,109	0.2%	0.2%	0.2%	0.2%
Medical Equipment Manufacturing	1,085	511	311	262	1,102	519	316	267	1.6%	1.6%	1.6%	1.6%
Couriers and Messengers	2,282	1,028	819	435	2,898	1,306	1,041	552	27.0%	27.0%	27.0%	27.0%
Warehousing and Storage	1,122	484	415	222	1,417	612	525	281	26.3%	26.3%	26.3%	26.3%
Ambulatory Health Care Services	18,613	4,309	7,121	7,181	26,896	6,227	10,290	10,376	44.5%	44.5%	44.5%	44.5%
Hospitals	22,932	5,149	7,713	10,064	26,716	5,998	8,986	11,724	16.5%	16.5%	16.5%	16.5%
Nursing and Residential Care Facilities	7,495	2,408	2,869	2,217	9,466	3,041	3,624	2,799	26.3%	26.3%	26.3%	26.3%
Wholesale Trade	11,331	4,285	3,738	3,308	12,872	4,867	4,246	3,758	13.6%	13.6%	13.6%	13.6%
Transportation and Warehousing	14,110	6,542	4,917	2,653	16,988	7,877	5,920	3,194	20.4%	20.4%	20.4%	20.4%
Total Listed Industries	117,666	43,559	39,279	34,817	135,345	48,664	45,741	40,926	15.0%	11.7%	16.5%	17.5%

Table 21: Cumberland Employment Education Projections

Industry	2010				2020 Projections				Growth Rate			
	Total Workers	Up To HS	Some College	BA plus	Total Workers - Prediction	Up To HS	Some College	BA plus	Total Workers	Up to High School	Some College	BA Plus
Food Manufacturing	2,395	1,366	719	310	2,433	1,388	731	315	1.6%	1.6%	1.6%	1.6%
Beverage Manufacturing	324	158	92	74	321	156	91	74	-1.0%	-1.0%	-1.0%	-1.0%
Chemical Manufacturing	658	332	196	130	611	309	182	121	-7.1%	-7.1%	-7.1%	-7.1%
Fabricated Metal Manufacturing	1,334	706	413	215	1,491	790	462	240	11.8%	11.8%	11.8%	11.8%
Machinery Manufacturing	1,302	725	389	187	1,282	714	384	184	-1.5%	-1.5%	-1.5%	-1.5%
Computer /Electronic Manufacturing	488	267	143	78	418	229	123	67	-14.3%	-14.3%	-14.3%	-14.3%
Appliance Manufacturing	1,000	572	303	125	918	525	278	115	-8.2%	-8.2%	-8.2%	-8.2%
Transportation Equipment Manufacturing	4,018	2,348	1,162	509	4,026	2,352	1,164	510	0.2%	0.2%	0.2%	0.2%
Medical Equipment Manufacturing	0	0	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
Couriers and Messengers	438	212	156	70	556	270	198	89	27.0%	27.0%	27.0%	27.0%
Warehousing and Storage	732	357	226	149	925	451	285	188	26.3%	26.3%	26.3%	26.3%
Ambulatory Health Care Services	5,189	1,205	2,020	1,963	7,498	1,741	2,919	2,837	44.5%	44.5%	44.5%	44.5%
Hospitals	5,834	1,427	2,172	2,233	6,797	1,663	2,531	2,602	16.5%	16.5%	16.5%	16.5%
Nursing and Residential Care Facilities	3,240	1,035	1,257	946	4,092	1,307	1,588	1,195	26.3%	26.3%	26.3%	26.3%
Wholesale Trade	3,201	1,408	1,061	732	3,636	1,600	1,206	831	13.6%	13.6%	13.6%	13.6%
Transportation and Warehousing	5,932	2,987	1,973	972	7,142	3,596	2,375	1,171	20.4%	20.4%	20.4%	20.4%
Total Listed Industries	34,915	14,536	11,901	8,475	40,667	16,369	14,033	10,261	16.5%	12.6%	17.9%	21.1%

Table 22: Kentuckiana Works Employment Education Projections

Industry	2010				2020 Projections				Growth Rate			
	Total Workers	Up To HS	Some College	BA Plus	Total Workers - Projections	Up To HS	Some College	BA Plus	Total Workers	Up to HS	Some College	BA Plus
Food Manufacturing	4,680	2,477	1,374	830	4,755	2,517	1,396	843	1.6%	1.6%	1.6%	1.6%
Beverage Manufacturing	2,302	956	726	620	2,279	947	719	614	-1.0%	-1.0%	-1.0%	-1.0%
Chemical Manufacturing	4,982	1,998	1,482	1,503	4,629	1,856	1,377	1,396	-7.1%	-7.1%	-7.1%	-7.1%
Fabricated Metal Manufacturing	5,812	3,059	1,726	1,027	6,498	3,420	1,930	1,148	11.8%	11.8%	11.8%	11.8%
Machinery Manufacturing	4,414	1,964	1,356	1,095	4,348	1,934	1,335	1,078	-1.5%	-1.5%	-1.5%	-1.5%
Computer /Electronic Manufacturing	1,978	857	601	520	1,695	734	515	445	-14.3%	-14.3%	-14.3%	-14.3%
Appliance Manufacturing	5,664	2,497	1,702	1,465	5,199	2,292	1,562	1,345	-8.2%	-8.2%	-8.2%	-8.2%
Transportation Equipment Manufacturing	13,868	7,943	4,066	1,858	13,896	7,959	4,074	1,862	0.2%	0.2%	0.2%	0.2%
Medical Equipment Manufacturing	1,290	544	401	345	1,311	552	407	351	1.6%	1.6%	1.6%	1.6%
Couriers and Messengers	17,227	7,497	5,834	3,896	21,879	9,522	7,410	4,948	27.0%	27.0%	27.0%	27.0%
Warehousing and Storage	3,161	1,510	1,271	1,566	3,992	1,907	1,605	1,978	26.3%	26.3%	26.3%	26.3%
Ambulatory Health Care Services	24,139	5,557	9,000	9,578	34,881	8,030	13,005	13,840	44.5%	44.5%	44.5%	44.5%
Hospitals	26,332	5,986	9,322	11,018	30,677	6,974	10,861	12,836	16.5%	16.5%	16.5%	16.5%
Nursing and Residential Care Facilities	11,714	3,882	4,451	3,382	14,795	4,903	5,622	4,272	26.3%	26.3%	26.3%	26.3%
Wholesale Trade	17,969	6,922	6,037	5,012	20,413	7,863	6,858	5,694	13.6%	13.6%	13.6%	13.6%
Transportation and Warehousing	35,906	16,223	12,228	7,456	43,231	19,533	14,723	8,977	20.4%	20.4%	20.4%	20.4%
Total Listed Industries	161,050	60,865	54,473	45,708	188,605	69,514	64,385	54,700	17.1%	14.2%	18.2%	19.7%

Table 23 : Lincoln Trail Employment Education Projections

2010					2020 Projections				Growth Rate			
Industry	Total Workers	Up To HS	Some College	BA plus	Total Workers - Projections	Up To HS	Some College	BA plus	Total Workers	Up to HS	Some College	BA Plus
Food Manufacturing	1,236	717	359	160	1,256	729	365	162	1.6%	1.6%	1.6%	1.6%
Beverage Manufacturing	1,313	700	394	219	1,300	693	391	216	-1.0%	-1.0%	-1.0%	-1.0%
Chemical Manufacturing	1,638	850	485	303	1,522	790	450	281	-7.1%	-7.1%	-7.1%	-7.1%
Fabricated Metal Manufacturing	1,296	683	381	232	1,449	764	426	259	11.8%	11.8%	11.8%	11.8%
Machinery Manufacturing	1,676	900	502	274	1,651	887	495	270	-1.5%	-1.5%	-1.5%	-1.5%
Computer /Electronic Manufacturing	155	65	48	42	133	56	41	36	-14.3%	-14.3%	-14.3%	-14.3%
Appliance Manufacturing	810	447	247	117	744	410	226	107	-8.2%	-8.2%	-8.2%	-8.2%
Transportation Equipment Manufacturing	7,250	4,214	2,118	918	7,265	4,222	2,123	920	0.2%	0.2%	0.2%	0.2%
Medical Equipment Manufacturing	72	28	24	19	73	29	25	20	1.6%	1.6%	1.6%	1.6%
Couriers and Messengers	1,305	599	438	268	1,657	760	557	341	27.0%	27.0%	27.0%	27.0%
Warehousing and Storage	588	245	195	149	743	309	246	188	26.3%	26.3%	26.3%	26.3%
Ambulatory Health Care Services	5,253	1,282	2,045	1,925	7,591	1,852	2,955	2,782	44.5%	44.5%	44.5%	44.5%
Hospitals	5,852	1,422	2,027	2,403	6,818	1,656	2,361	2,799	16.5%	16.5%	16.5%	16.5%
Nursing and Residential Care Facilities	2,918	943	1,129	845	3,685	1,191	1,426	1,068	26.3%	26.3%	26.3%	26.3%
Wholesale Trade	3,275	1,381	1,094	801	3,720	1,569	1,242	909	13.6%	13.6%	13.6%	13.6%
Transportation and Warehousing	6,975	3,308	2,365	1,302	8,398	3,983	2,847	1,567	20.4%	20.4%	20.4%	20.4%
Total Listed Industries	39,719	16,940	13,218	9,558	45,603	18,830	15,373	11,396	14.8%	11.2%	16.3%	19.2%

Table 24: Indiana Region 10 Employment Education Projections

Industry	2010				2020 Projections				Growth Rate			
	Total Worker	Up To HS	Some College	BA Plus	Total Workers - Prediction	Up To HS	Some College	BA Plus	Total Workers	Up to HS	Some College	BA Plus
Food Manufacturing	2,975	1,636	893	447	3,023	1,662	907	454	1.60%	1.60%	1.60%	1.60%
Beverage Manufacturing	700	370	198	131	693	367	196	130	-1.00%	-1.00%	-1.00%	-1.00%
Chemical Manufacturing	2,402	1,257	674	471	2,232	1,168	626	437	-7.10%	-7.10%	-7.10%	-7.10%
Fabricated Metal Manufacturing	3,231	1,678	945	608	3,612	1,876	1,057	680	11.80%	11.80%	11.80%	11.80%
Machinery Manufacturing	1,978	1,026	590	362	1,948	1,010	581	357	-1.50%	-1.50%	-1.50%	-1.50%
Computer /Electronic Manufacturing	1,074	487	329	258	920	418	282	221	-14.30%	-14.30%	-14.30%	-14.30%
Appliance Manufacturing	1,418	771	413	234	1,302	708	379	215	-8.20%	-8.20%	-8.20%	-8.20%
Transportation Equipment Manufacturing	7,916	4,318	2,361	1,235	7,932	4,327	2,366	1,237	0.20%	0.20%	0.20%	0.20%
Medical Equipment Manufacturing	703	385	213	105	714	391	216	107	1.60%	1.60%	1.60%	1.60%
Couriers and Messengers	2,645	1,111	898	636	3,359	1,411	1,141	808	27.00%	27.00%	27.00%	27.00%
Warehousing and Storage	468	204	156	108	591	258	197	136	26.30%	26.30%	26.30%	26.30%
Ambulatory Health Care Services	8,264	2,135	3,275	2,850	11,941	3,085	4,733	4,118	44.50%	44.50%	44.50%	44.50%
Hospitals	9,453	3,038	4,511	1,902	11,013	3,540	5,255	2,216	16.50%	16.50%	16.50%	16.50%
Nursing and Residential Care Facilities	3,980	1,277	1,484	1,218	5,027	1,613	1,874	1,539	26.30%	26.30%	26.30%	26.30%
Wholesale Trade	4,662	2,007	1,553	1,103	5,296	2,280	1,764	1,253	13.60%	13.60%	13.60%	13.60%
Transportation and Warehousing	11,683	5,424	3,960	2,300	14,066	6,530	4,767	2,770	20.40%	20.40%	20.40%	20.40%
Total Listed Industries	60,439	25,810	21,400	13,224	69,719	28,974	25,005	15,732	15.40%	12.30%	16.80%	19.00%

Figure 1: BEAM Counties

Kentucky Counties: Anderson, Bourbon, Bullitt, Clark, Fayette, Franklin, Harrison, Henry, Jefferson, Jessamine, Meade, Nelson, Oldham, Shelby, Spencer, Trimble, Woodford,

