Mapping your Future:
Do College Locations Impact Future Earnings and Job Placement?

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Abstract: This paper analyzes the effects of urbanization on college graduates' future earnings and job placement rates. I hypothesize that students attending institutions in urban areas benefit from local knowledge spillovers through greater exposure to human capital and R&D at nearby firms, which translates to higher future earnings and job placement rates. Using data from the 2016/2017 Baccalaureate and Beyond data set (National Center for Education Statistics), I employ three regression models to investigate the relationship between urbanization and annualized salaries, employment, and employment requiring a bachelor's degree. I find that urbanization does not have a significant effect on earnings or job placement. Due to limitations in my model design and data, this study warrants further research. Examining state and county characteristics (e.g., percentage of college graduates in the labor force, average incomes) will help account for the variation of human capital among urban areas and will likely affect future results.

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I. Introduction

For high school and community college students intending to pursue higher education at a four-year university, choosing which college to attend is a big decision. Many of these students consider factors relating to the quality of education provided by different institutions through measures such as their ranking, selectivity, and projected future earnings. Numerous papers have also tackled this question yet showcase mixed results. While some studies, such as Hoxby (1998), concluded that attending a more-selective university led to higher returns, others, including Dale & Kruger (2002), found that a student's academic aptitude was of the uttermost importance, regardless of the college they chose to attend.

Important factors that are often overlooked in these analyses are institutions' geographical locations. Past literature on the urban wage premium and human capital accumulation has argued that urban areas have tended to host greater populations of skilled, educated workers and that such environments have fostered greater productivity, insights, and transferring of skills (Abel & Deitz, 2011; Peri, 2002). Therefore, it is likely that students attending colleges in urban areas will have greater exposure to skilled employees at local firms.

Intuitively, experiences outside the classroom also contribute to students' educations and shape their future potential in the workforce. Students attending colleges in urban areas will likely benefit from knowledge spillovers from highly educated employees (human capital) in the surrounding area. These experiences will allow them to build connections, pick up skills, and better navigate the workforce as they apply for internships and full-time jobs. Consequently, these benefits translate to higher future earnings and job placement rates post-graduation.

Following this idea, I analyze the effects of human capital on college students. Specifically, I observe the urbanization of universities as I believe they contribute to the overall quality and educational experience provided by an institution. I hypothesize that students attending universities in more urbanized areas will have greater future earnings and greater rates of job placement than their counterparts (attending universities in less urbanized areas) on average.

To test this hypothesis, I use data from the 2016/2017 Longitudinal Study of the Baccalaureate and Beyond data set, published by the National Center of Education Statistics. In order to isolate the effects of an institution's location on the future earnings and job placement of its graduates, I use variables to control for a student's background, academic aptitude, and the selectivity of different universities.

I conclude that urbanization has no significant effect on future earnings or job placement. Based on past findings that there was substantial variation in human capital and educated workers even among urban areas, I believe this study warrants further research looking at additional characteristics of locations (Moretti, 2004b). In particular, observing the percentage of college graduates in the labor force, average incomes, and the number of firms within a certain radius may be insightful. If these factors prove to be significant, students choosing where to pursue higher education should consider the urbanization of their prospective universities when assessing the quality of education and subsequent returns they will receive.

II. Literature Review

Returns to College Education and Spillovers

There is extensive literature on the returns to a college education, namely focused on how differences in college characteristics can lead to variations in future earnings. Of these papers, several explored the importance of the quality of education provided by an institution. In addition, many of these papers used data from similar sources, including the National Longitudinal Study of the High School Class of 1972, and the Postsecondary Education Transcript Study.

The quality of education was proxied differently by different authors, using measures such as Barron's selectivity ranking, average SAT scores, expenditures by the university, whether it is a private or public institution, and net tuition. These papers also controlled for different student characteristics, such as academic aptitude and familial income. Dale & Krueger (2002) measured academic aptitude using data on the set of colleges that a student applied to (comparing students who were accepted and rejected from similar institutions), whereas Hoxby (1998) relied on SAT scores and high school grade point averages. Performance in college, including variables describing participation in extracurricular activities and college grade point averages, was also considered, as a student's academic performance may have varied between high school and college (James et al., 1989).