Indiana Counties: Washington, Harrison, Floyd and Clark

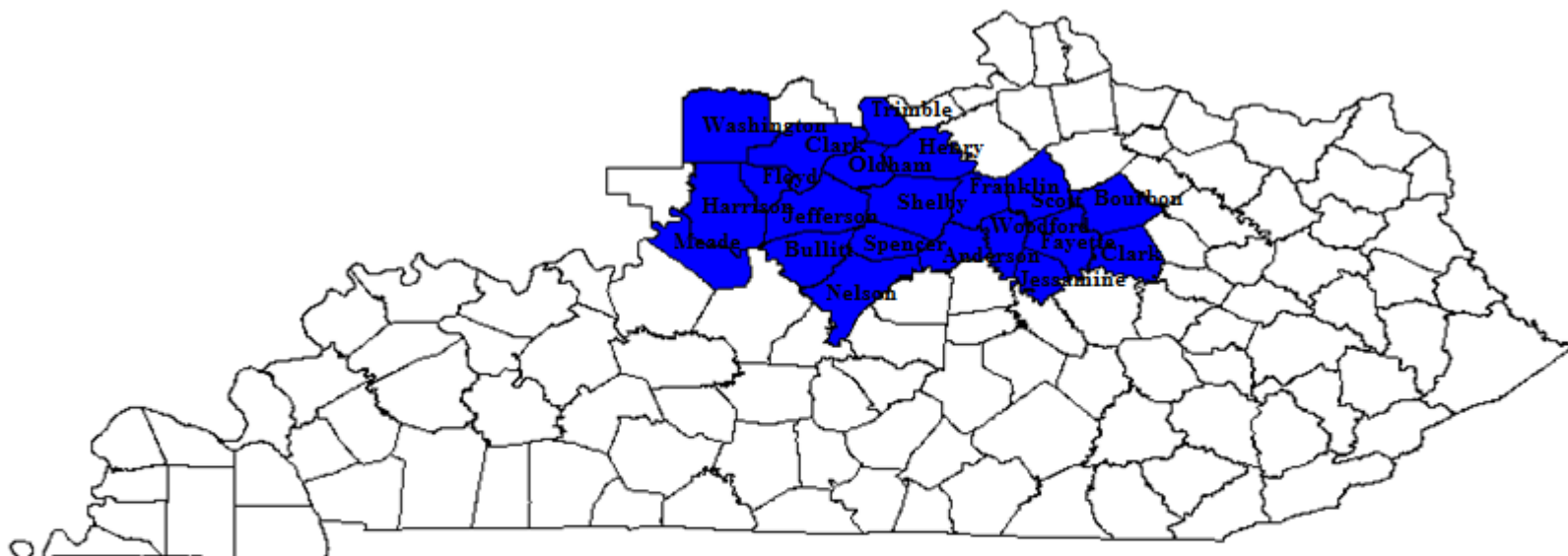


Figure 2: Workforce Area Counties

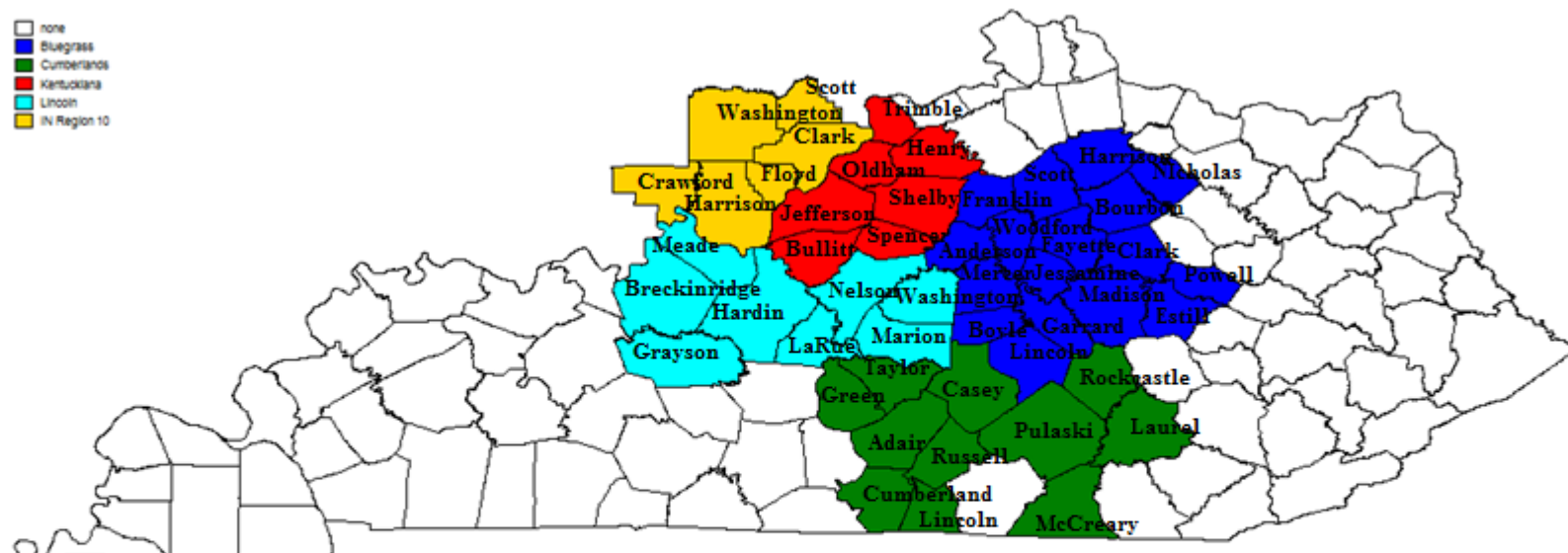
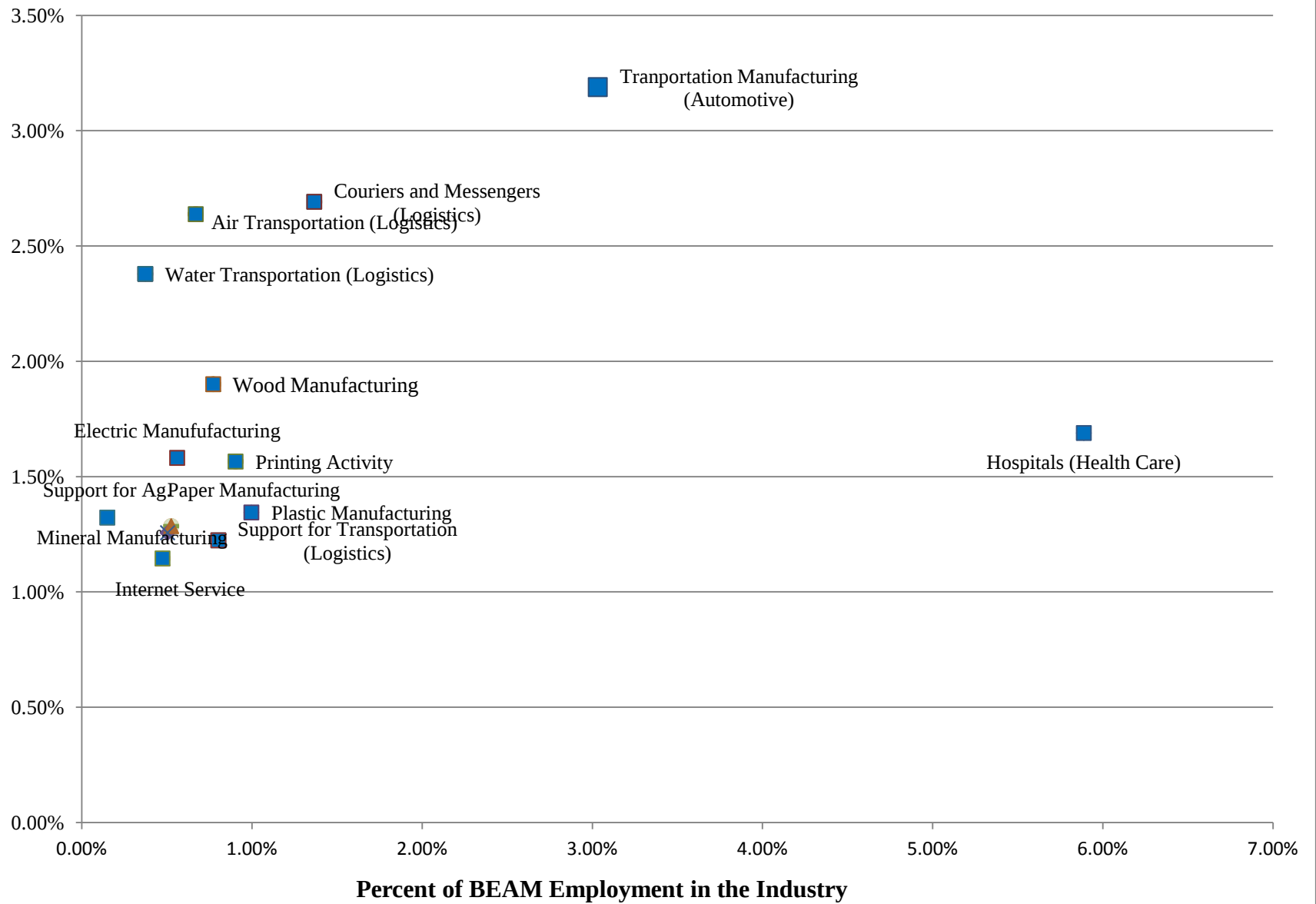
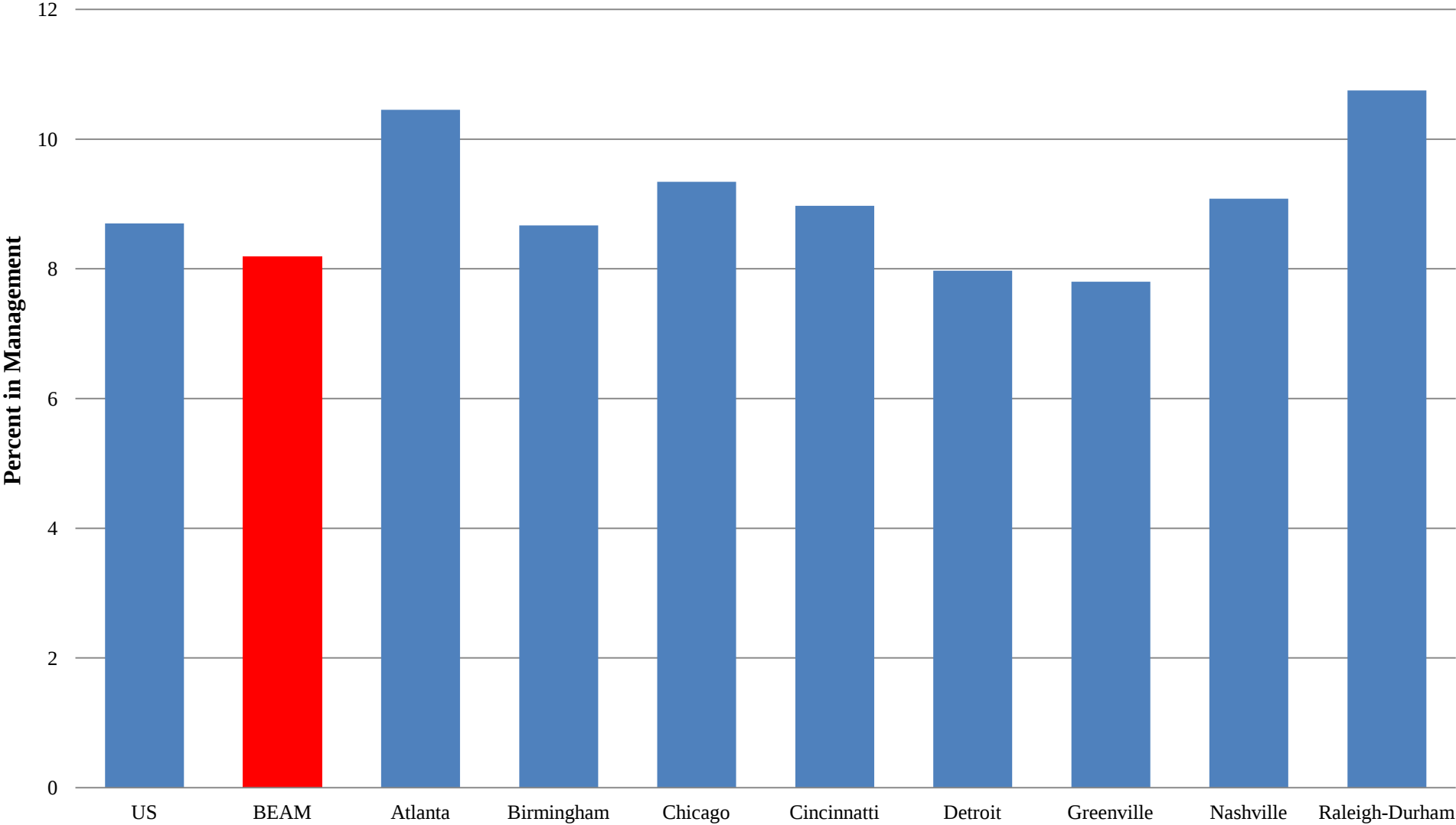


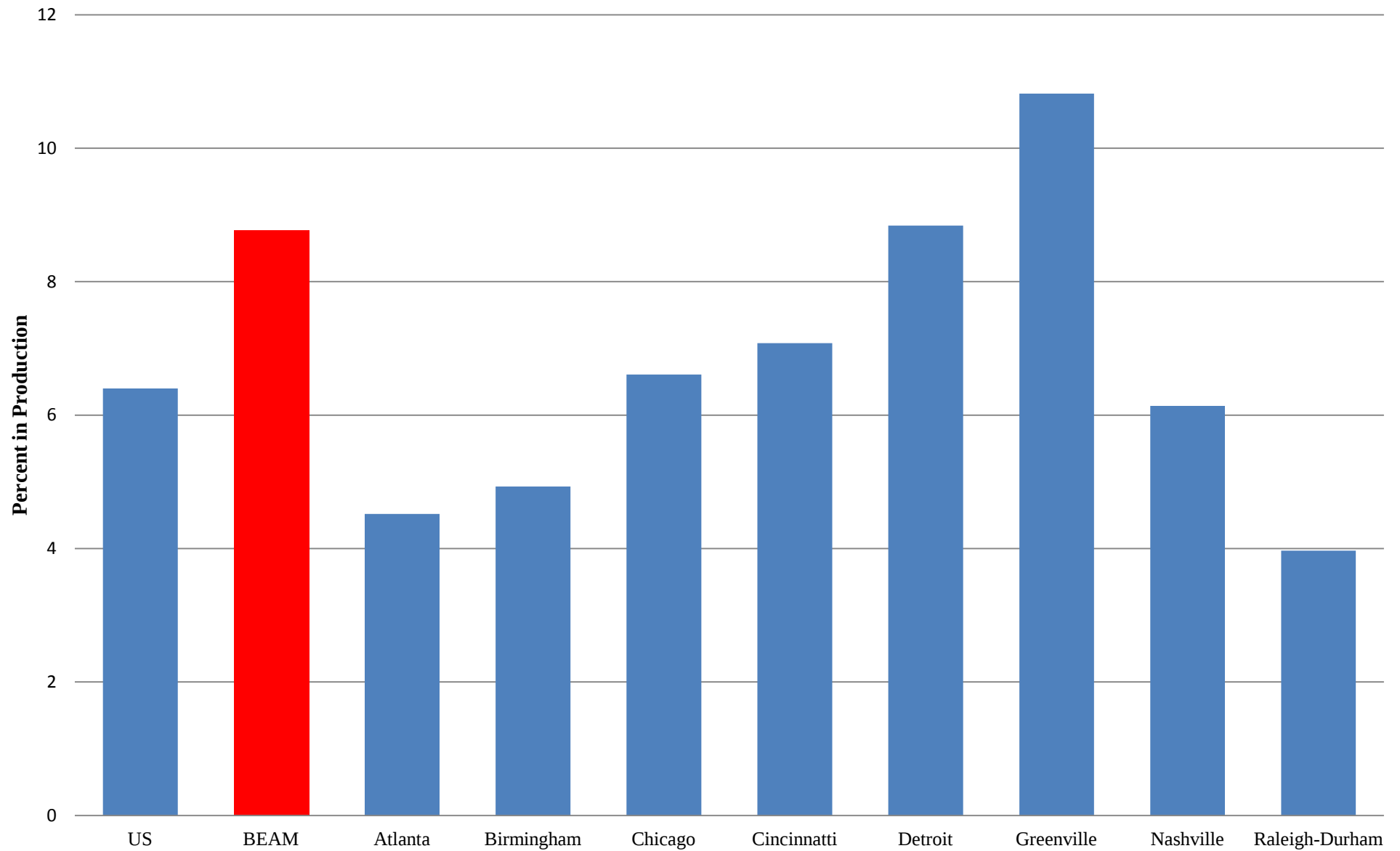
Figure 3: Top 15 Industries (Three-Digit) Ranked by the Share of US Employment in the BEAM Region



**Figure 4a: Percent of Overall Employment in Managed Occupations
BEAM Region and Comparable MSAs**



**Figure 4b: Percent of Overall Employment in Production Occupations
BEAM Region and Comparable MSAs**



**Figure 5a: Percent of Transportation Manufacturing Employment in Management Occupations
BEAM Region and Comparable MSAs**

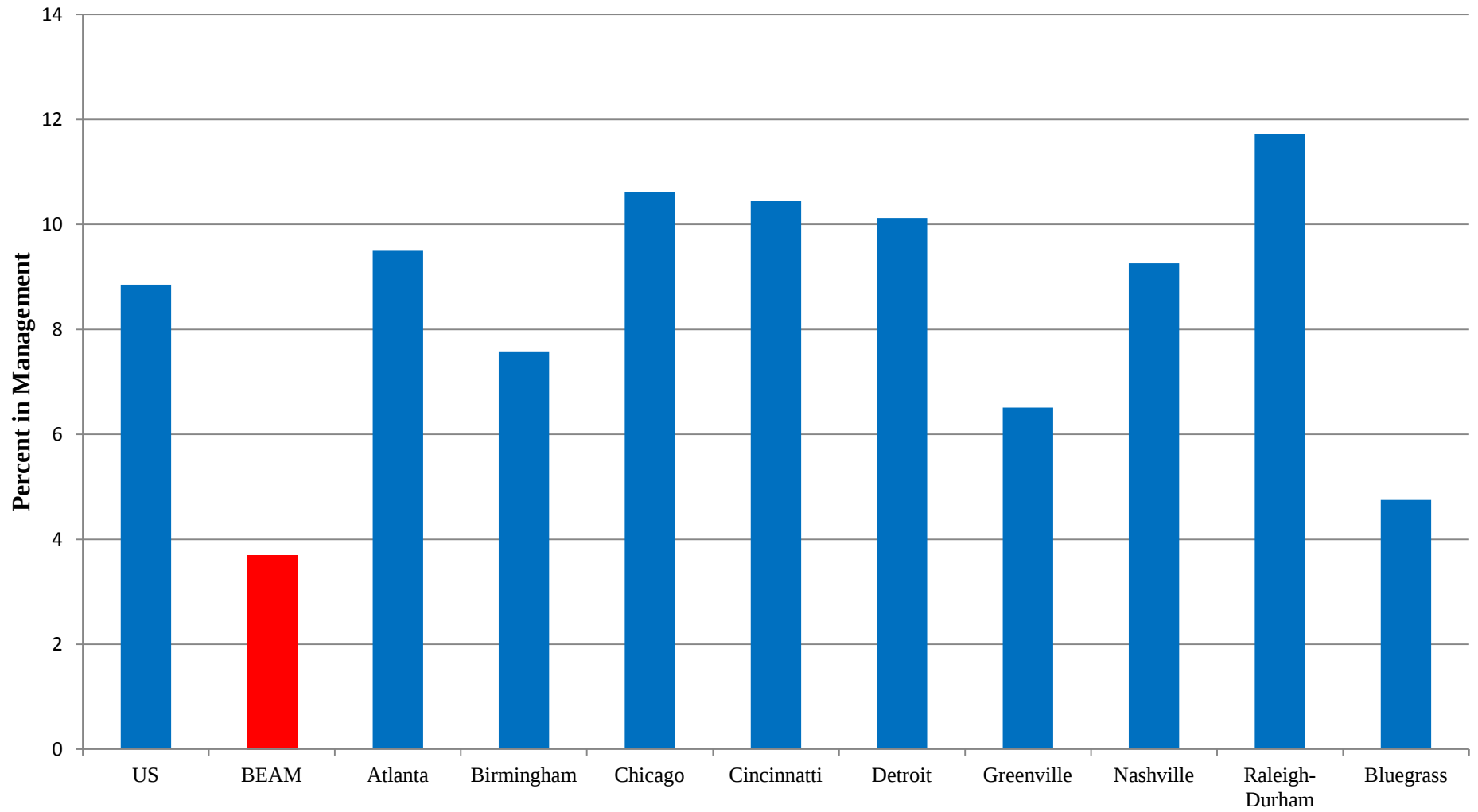
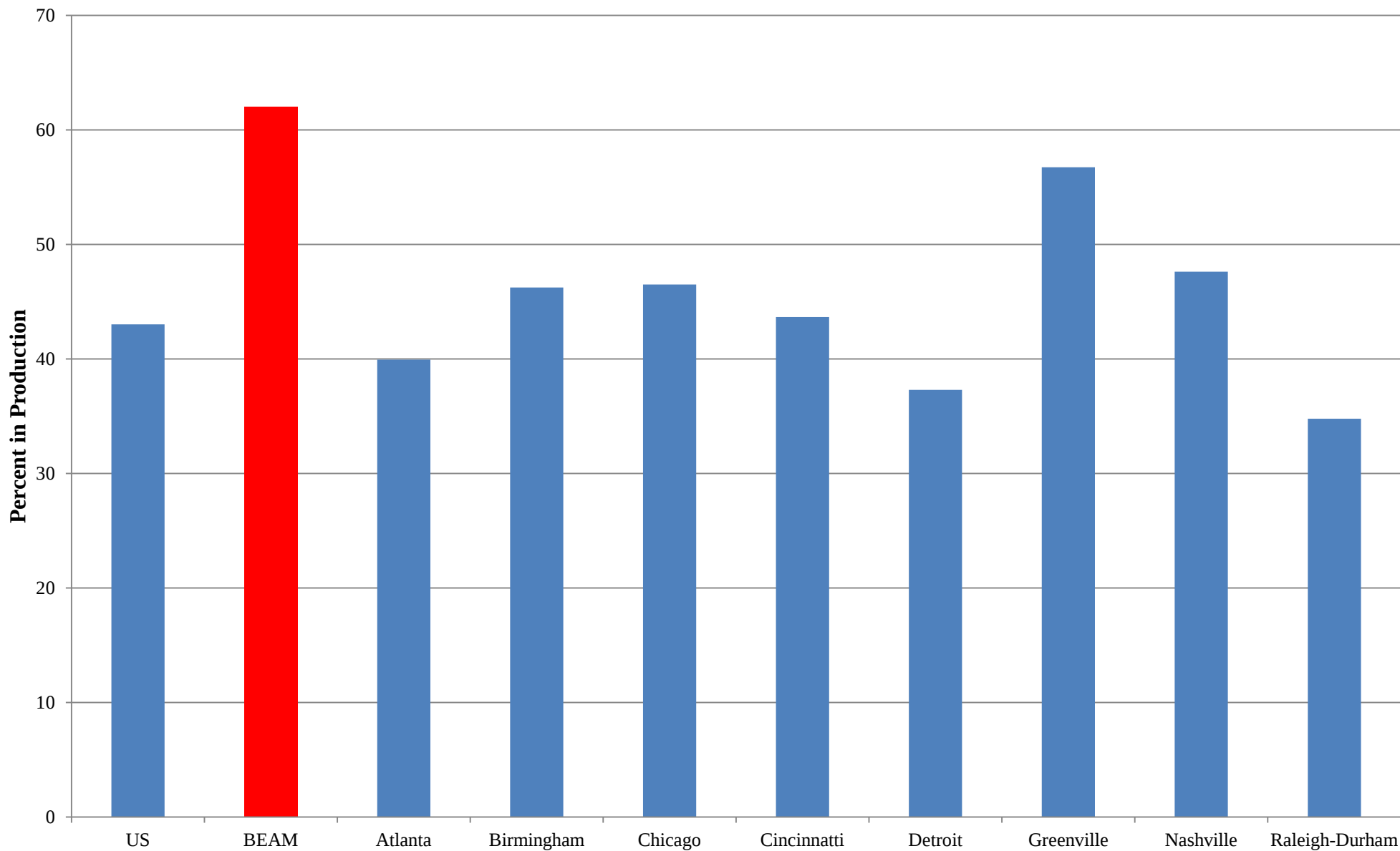
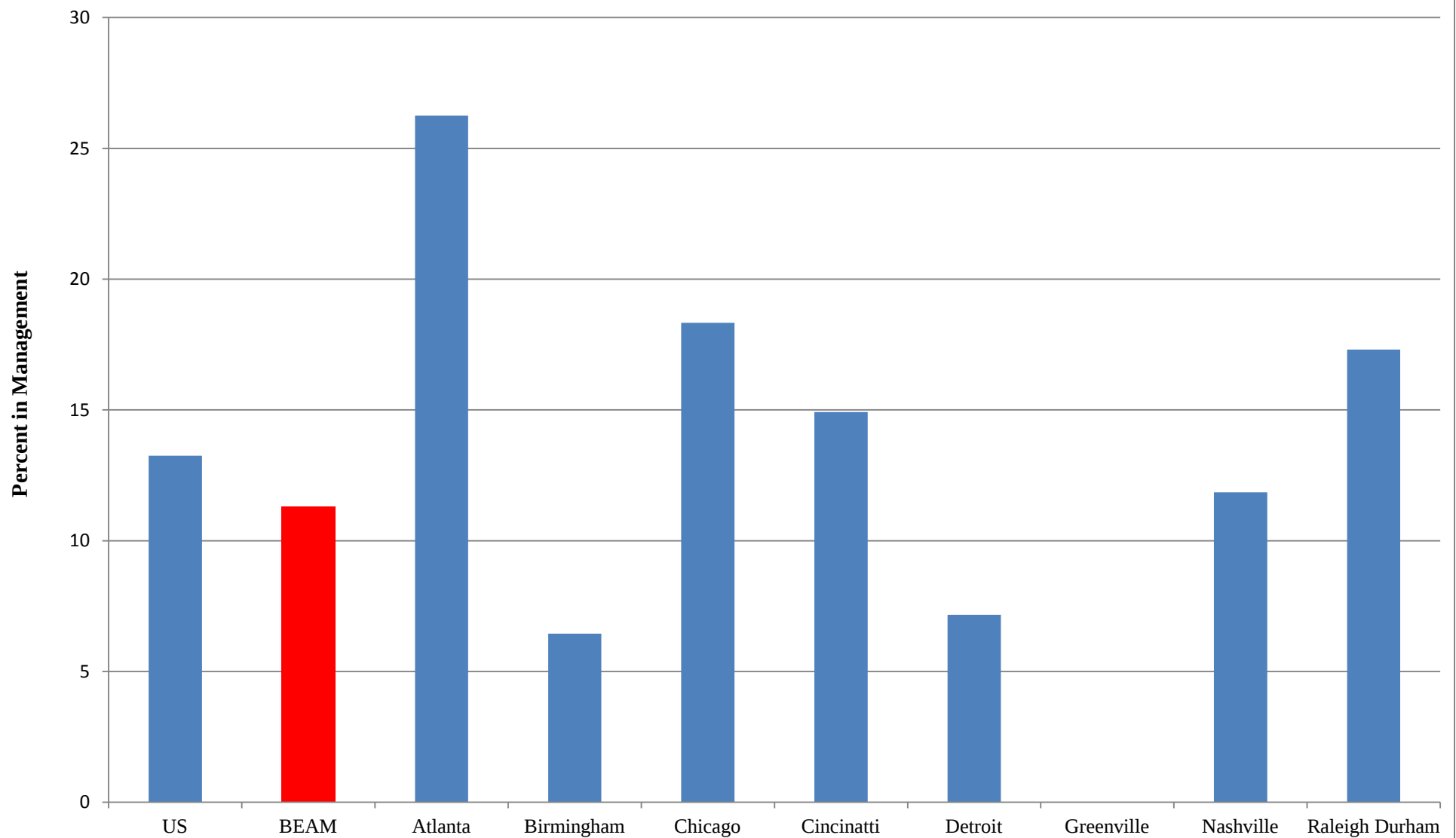


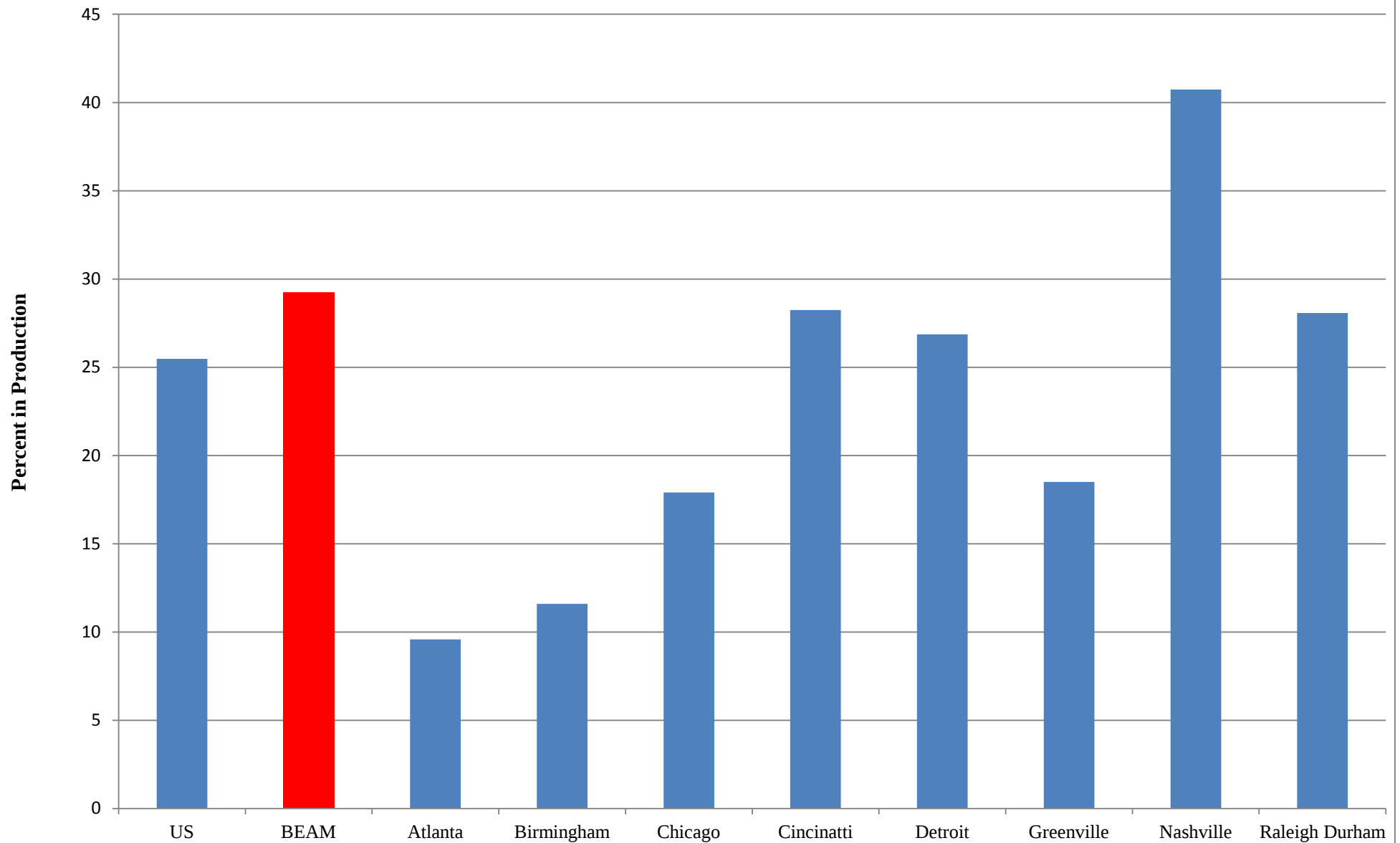
Figure 5b: Percent of Transportation Manufacturing in Production Occupations



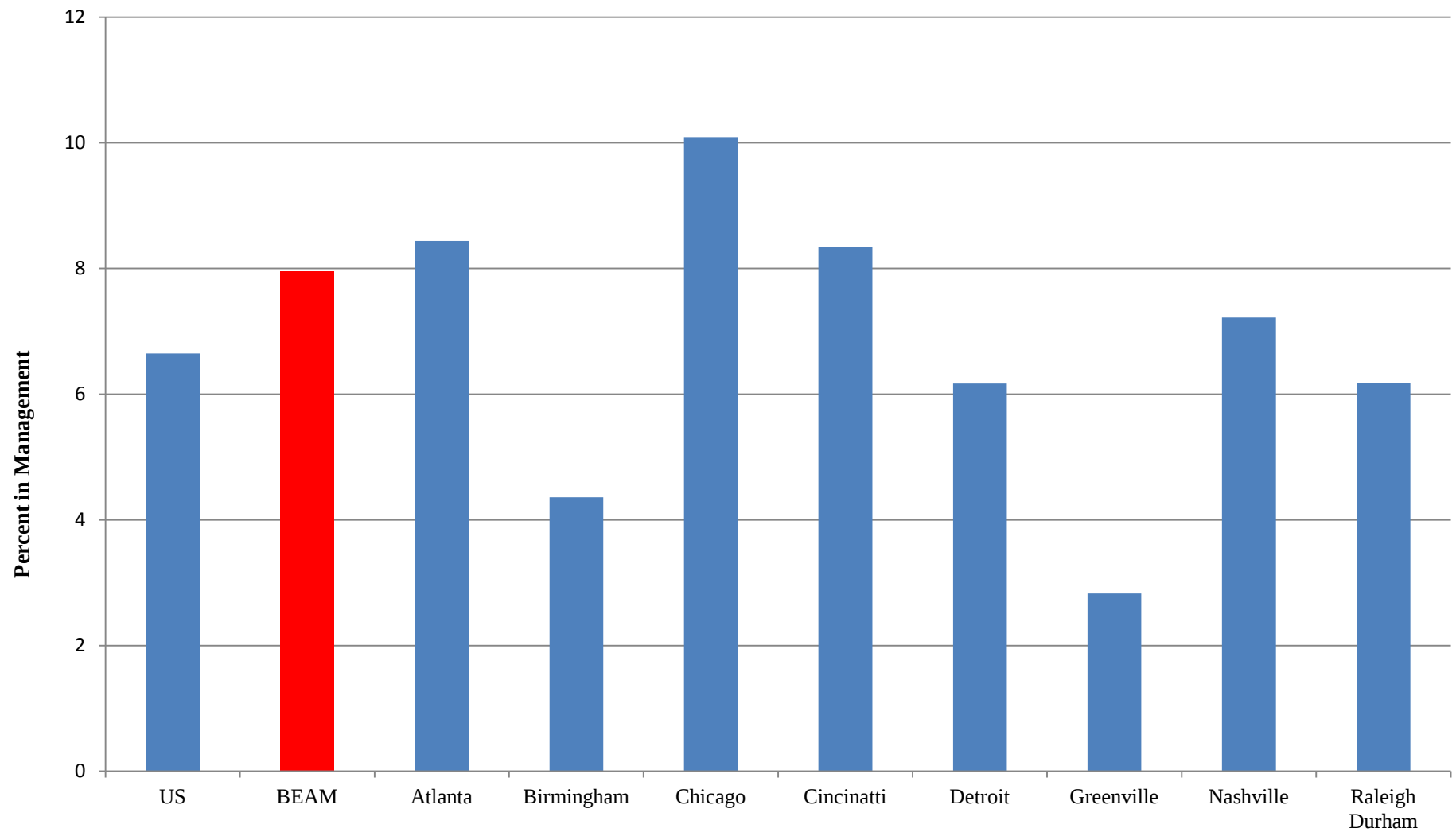
**Figure 6a: Percent of Beverage Manufacturing Employment in Management Occupations
BEAM Region and Comparable MSAs**



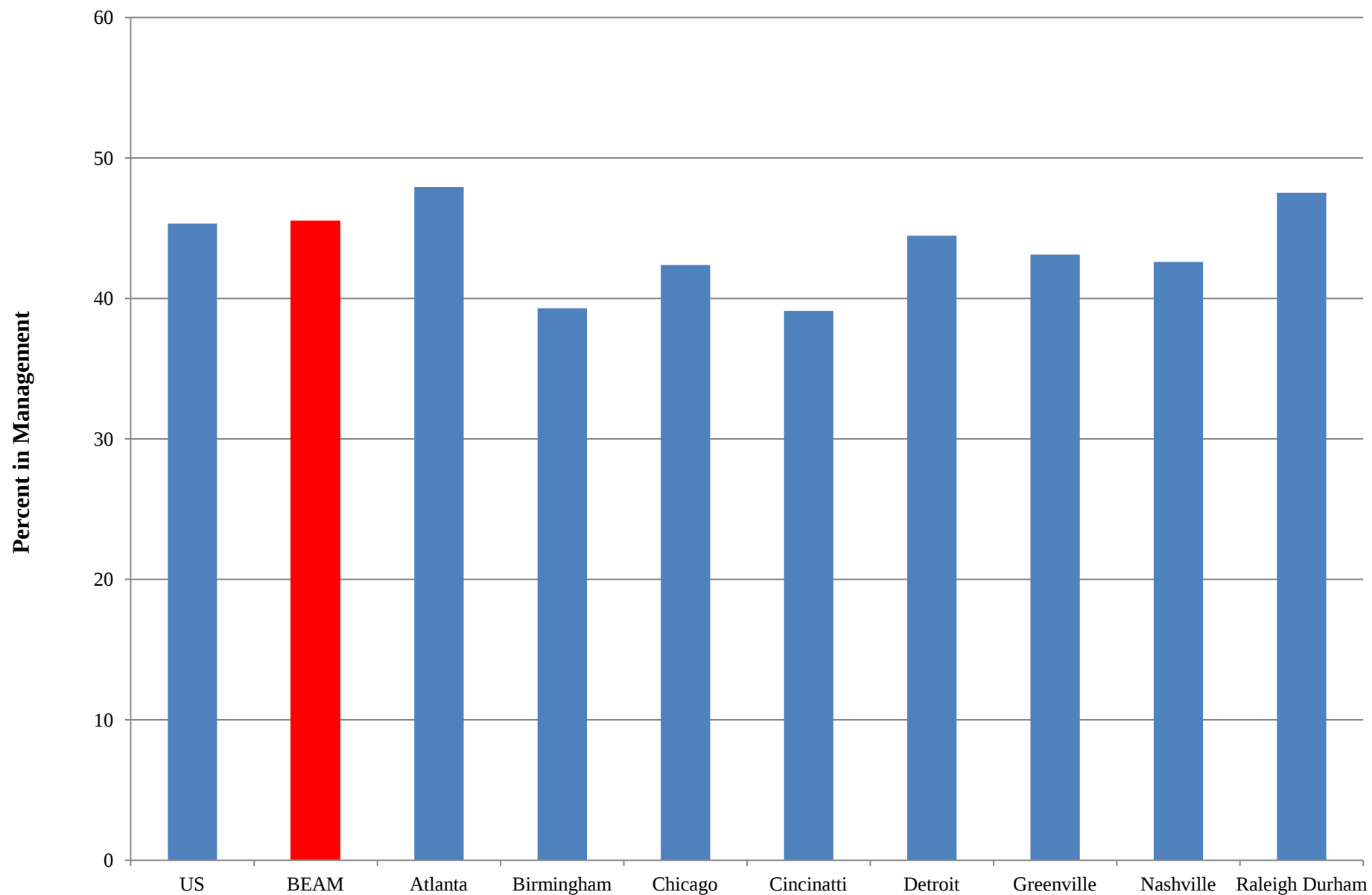
**Figure 6b: Percent Beverage Manufacturing Employment in Production Occupations
BEAM Region and Comparable MSAs**



**Figure 7a: Percent of Food Manufacturing Employment in Management Occupations
BEAM Region and Comparable MSAs**



**Figure 7b: Percent of Food Manufacturing Employment in Production Occupations
BEAM Region and Comparable MSAs**



**Figure 8a: Percent of Transportation and Warehousing Employment in Management Occupations
BEAM Region and Comparable MSAs**