Due to the differing methods for accounting for student and institutional characteristics, it comes as no surprise that there is no general consensus regarding the effect of a university's quality on future earnings, regardless of the similar sources of data used. Dale & Krueger (2002) stated that students with similar academic aptitudes tended to have comparable future earnings, across differently-ranked universities, and James et al. (1989) concluded that a student's performance in college was of the greatest importance, regardless of the university attended. On the other hand, Hoxby (1998) suggested that attending a more-selective college was a better investment, and went so far as to say that even a student offered a full ride at a less selective university would be better off refusing the scholarship and paying more to attend a more renowned university. In all of these papers, a common limitation was that a student's success was only measured using monetary costs and returns, although a college education also results in non-monetary benefits that may vary across different institutions.

Other studies focus on the benefits of a college education with regards to spillovers in surrounding areas. Moretti (2004a) estimated such spillovers by comparing wages for similar individuals who worked in different cities. These cities were distinguished by their share of college graduates in the labor force. After accounting for city-specific demand shocks based on a lagged city demographic structure and the presence of a land-grant college, it found that a higher presence of college graduates increased wages among workers across all education levels. Specifically, a one-percentage-point increase in the supply of college graduates raised high school drop-outs' wages by 1.9%, high school graduates' wages by 1.6%, and college graduates' wages by 0.4% (Moretti, 2004a).

On a similar thread, many studies found that there were positive spillovers from universities, which led to greater innovation in surrounding areas. In each of these papers, innovation was defined differently, yet the overall conclusions remained consistent. One study showed that firms in close proximity to top universities tended to engage in more research and development and produced more valuable patents as a result. Any potential endogeneity regarding factors of the surrounding area not attributed to the presence of a university was eliminated using the random allocation of land-grant colleges and comparing these areas to runner-up locations for the colleges (Charles, 2019). Another measure for innovation involved new high-technology establishments, also known as “high tech plant births.” After controlling for local costs, demand, and agglomeration economies, a study found that marginal increases in research and development funding of universities corresponded to increased county probabilities of new high tech plant births. These spillover effects had also been found to extend up to 145 miles from the physical universities (Woodward et al., 2006).

Based on this idea of spillovers, Abel and Deitz (2011) hypothesized that institutions strengthened the human capital in surrounding areas (as they produced skilled graduates who joined the local labor force), but ultimately concluded that this was not necessarily the case. It found that universities did not directly build a local labor force, as graduates were highly mobile, and the amount of human capital depended on other supply and demand factors of the labor market. Thus, one can rule out any possible endogeneity between the presence and size of a particular college and the amount of human capital in the surrounding area.

Urban Wage Premium and Human Capital Accumulation

The wage premium and accumulation of human capital in urban areas are also topics that have been covered by many studies. According to several papers, urban workers made anywhere from 19% to 33% more than their non-urban counterparts having comparable education and skills (Glaeser & Mare, 2001; Yankow, 2006). The reasoning behind these statistics is a question tackled in subsequent papers.

Yankow (2006) examined competing hypotheses, and argued that about two-thirds of the wage premium could be attributed to ability sorting, with cities attracting workers having higher unmeasured skills and abilities. However, Phelan and Sander (2017) came to a different conclusion; it found that the premium was actually a result of intrinsic elements of cities and geographic regions, rather than individuals. Similarly, Glaeser & Mare (2001) found that there was no distinct difference in the skills and ability of urban versus non-urban workers, and suggested that living in cities made workers more productive and thus earn higher wages. Abel & Deitz (2011) concluded that knowledge spillovers were more apparent in larger cities, as individuals not only transferred skills among one another, but could also generate new insights as a group.