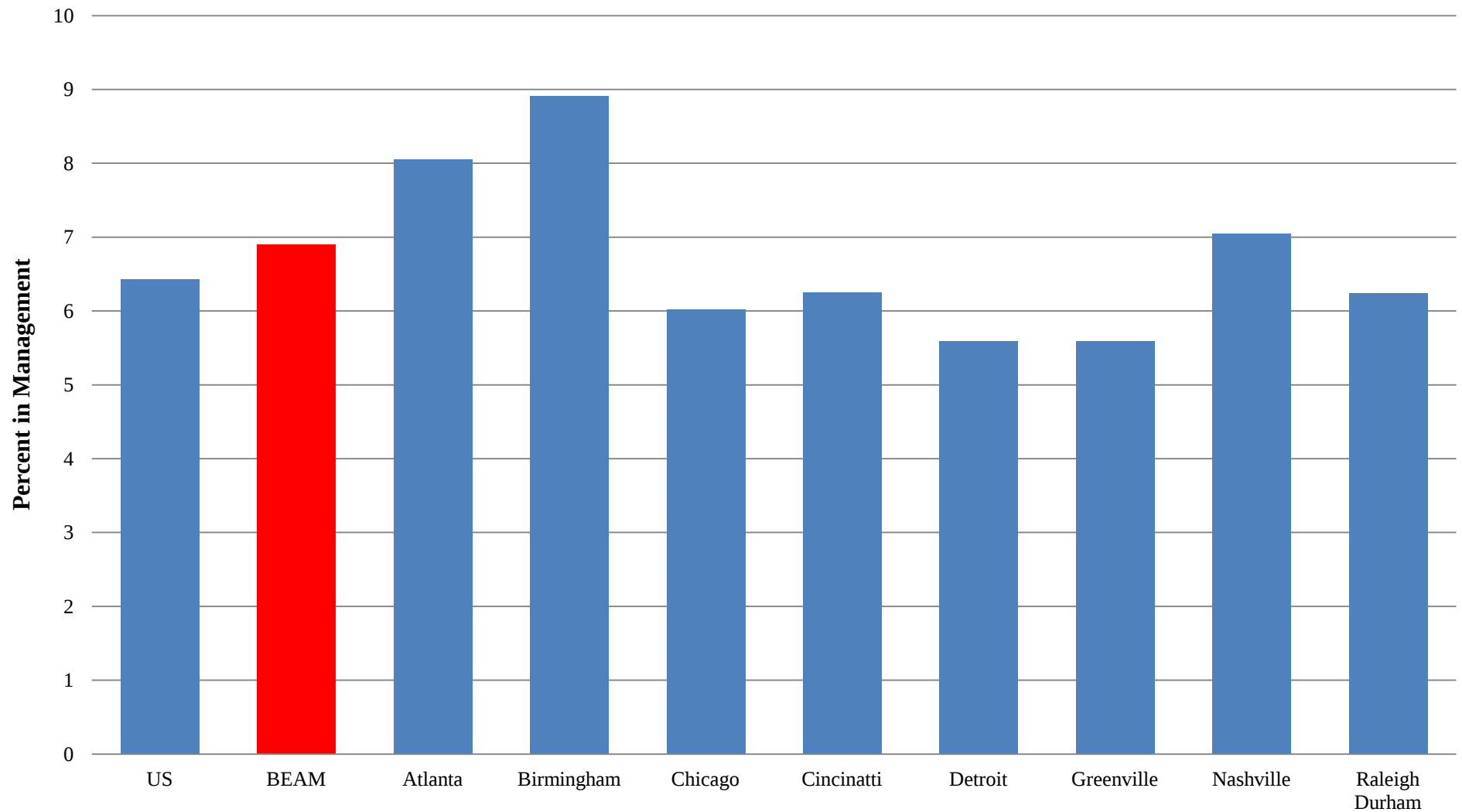
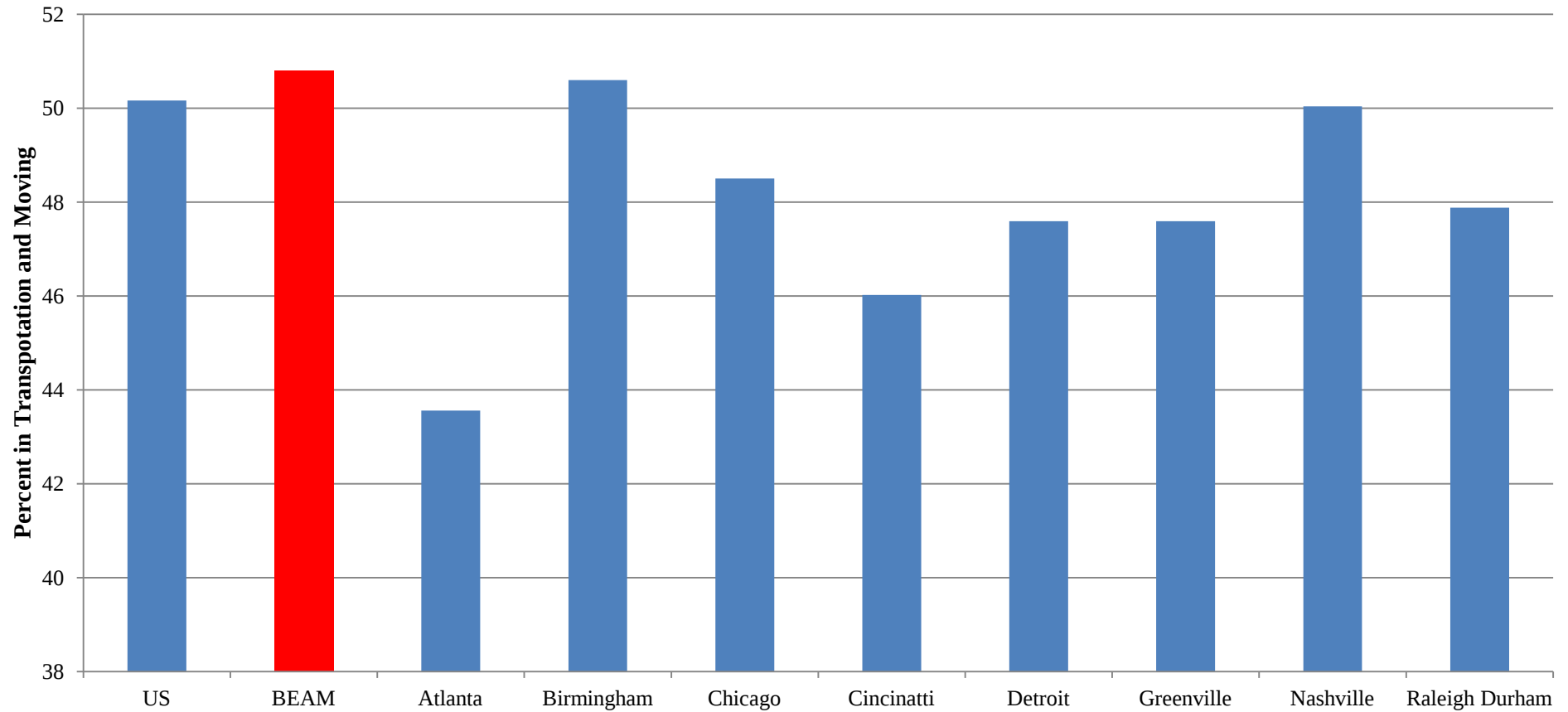
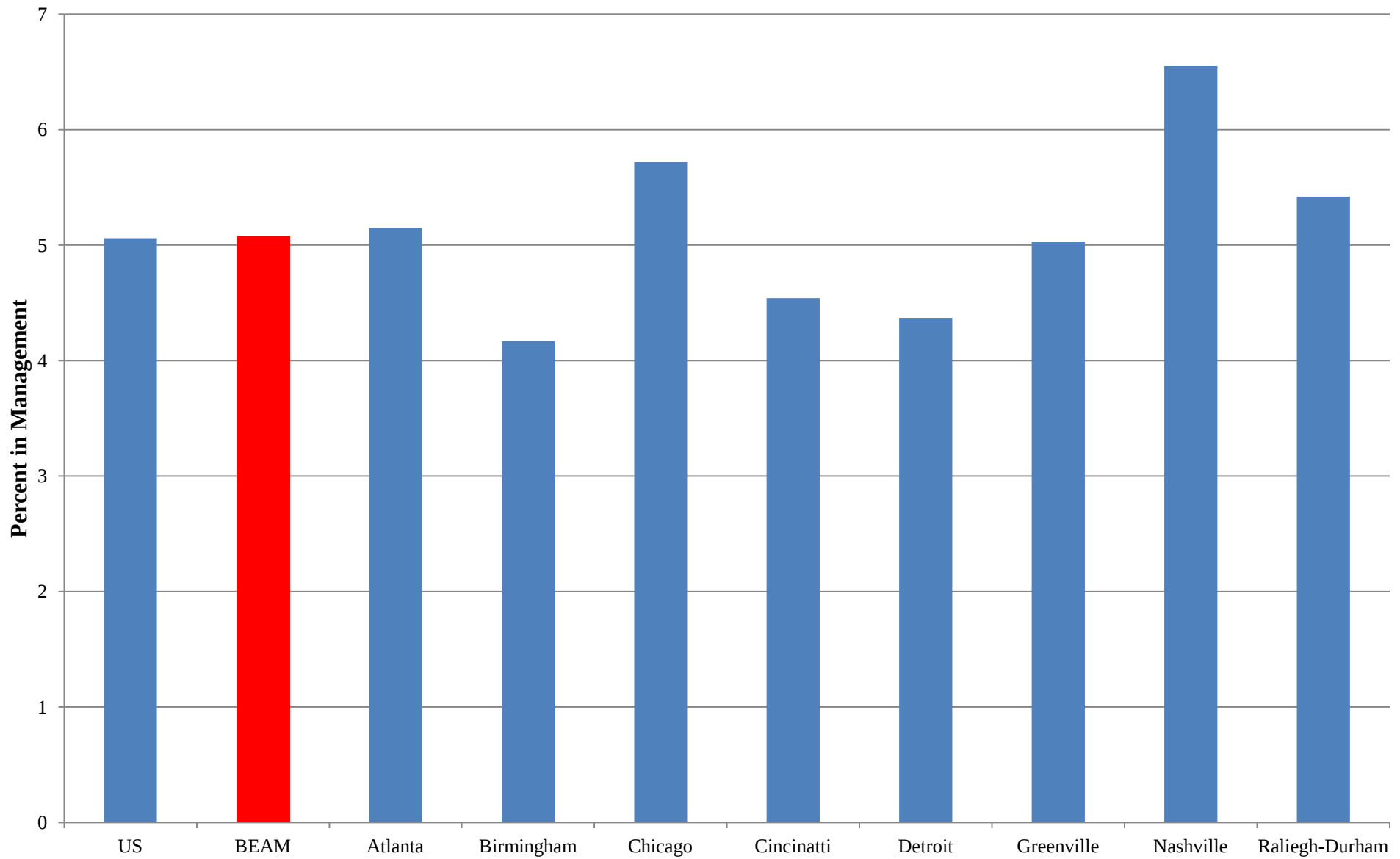


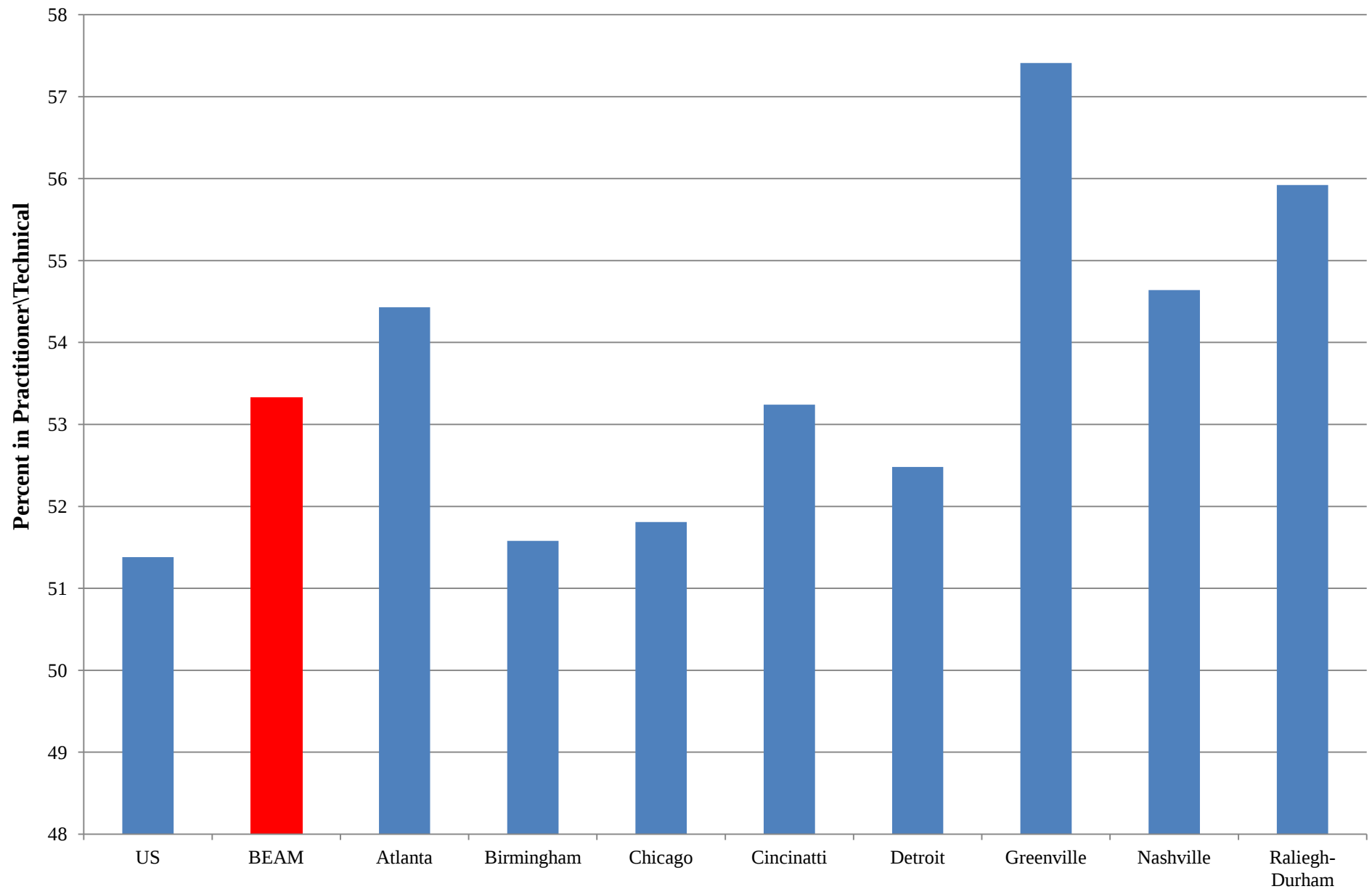
Figure 8b: Percent of Transportation and Warehousing Employment in Transport and Moving Occupations, BEAM Region and Comparable MSAs



**Figure 9a: Percent of Hospital Employment in Management Occupations
BEAM Region and Comparable MSAs**



**Figure 9b: Percent of Hospital Employment in Practitioners and Technical Occupations
BEAM Region and Comparable MSAs**



**Figure 9c: Percent of Hospital Employment in Support Occupations
BEAM Region and Comparable MSAs**

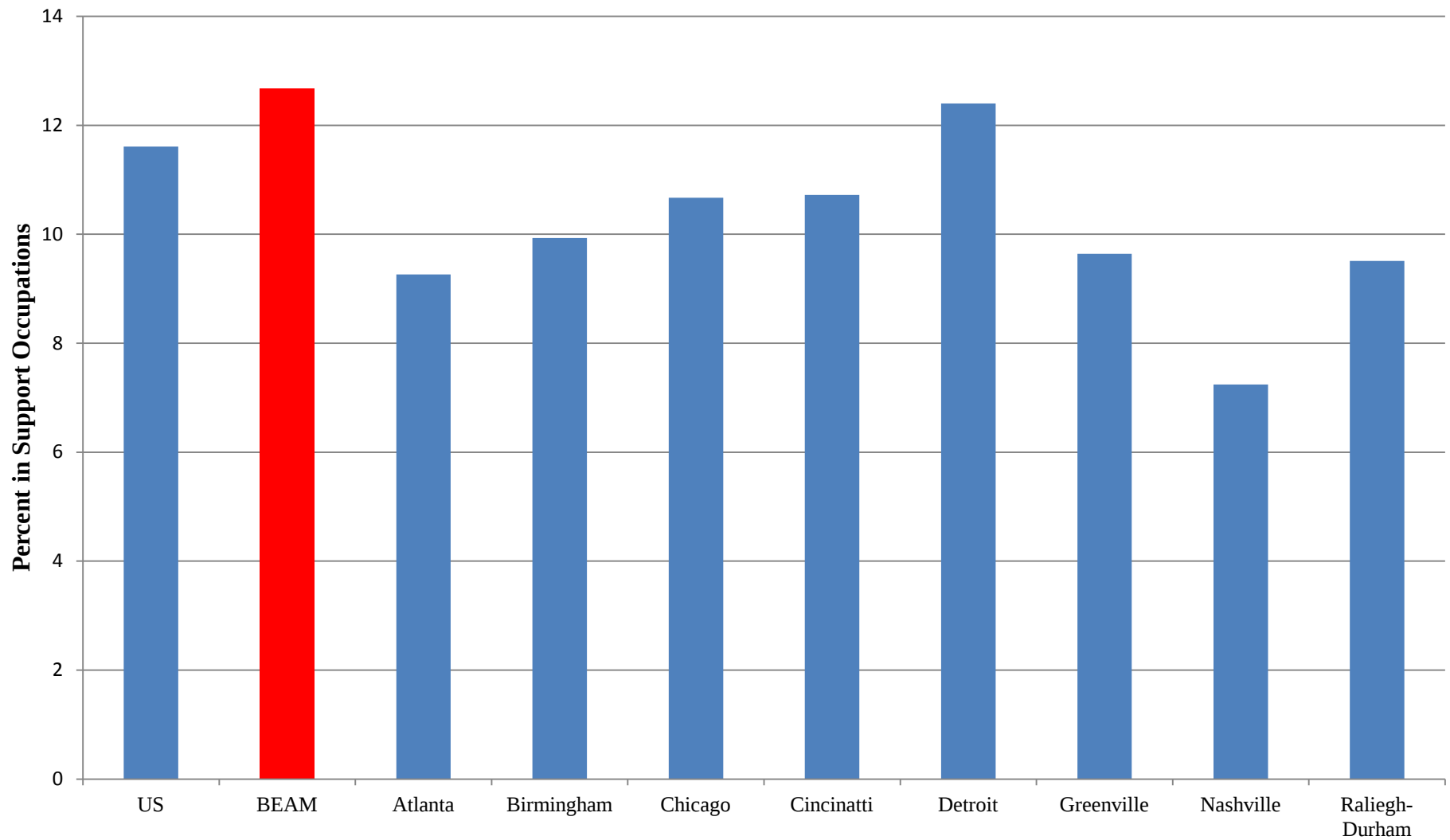
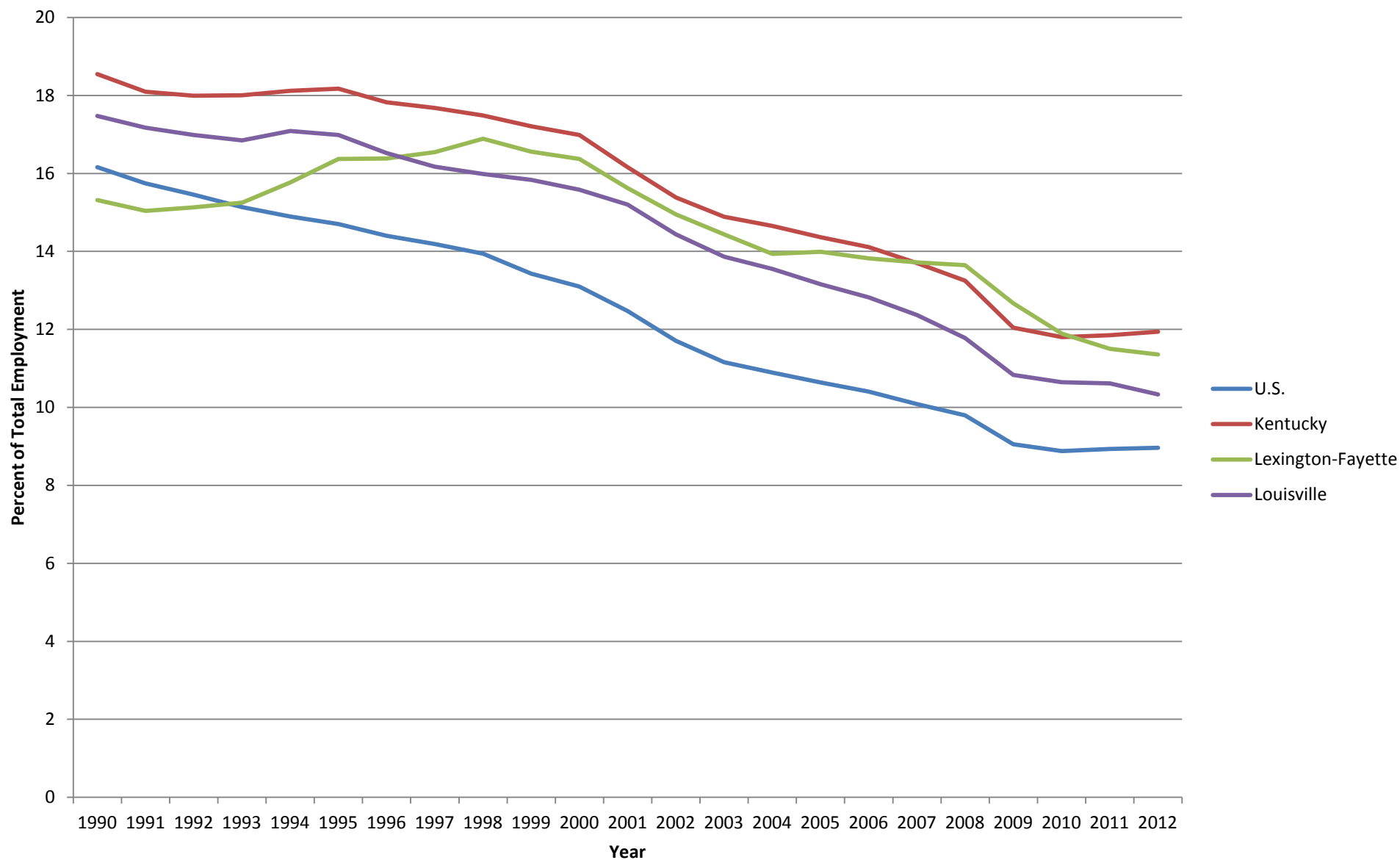


Figure 10: Manufacturing as Percent of Total Employment: 1990-2010



**Figure 11: Predicted Growth in the Demand for Workers with a BA or More by Total Employment in the Industry
BEAM Region**

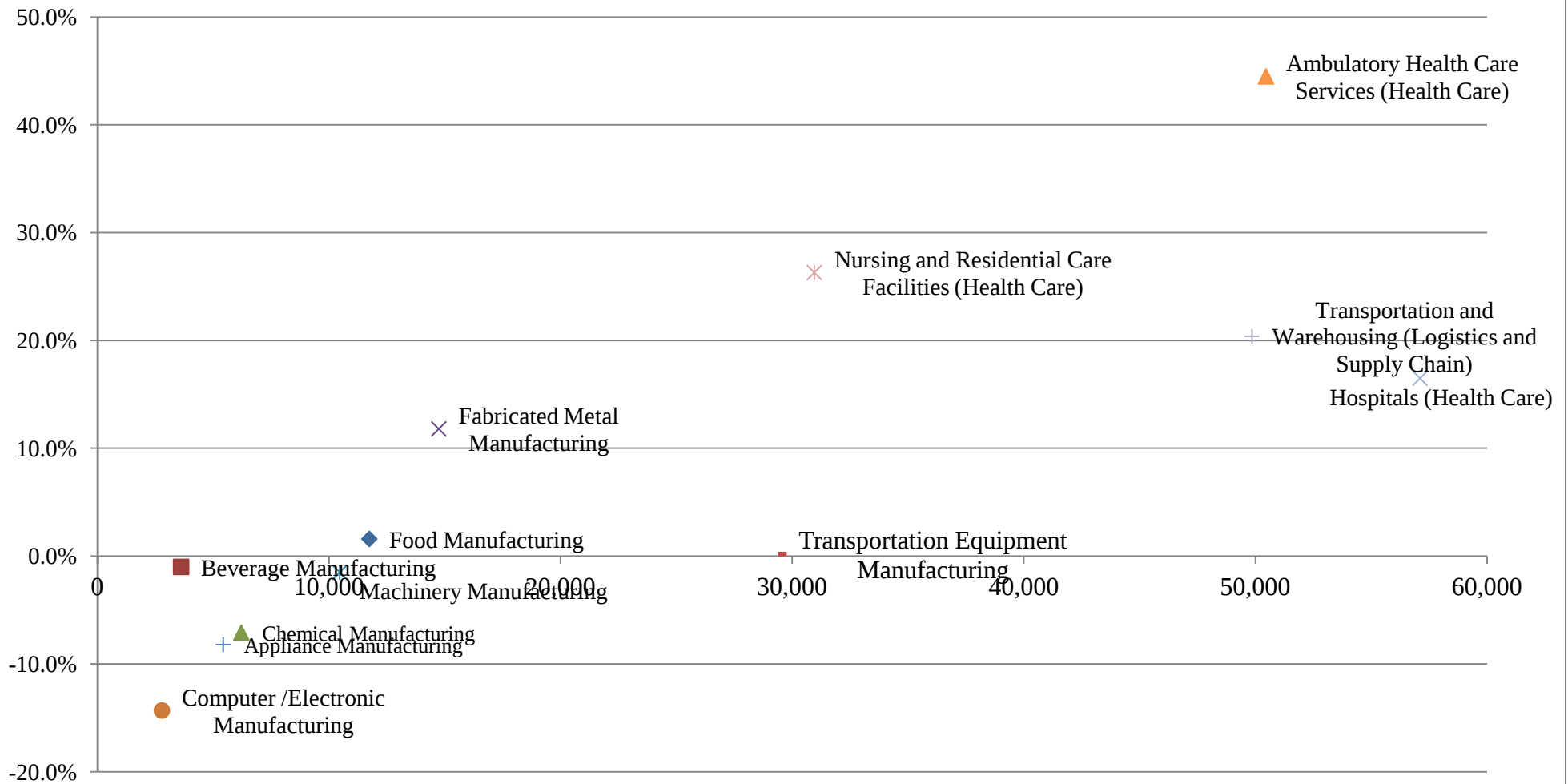
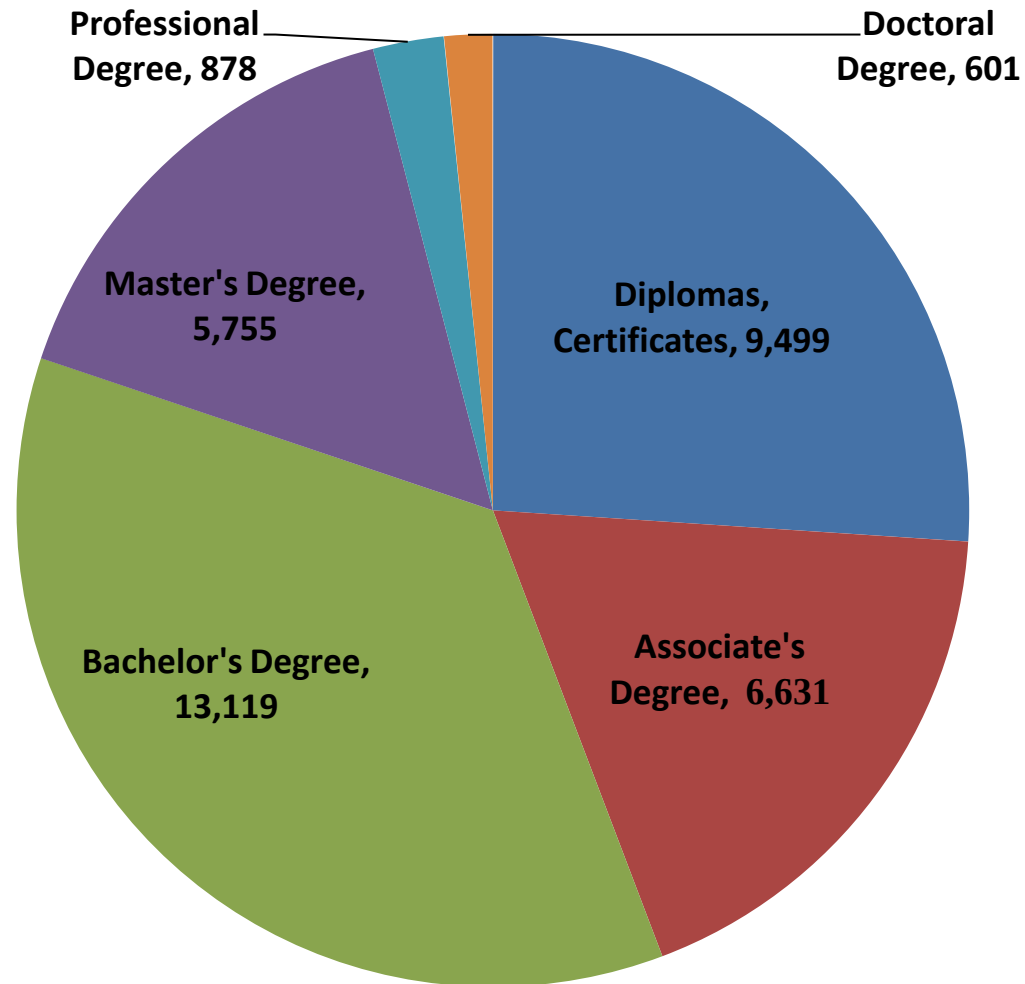
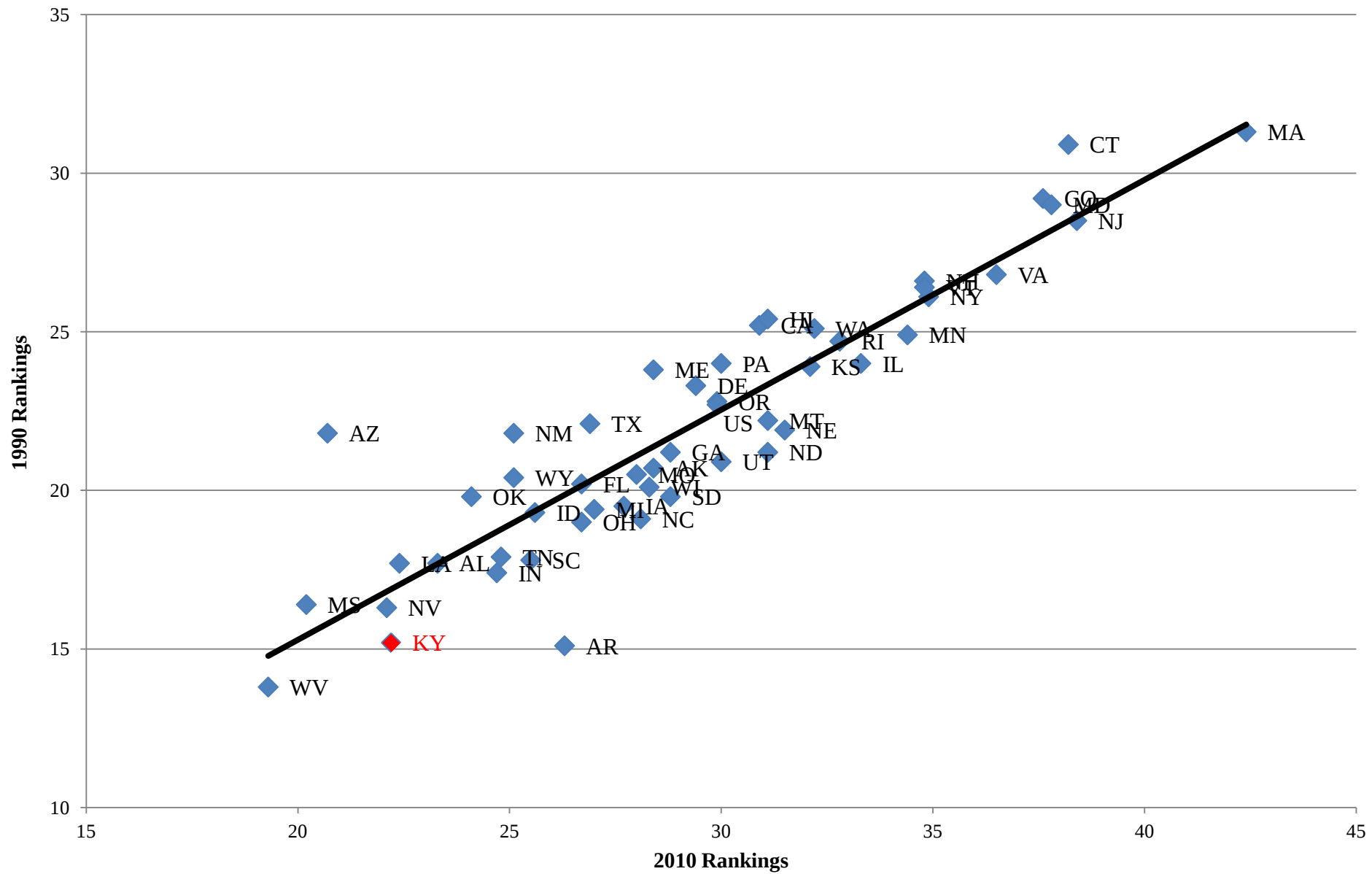