As urban areas tend to have a higher percentage of college educated workers than non-urban areas, it is clear that urban wage premium is also a result of the college education spillovers mentioned earlier (Moretti, 2004a; Moretti, 2004b; Peri, 2002). Upon its investigation of this relationship, Rosenthal and Strange (2008) found a positive trend between wage and the spatial concentration of employment within a five-mile radius. These effects sharply declined with distance, indicating that the presence of college-educated workers was of utmost importance.

Regardless of the specific phenomena behind the urban wage premium, it is evident that more urban areas host a higher percentage of skilled (and often educated) workers who benefit from more economic activity, innovation, and personal growth (through higher wages and the exchange of skills) (Abel & Deitz, 2011; Moretti, 2004a).

Urbanization of Universities

With regards to how urbanization affects university students, a paper by Hamrick et al. (2004) observed the impact of the degree of urbanization of a college in conjunction with factors such as institutional expenditures and financial aid on graduation rates. It concluded that significant variables were the institution's Carnegie classification status, a lower acceptance rate, and an interaction term between the presence of a medical, dental or veterinary program and a more urbanized location. This paper provided insight into the effects of urban areas, but focused more on resource allocation decisions and recommendations to universities rather than students' futures.

Although the existing literature provides a fairly comprehensive overview of three main topics (the effects of a college's quality on future earnings, the spillovers of universities, and the urban wage premium), there is limited literature that brings them all together, considering the impact of a college's geographical location on student success (specifically, future earnings and job placement).

III. Theoretical Discussion

As outlined in the literature review, several papers have tackled the idea of varying returns to a college education based on different indicators for college quality. These indicators most commonly involve factors such as average test scores and school rankings, yet I believe that a college's physical location can also attribute to the overall quality of an institution.

Although there is no consensus regarding the causes of the urban wage premium and human capital accumulation in urban areas, these phenomena in themselves are insightful; urban areas tend to host a larger percentage of college-educated workers who earn premium wages (Moretti, 2004a; Moretti, 2004b; Peri, 2002; Rosenthal & Strange, 2008). These local workers also benefit from knowledge spillovers as they transfer skills among one another and generate new insights collectively (Abel & Deitz, 2011).

In this paper, I apply similar logic to students attending universities in urban areas. I believe that such students may benefit from comparable local knowledge spillovers; these students have access to high percentages of local skilled and educated workers and the R&D occurring at nearby firms.

In this sense, I argue that learning occurs outside the classroom as well. Exposure to a greater accumulation of human capital will aid students as they pick up skills, increase their productivity, build more connections, and learn how to navigate the workforce. I hypothesize that these spillovers will translate to higher rates of job placement and increased future earnings.

Following the framework set by previous papers, I believe it is important to account for a student's academic aptitude, background characteristics, and institutional characteristics, all of which can impact future earnings and job placement (Dale & Krueger, 2002; Hoxby, 1998; James et al., 1989). Furthermore, different characteristics of colleges may likely have disparate effects on different samples of the student population. James et al. (1989) and Dale & Kreuger (2002) concluded that race, parental income, and parents' education levels had a strong impact on future earnings as they influenced a student's choice of college and probability of completing college. Similarly, Hoxby (1998) found that attending a higher quality, more selective institution was more beneficial for students after accounting for such factors. In particular, attending more selective universities led to higher payoffs among disadvantaged students (defined by parental education levels and income).

As I believe that the degree of urbanization contributes to the quality of an institution, I suggest that attending college in an urban area may be more beneficial for students of different backgrounds. Students with degree-holding, wealthy parents may already benefit from support, industry connections, and insight on how to navigate the workforce, whereas their counterparts will not. Therefore, I conjecture that attending a university in an urban area will have a greater impact on students coming from more disadvantaged backgrounds. I perform a similar analysis on students of different races, as I suppose that students belonging to historically underrepresented groups and minorities may also be affected by an institution's urbanization at different rates.