Figure 12: Degrees Completed, Academic Year 2010, BEAM

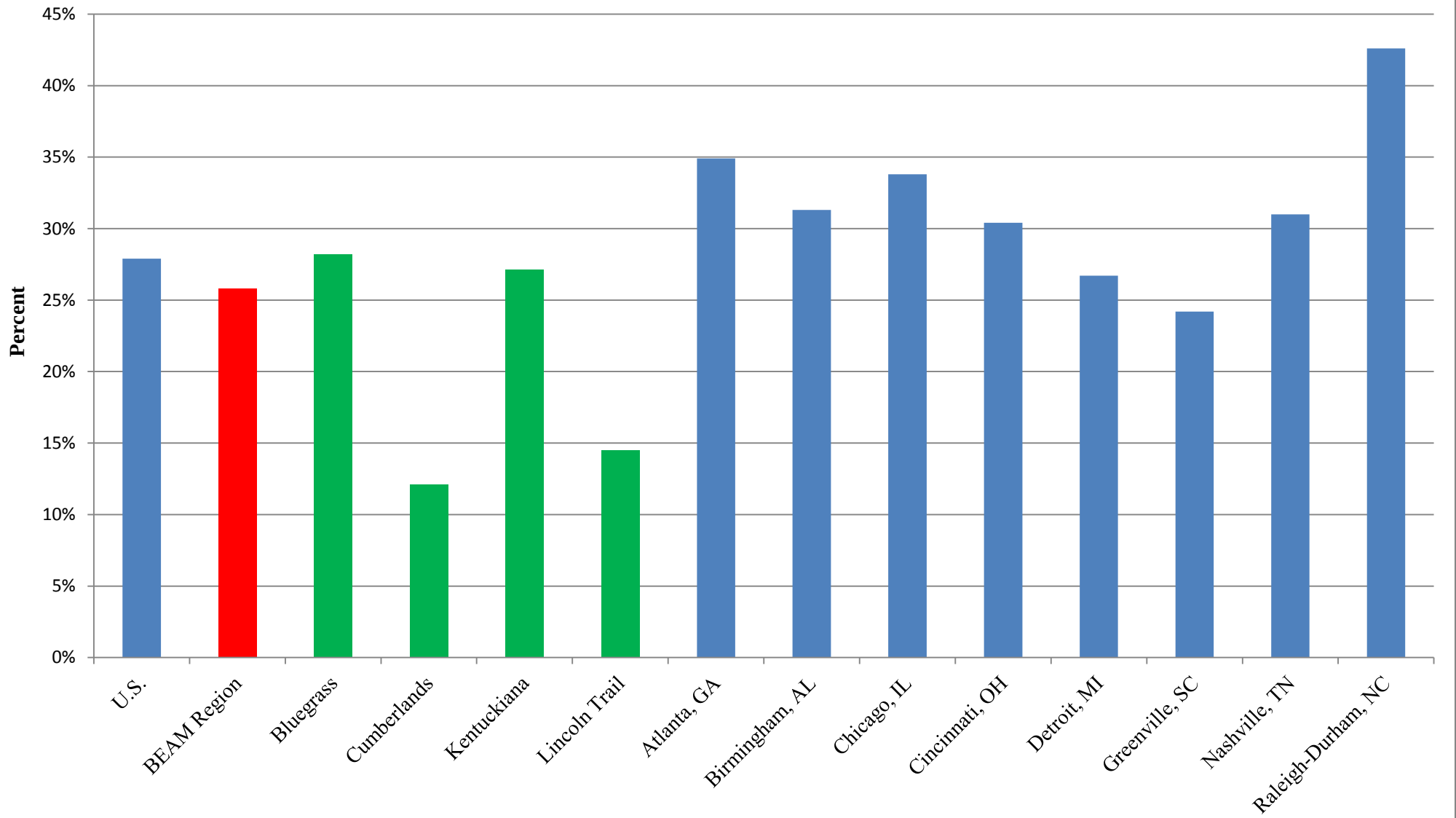


**Source: US Department of Education, IPEDS; for 49 Institutions Identified in the Greater Beam Region.
Total Completions: 36,483.**

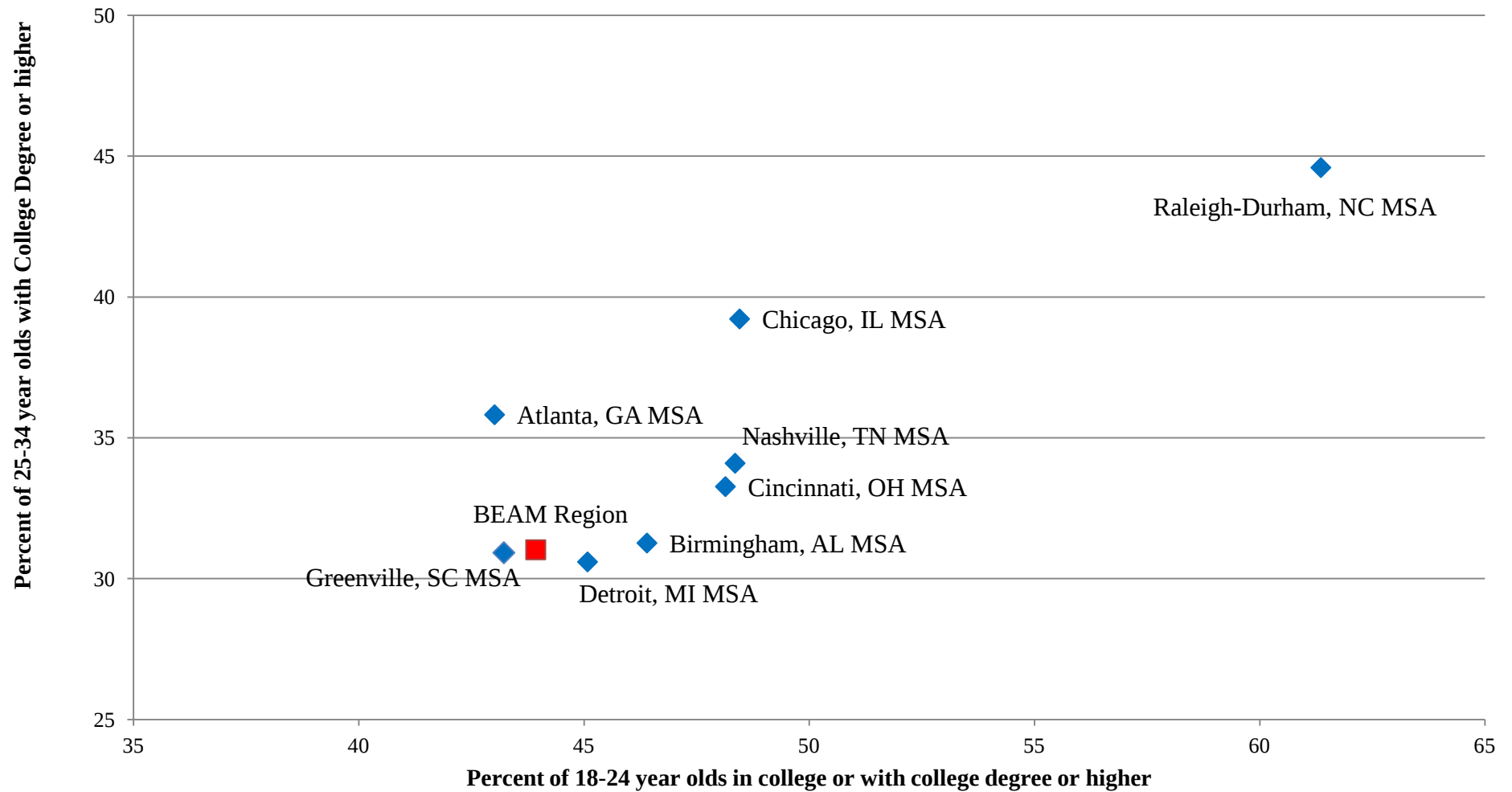
**Figure 13: State College Attainment Rankings
1990 vs. 2010**



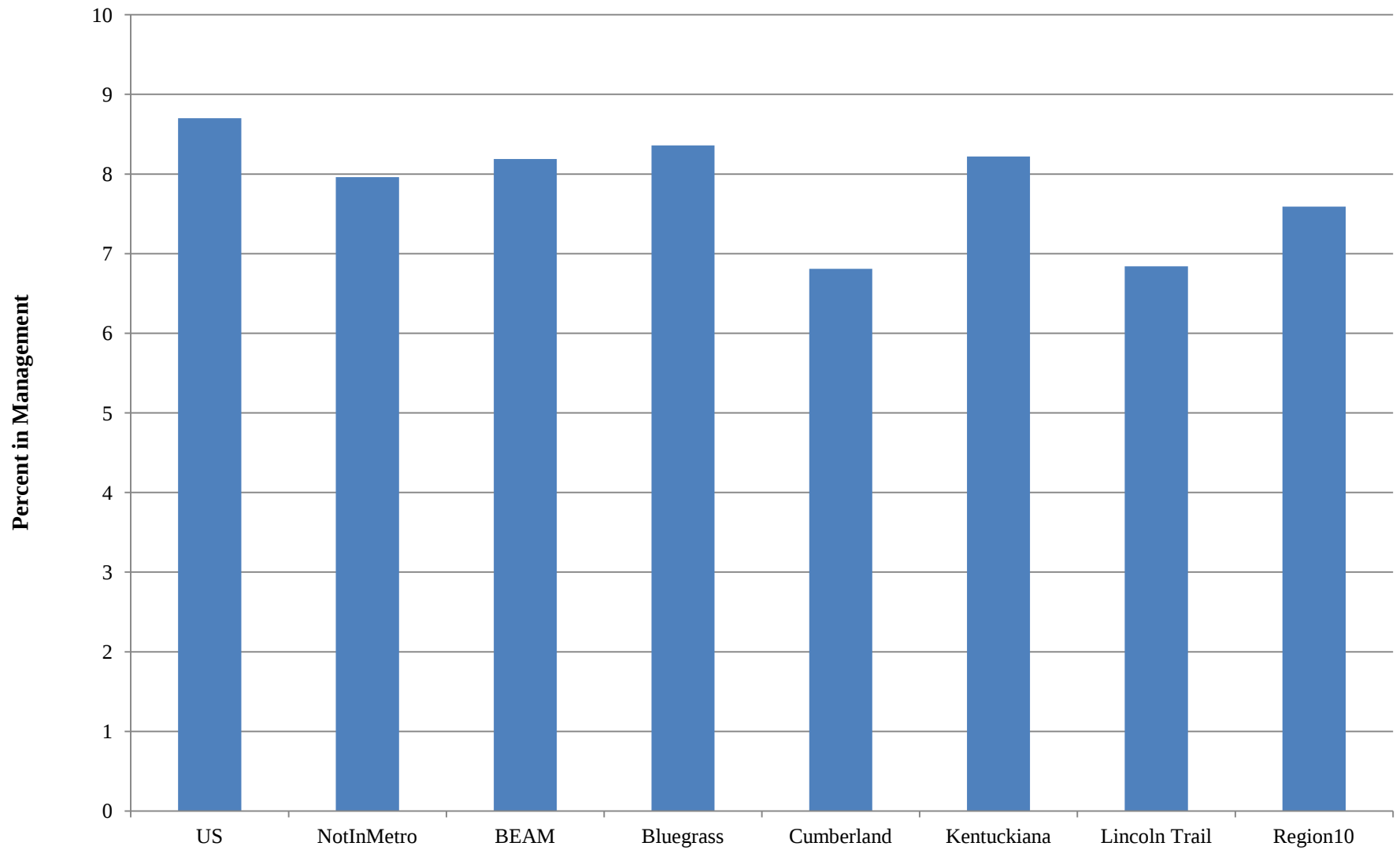
**Figure 14: Percent of Adults (25 and Older) with at least a B.A. Degree
BEAM Region and Comparable MSAs**



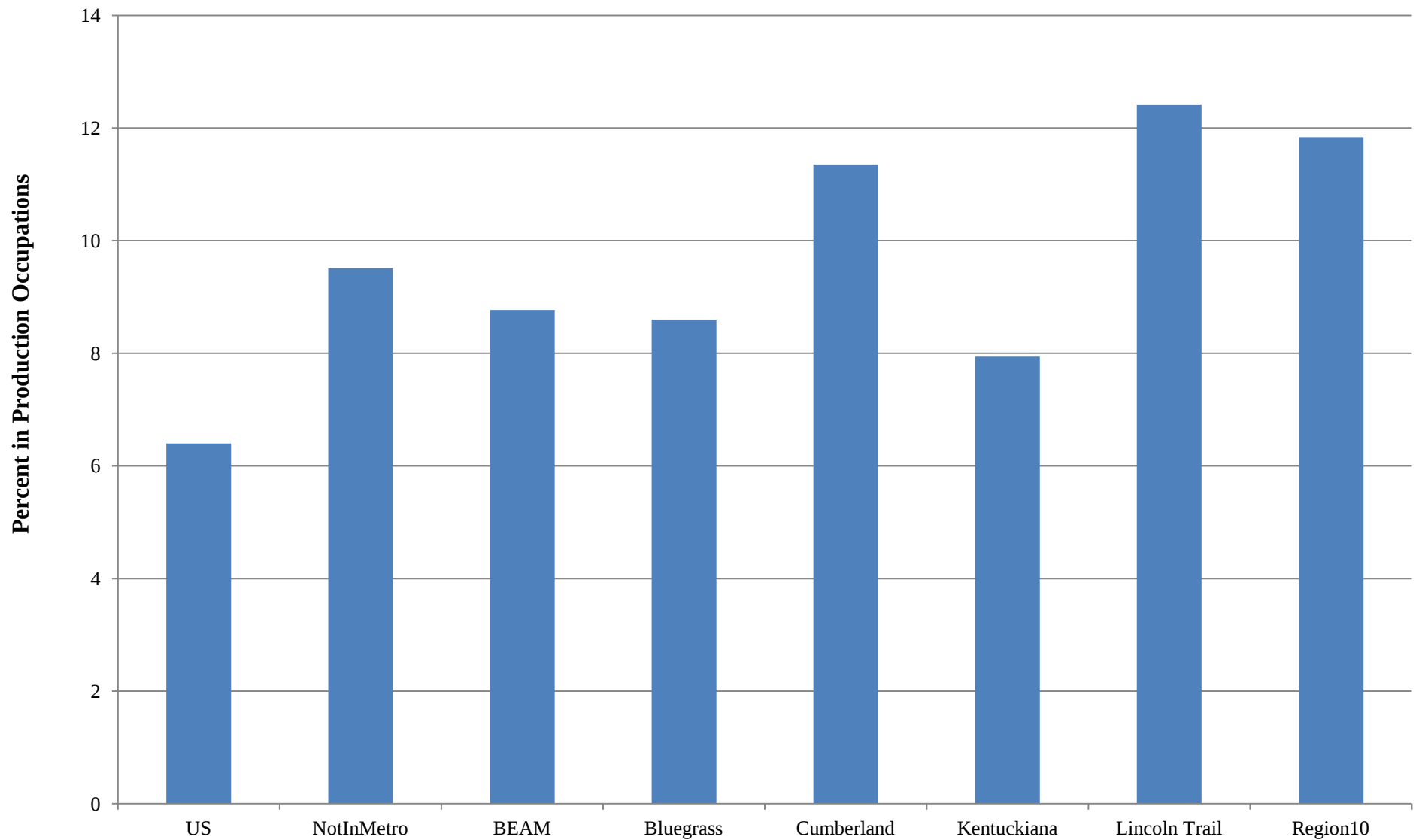
**Figure 15: College Attainment and Recent College Production
BEAM Region and Comparable MSAs**



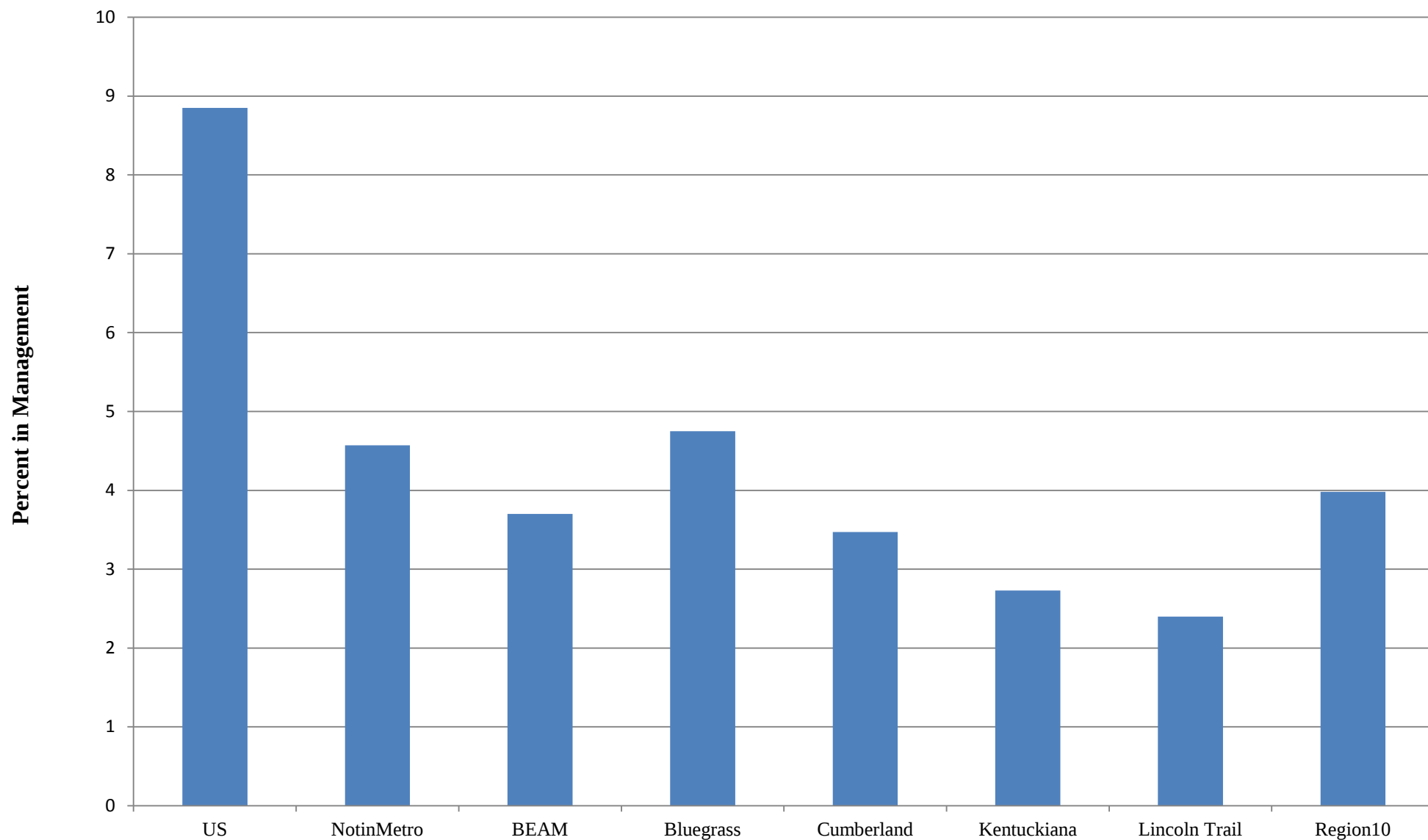
**Figure 16a: Percent of Total Employment in Management Occupations
WIA Regions Compared to other Non-Metro Regions**



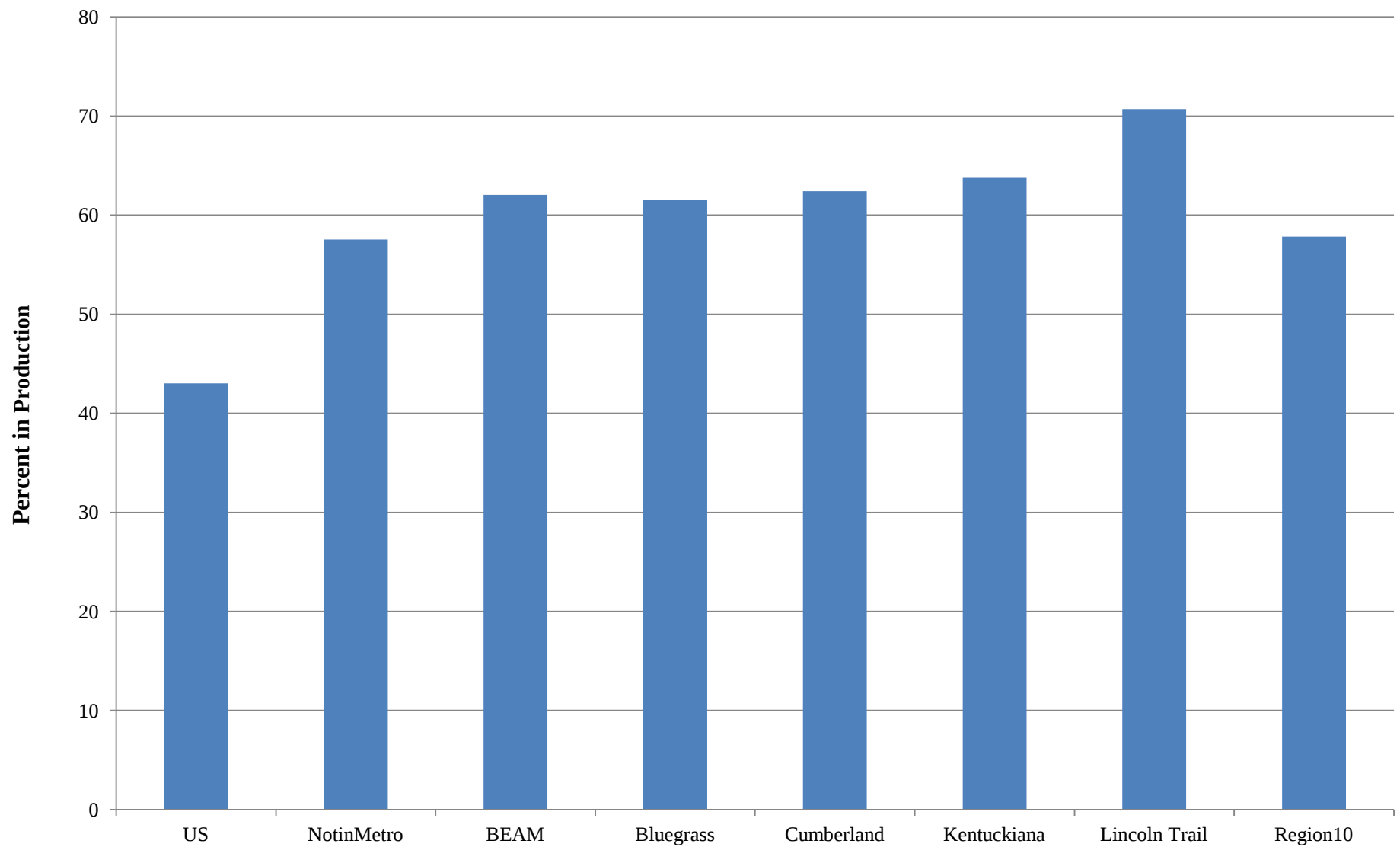
**Figure 16b: Percent of Total Employment in Production Occupations
WIA Regions Compared to other Non-Metro Regions**



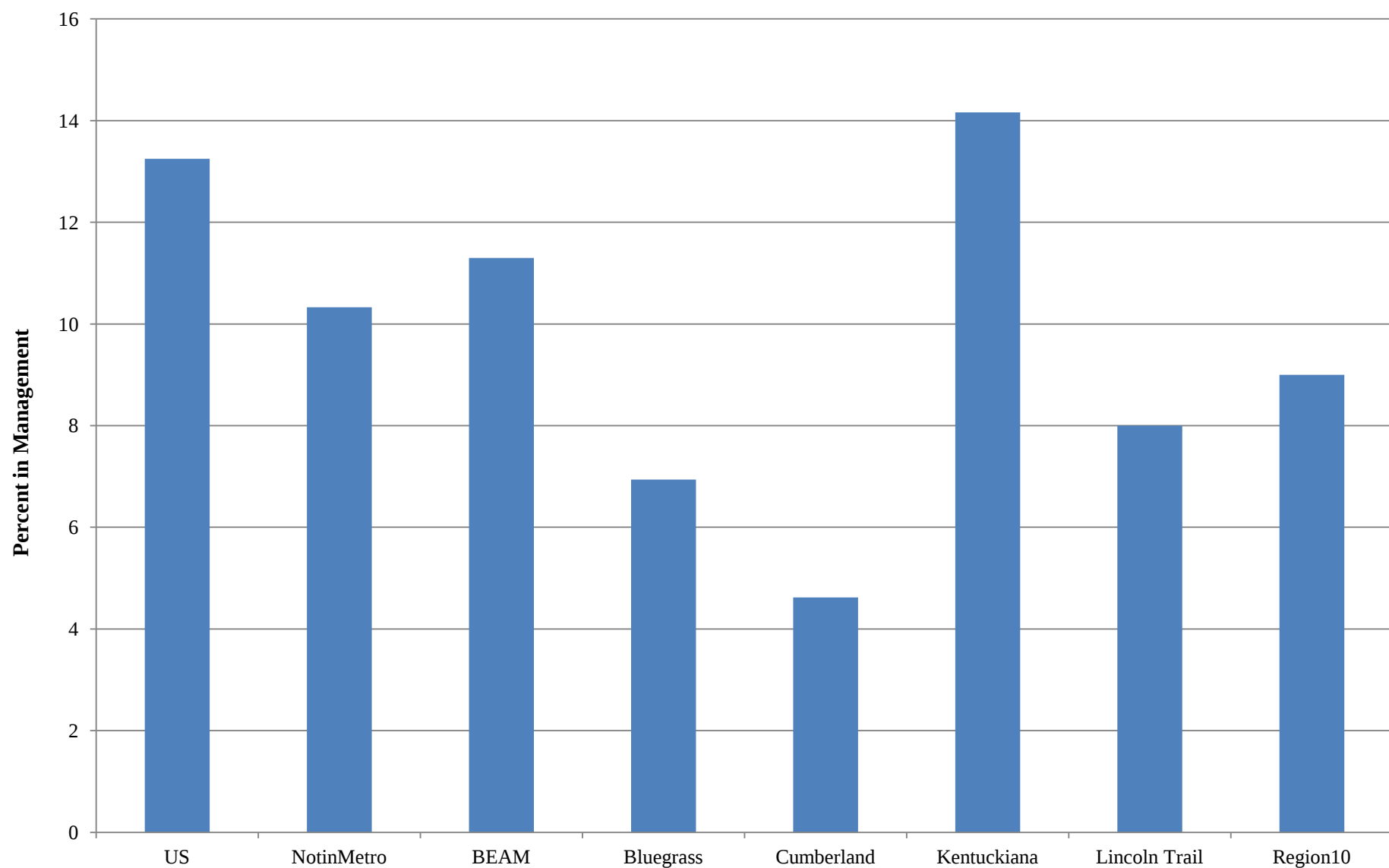
**Figure 17a: Percent Transportation Manufacturing Employment in Management Occupations
WIA Regions Compared to other Non-Metro Areas**



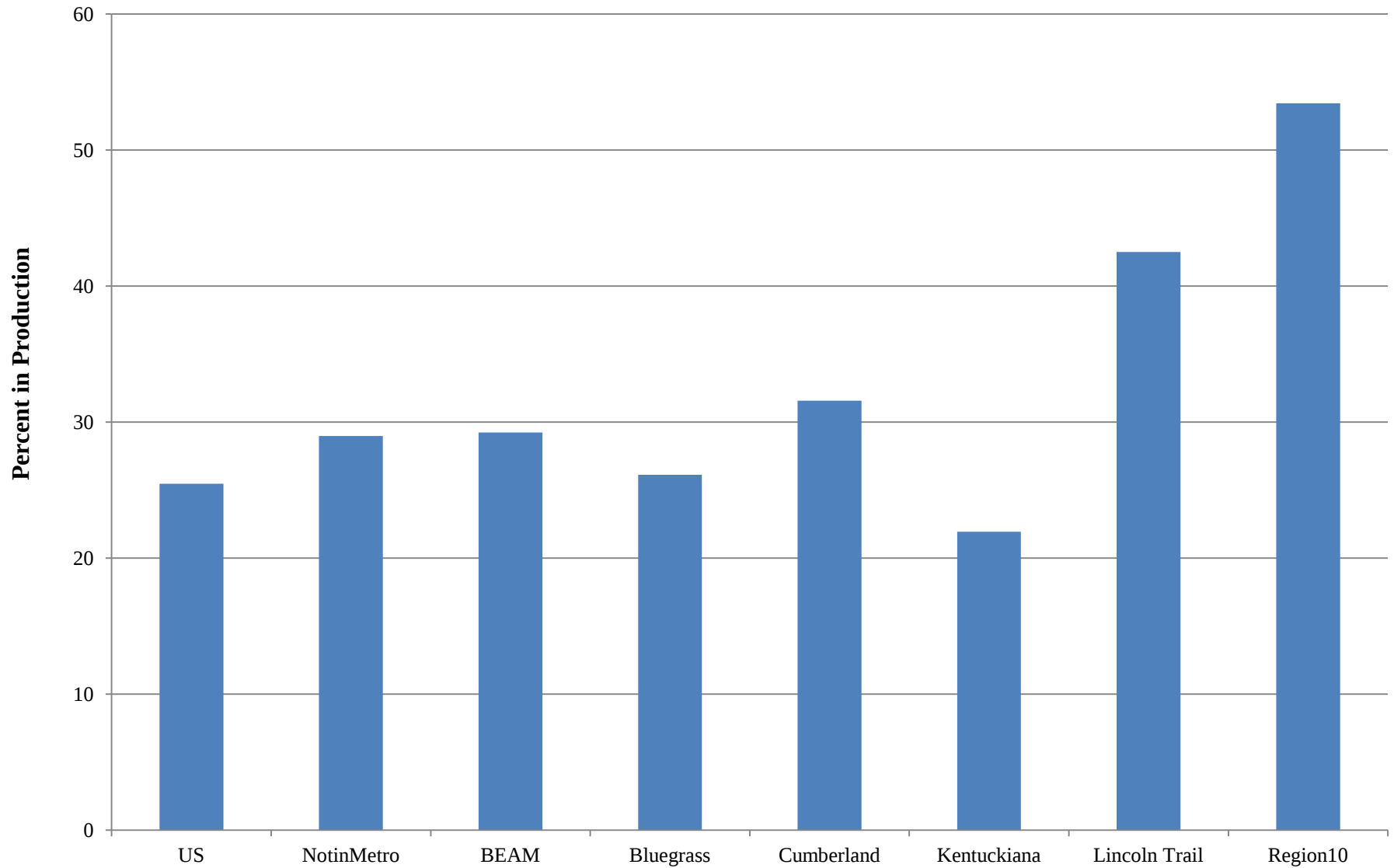
**Figure 17b: Percent Transportation Manufacturing Employment in Production Occupations
WIA Regions Compared to Other Non-Metro Areas**



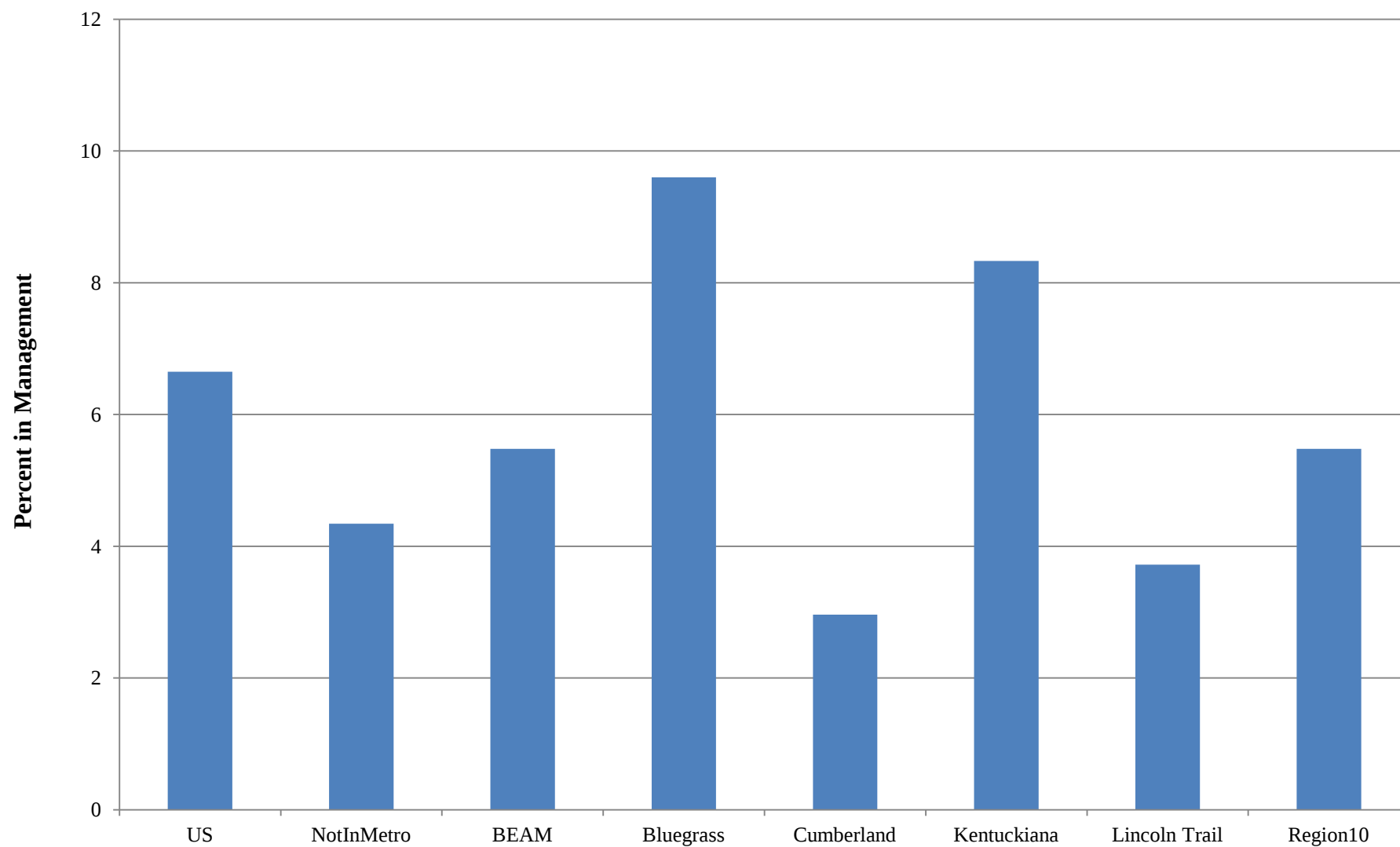
**Figure 18a: Percent of Beverage Manufacturing Employment in Management Occupations
WIA Regions Compared to Non-Metropolitan Areas**



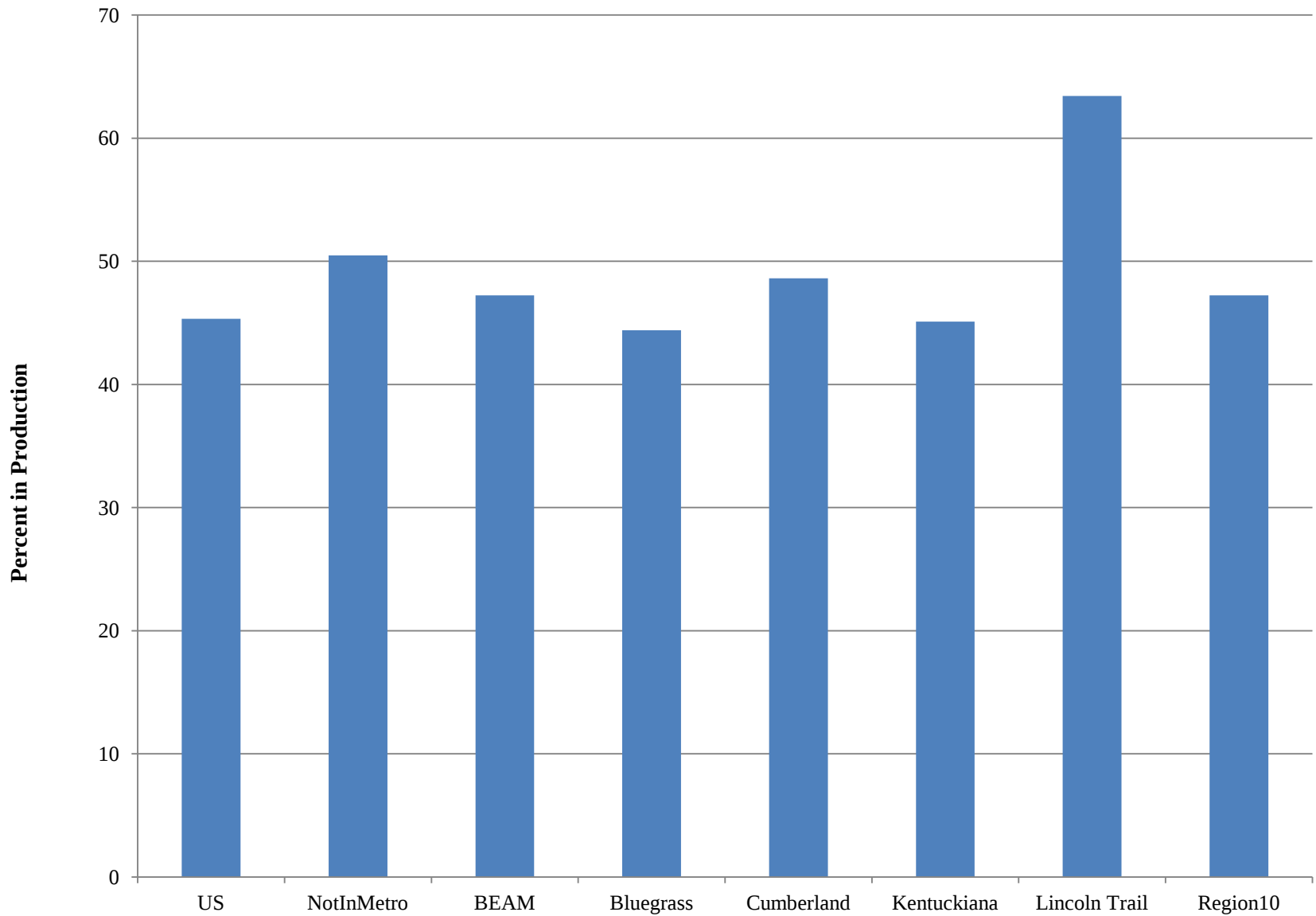
**Figure 18b: Percent of Beverage Manufacturing Employment in Production Occupations
WIA Regions Compared to Non-Metro Areas**