In its study of various institutional characteristics, Hamrick et al. (2004) concluded that the region of an institution (e.g., New England, Mideast, Great Lakes) had a significant effect on graduation rates. By incorporating this idea in my analysis, I argue that institutional regions may also affect students' success in other ways, as measured by future earnings and job placement. Similarly, various papers suggested that there were regional differences in wages based on variations in human capital, R&D of local firms, customs, endowments, and other unobserved characteristics of geographic areas (Abel & Deitz, 2011; Kiefer & Smith, 1977; Phelan & Sander, 2017). As there are compositional differences of urban and nonurban areas among regions, I am interested in exploring how the urbanization of an institution may affect students attending college in different regions as well. I hypothesize that the impact of urbanization will be greater for students attending universities in regions with modest amounts of human capital and R&D; if there are limited skilled workers and opportunities within a region, attending a university in proximity to local firms may make all the difference for securing a high paying job upon graduation.

IV. Empirical Strategy

Approach

In order to examine and isolate the impact of a university's degree of urbanization on the future success of its graduates, I use ordinary least squares linear regression models and logistic regression models. I observe the effects of urbanization on earnings and job placement (within 12 months after BA completion) and control for a student's academic aptitude, location of origin, and various demographic characteristics. I use the degree of urbanization of the area in which a university is located to assess the college's geographical location, and the starting annualized pay of the respondent's first job to estimate future earnings (*Model 1*). When observing job placement, I focus on if the respondent was ever employed for pay (*Model 2*) and if the first job acquired required a Bachelor's degree (*Model 3*).

It is important to control for a student's academic aptitude because it is likely that more intelligent, high-achieving students will tend to have higher future earnings on average, regardless of the type of institution they attend. I use students' ACT composite scores, overall GPAs, and selectivity of the institution attended to control for aptitude. I also include whether or not the student used their university's career planning services. This variable serves as a proxy to determine if the student was actively looking for a job.

In addition, it is likely that students who grew up in an urban area in close proximity to innovative firms, or a high percentage of college graduates, will already benefit from local knowledge spillovers, and will likely have higher future earnings than their counterparts originating from different areas, irrespective of the college they choose to attend. Therefore, controlling for a student's location of origin is a vital step in my analysis. I use the degree of urbanization of their location of origin (based on their permanent address provided to the university) to control for this factor. Similarly, students with wealthy and/or college educated parents may already have more support and insight on how to navigate the workforce. This may help them secure a high paying job, regardless of where they attend college. For these reasons, I include total income and the parents' highest education level in my model.

Demographic characteristics, such as a student's race and gender, may also affect future earnings or influence where a student chooses to attend college, so I account for these variables in my model as well.

Primary Models

Future Earnings

I observe the effects of urbanization on future earnings using the following model.

$$\begin{aligned} salary_i = \beta_0 + \beta_1 urbanization_i + \boldsymbol{selectivity'}_{\boldsymbol{i}}\boldsymbol{\beta_2} + \beta_3 gender_i + \boldsymbol{race'}_{\boldsymbol{i}}\boldsymbol{\beta_4} \\ + \beta_5 income_i + \beta_6 parenteducation_i + \beta_7 addressurbanization_i \\ + \beta_8 ACTscore_i + \beta_9 GPA_i + \beta_{10} careerservices_i + \epsilon_i \end{aligned} \quad (1)$$

As mentioned earlier, $salary_i$ is measured using the starting annualized pay of the respondent's first job (within 12 months after BA completion).[2] The dummy variable $urbanization_i$ indicates the degree of urbanization of the university's surrounding area. For this variable, a value of 0 indicates that the university is located in a rural area or a town, and a value of 1 indicates that it is located in a suburb or city. Since I am interested in observing the effect of the urbanization of

[2] Ideally, I would apply a log transformation on the $salary_i$ variable as earnings tend to be skewed to the right and follow a log-normal distribution. However, such a transformation is not possible due to constraints of the public-use Baccalaureate and Beyond data set.

a university on future earnings, β_1 is my coefficient of interest. If this coefficient is found to be significant, it will support the hypothesis that attending a college located in a more urbanized area will lead to higher future earnings.