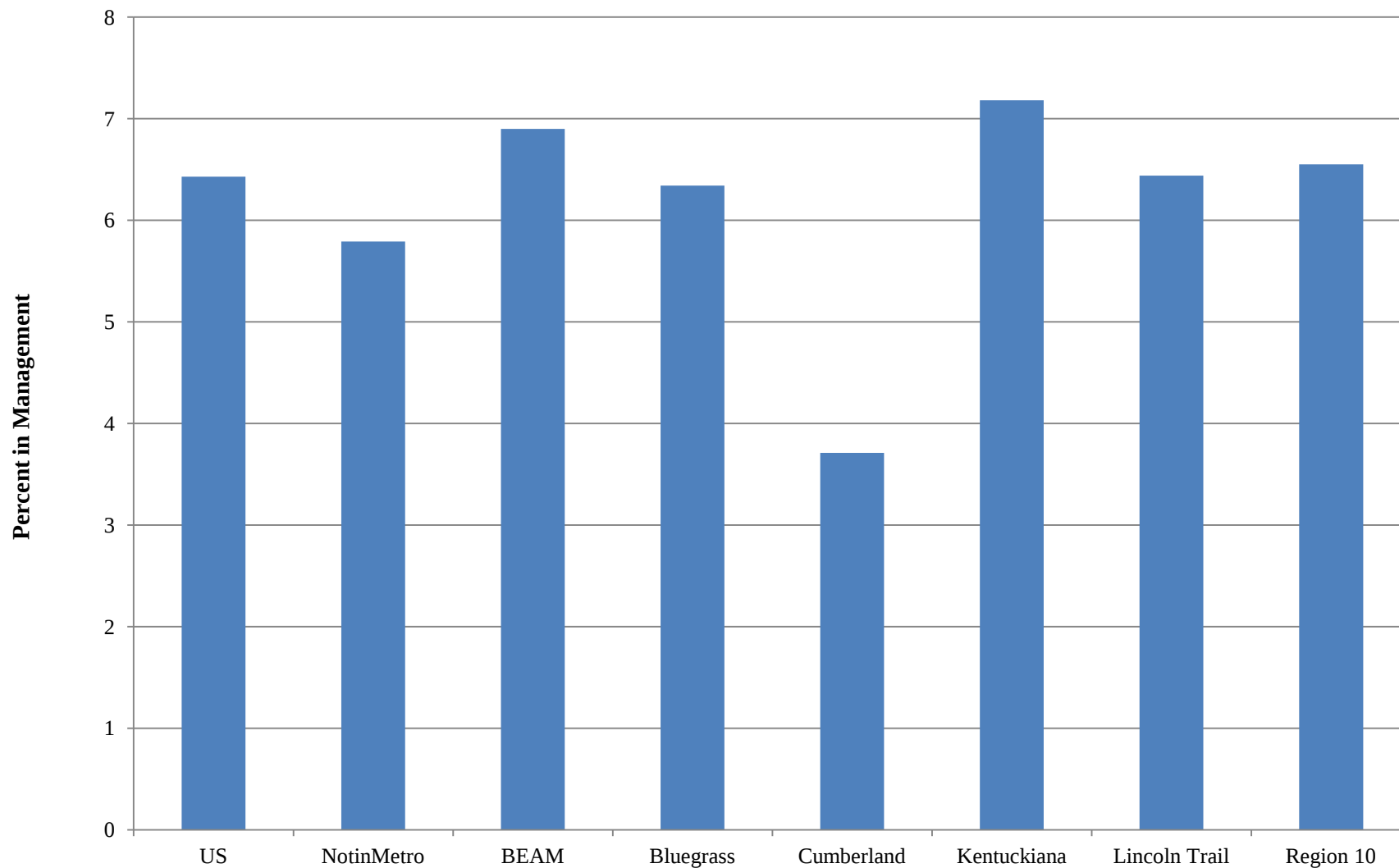
**Figure 19a: Percent of Food Manufacturing Employment in Management Occupations
WIA Regions Compared to Non-Metro Areas**



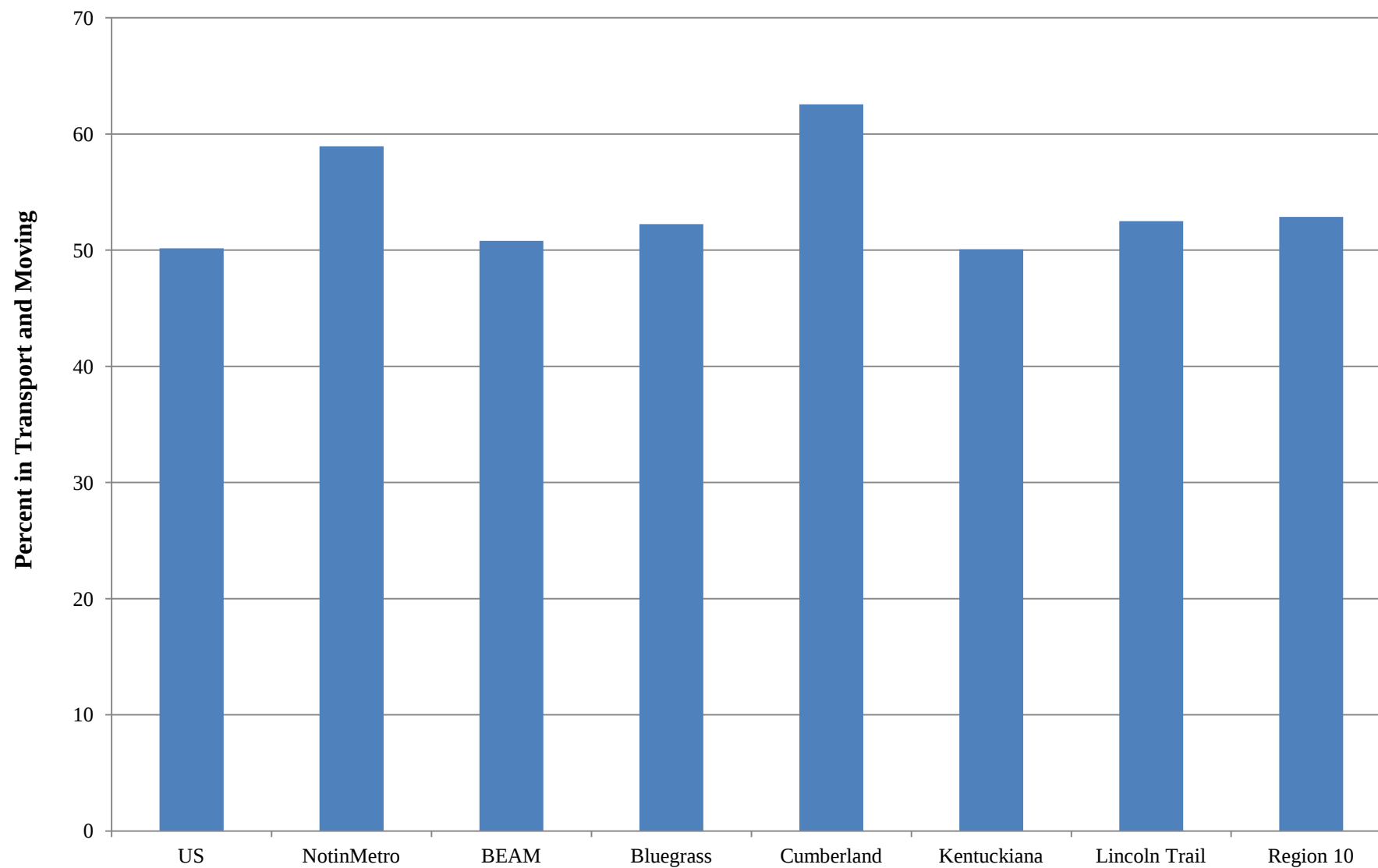
**Figure 19b: Percent of Food Manufacturing Employment in Production Occupations
WIA Regions Compared to Non-Metro Areas**



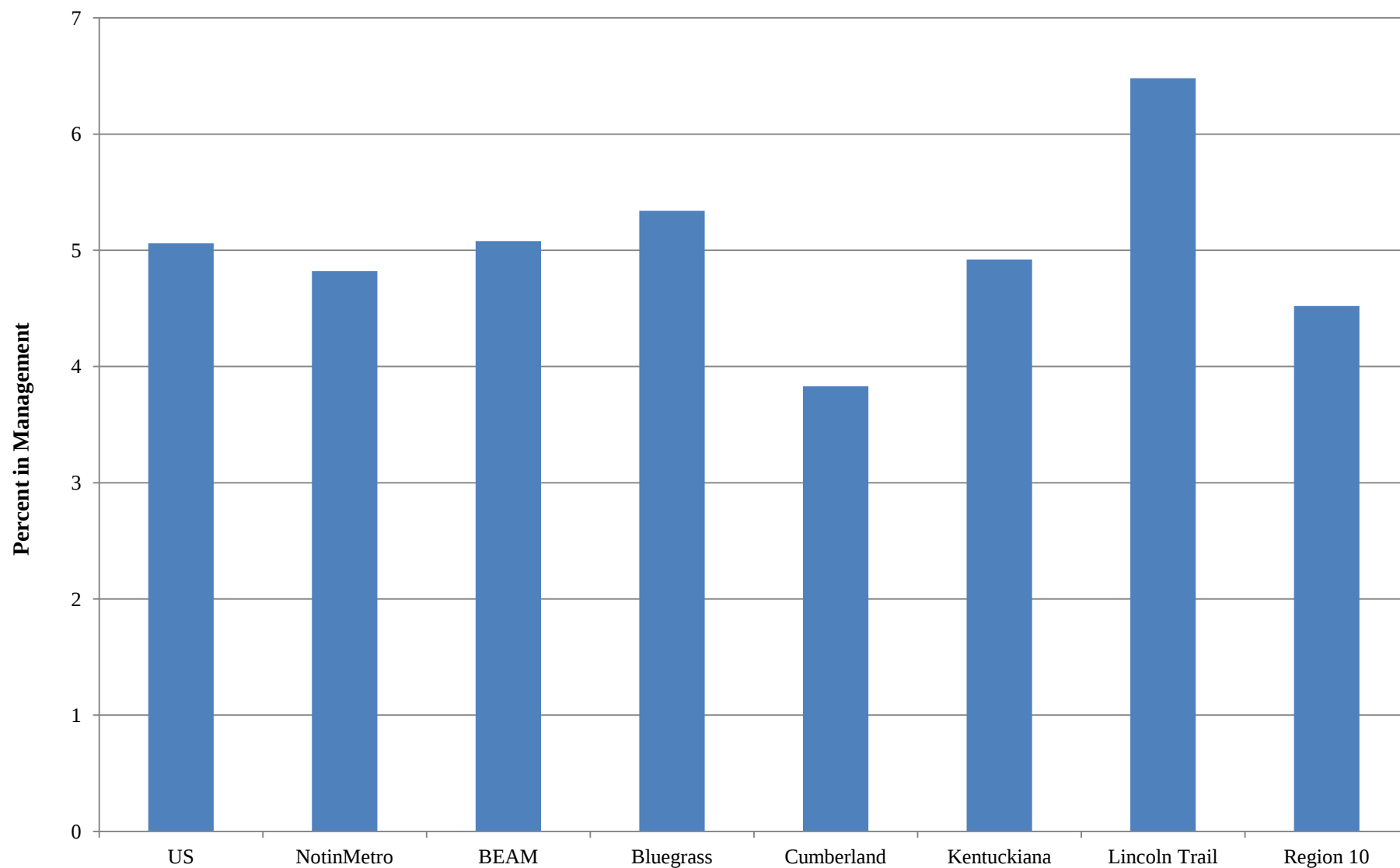
**Figure 20a: Percent Transportation and Warehouse Employment in Management Occupations
WIA Regions Compared to Non-Metro Areas**



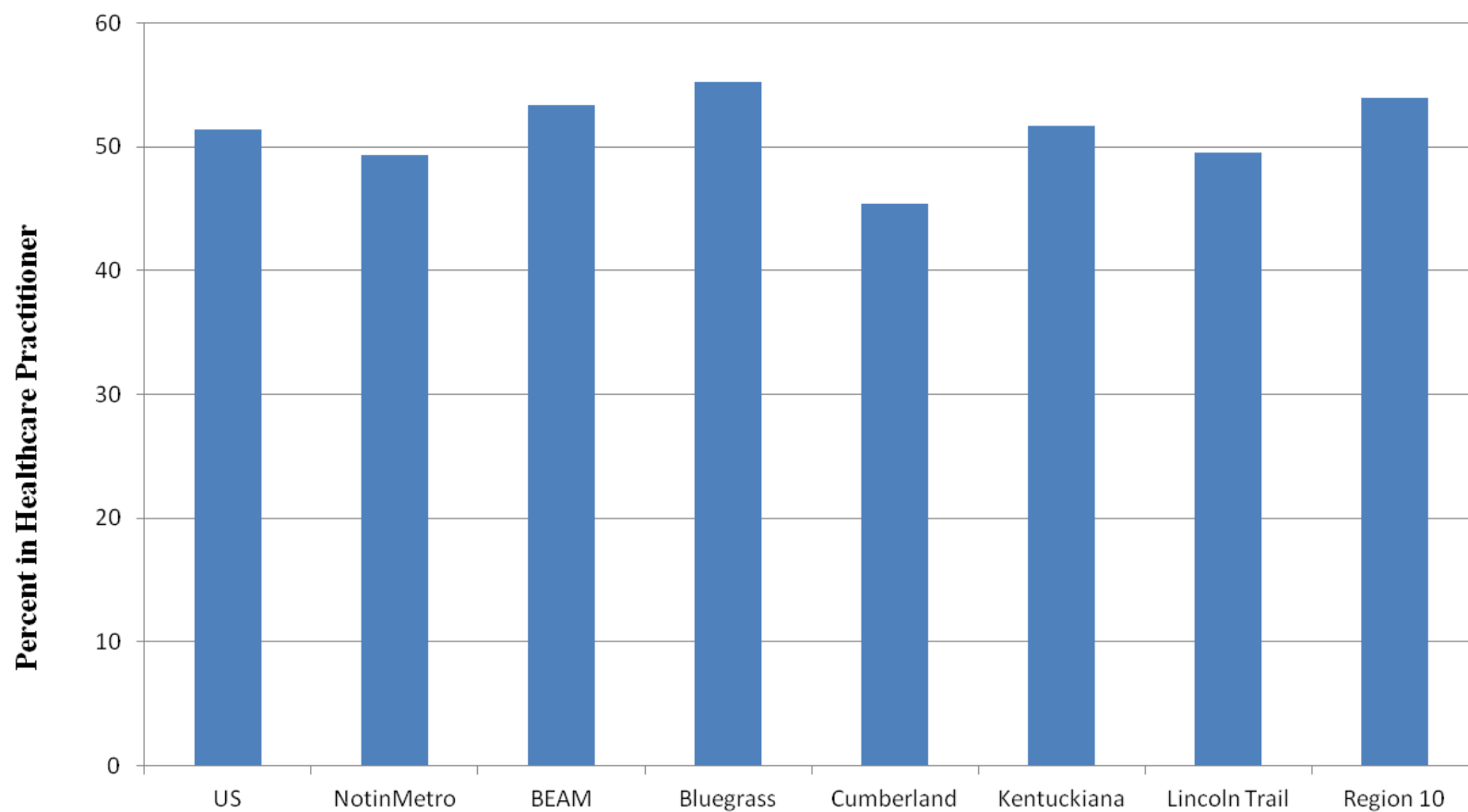
**Figure 20b: Percent Transportation and Warehouse Employment in Transport and Moving Occupations
WIA Regions Compared to Non-Metro Areas**



**Figure 21a: Percent of Hospital Employment in Management Occupations
WIA Regions Compared to Non-Metro Areas**



**Figure 21b: Percent Hospital Employment in Healthcare Practitioner and Technical Occupations
WIA Compared to Non-Metro Areas**



**Figure 21c: Percent Hospital Employment in Healthcare Support Occupations
WIA Areas Compared to Non-Metro Areas**