In this model, $\boldsymbol{selectivity_i}$ is a vector containing a set of dummy variables reflecting the selectivity of the institution attended, and includes dummies for the school being 'not selective' (which includes open admission and minimally selectivity), 'moderately selective,' and 'very selective.' The vector $\boldsymbol{race_i}$ contains dummy variables indicating the race of the student. It includes dummies for 'White,' 'Black or African American,' 'Hispanic or Latino,' 'Asian,' and 'Other Race' (which includes Native Hawaiian/Pacific Islander, American Indian/Alaska Native, More than one race). The variable $parenteducation_i$ indicates the parents' highest education level, and can take on a value of 1 if the parent obtained an Associate's or Bachelor's degree, and 0 otherwise. Gender is indicated by the dummy variable $gender_i$, which takes on a 0 if the respondent is male and a 1 if the respondent is female.

The variable $addressurbanization_i$ is defined similarly to $urbanization_i$ and represents the degree of urbanization of the student's home address. $ACTscore_i$ indicates the student's composite score on the ACT test (ranging from 1 to 36), and GPA_i represents the student's college GPA (on a 4.0 scale). Lastly, $careerservices_i$ is a dummy variable indicating whether or not the student used the university's career planning services. This variable serves as a proxy for whether or not the student was actively looking for a job.

Job Placement: Ever Employed for Pay

The following logistic regression model (estimated as a logit) allows me to analyze the impacts of urbanization on job placement. The response variable, $employed_i$, is a dummy variable and reflects if the student was ever employed for pay within 12 months after BA completion.

$$\begin{aligned} employed_i = \beta_0 + \beta_1 urbanization_i + \boldsymbol{selectivity'_i \beta_2} + \beta_3 gender_i + \boldsymbol{race'_i \beta_4} \\ + \beta_5 income_i + \beta_6 parenteducation_i + \beta_7 addressurbanization_i \\ + \beta_8 ACTscore_i + \beta_9 GPA_i + \epsilon_i \end{aligned} \quad (2)$$

In this model, the variables have similar interpretations as in Model 1, specified earlier. For this regression, I use a subset of the population who indicated that they used their university's career planning services, to focus on students who were actively looking for employment.

Job Placement: First Job, Requires a Bachelor's Degree

This logistic regression model (estimated as a logit) allows me to focus on the type and quality of employment a respondent undertakes within 12 months after BA completion.

$$\begin{aligned} employedBA_i = \beta_0 + \beta_1 urbanization_i + \boldsymbol{selectivity'_i \beta_2} + \beta_3 gender_i + \boldsymbol{race'_i \beta_4} \\ + \beta_5 income_i + \beta_6 parenteducation_i + \beta_7 addressurbanization_i \\ + \beta_8 ACTscore_i + \beta_9 GPA_i + \beta_{10} careerservices_i + \epsilon_i \end{aligned} \quad (3)$$

The response variable, $employedBA_i$, is a dummy variable representing whether or not a student's first job upon graduation requires a bachelor's degree. This variable only applies to respondents who were employed within 12 months of graduating; therefore, a 0 value indicates that the respondent worked in a job that does not require a bachelor's degree.

V. Data Overview

The data set I use comes from the public-use Baccalaureate and Beyond (B&B) data set published by the National Center of Education Statistics (NCES). I utilize the 2016/2017 National Longitudinal Study, which is a nationally representative longitudinal study of students who completed the requirements of a bachelor's degree during the 2015-2016 academic year. This survey contains covers students' undergraduate experiences, and includes information regarding college applications, participation in financial aid programs, and postbaccalaureate employment and education (National Center for Education Statistics, 2019). The data contains the variables of interest which I specified in my model above, and the coarsened number of cases provided is 11,800.[3]

Since I want to focus on the success of students who pursue full-time jobs directly after graduation, I employ a subset of students who do not intend to continue their education in my analysis. Specifically, I filter the data set by students who are not enrolled in a degree/certificate program within 12 months of graduation. The coarsened number of observations in this subsample is 9,200. As shown in Figure 1, students who are not enrolled in such a program upon graduation spend much more time working than their counterparts. For example, of the students who are employed for over 75% of the year following graduation, over 80% are not pursuing a degree/certificate.

To observe how students' demographic and socioeconomic characteristics impact their future earnings and rates of job placement, I observe different subsets of my data. Figures 2 through 4 highlight the effects of the parents' education level (whether or not they obtained a

[3] Due to the nature of the public-use Baccalaureate and Beyond data set, I rely on the coarsened number of observations within my sample.

college degree), and focus on the independent variables in each of my models (starting annualized salary, employment, and employment requiring a degree). In all three cases, it is clear that having a parent who has obtained a degree is beneficial for students.

Starting salaries of students greatly vary by race. As shown in Figure 5, Asian and White students make up the majority of students earning above about $41,500 per year, whereas ‘Other Race’ and Hispanic or Latino students make up the majority of students earning less than about $16,000 per year. Similarly, Figure 6 highlights the discrepancy among employment statistics between racial groups. While 94.5% of White graduates are employed, 89.1% of Black or African American students are employed, 88.6% of Hispanic or Latino students are employed, and 84.1% of Asian students are employed. These percentages are not consistent with employment requiring a Bachelor’s degree. The number of students employed in such jobs are generally lower, though Asian and White graduates tend to be employed at higher percentages, 48.8% and 39.3%, respectively (Figure 7).

In order to see the effects of a student’s federal aid status, I observe how starting salaries and percentages of employment are affected by cumulative Pell Grant amounts.[4] As visualized by the trend in Figure 8, larger Pell grant amounts are associated with lower starting salaries. Similarly, students with larger grant amounts have lower percentages of employment, including all employment and employment requiring a degree (Figures 9 and 10).

Based on the data, it is clear that demographic and socioeconomic factors impact students’ career trajectories upon graduation.

[4] Due to limitations of the public-use data, I use the cumulative Pell Grant amounts to visualize the effects of federal aid on future earnings and job placement in my figures. In regressions, I use all types of federal aid.

VI. Results

I apply the regression models specified earlier first to my entire student population, and second to different subsamples of my student population based on demographic and socioeconomic characteristics and geographical regions of institutions.

Primary Models

Based on the results of my primary models, students attending institutions in urbanized locations have lower annualized salaries, yet higher rates of overall employment and employment in a job requiring a Bachelor's degree. That being said, the coefficient on the $urbanization_i$ variable is not significant in any model. This indicates that the degree of urbanization of a university does not have a significant impact on the returns to higher education, as measured by future earnings and job placement. Estimated marginal regression coefficients on the degree of urbanization variable for Models 1, 2, and 3 can be found in Table 1.[5]

Table 2 highlights the regression coefficients of all variables in each model. In all models, ACT scores and college GPAs are significant, indicating that academic aptitude plays a large role in the future success of students. Other variables are only significant in one model. For example, 'very selective' is only significant in Model 3. In this case, we can determine that attending a very selective university, holding the other variables constant, will lead to a higher chance of obtaining a job requiring a BA after graduation. These phenomena tell us that

[5] The estimated marginal effects for my logistic regression models are found by multiplying my output coefficients by 0.25. The final value represents the upper bound of the marginal effect.

traditional predictors of student success, such as test scores, GPAs, and the selectivity of universities, have significant impacts on future earnings and job placement.

Race and Socioeconomic Status

In order to assess whether urbanization has disparate effects on students from disadvantaged backgrounds and historically underrepresented racial groups, I examine the results of my models on subgroups of my population. I create subsets of my sample based on race, socioeconomic characteristics (as defined by federal aid status and parental education levels), and a combination of race and socioeconomic characteristics.

When observing these results, the coefficient on the $urbanization_i$ variable is not significant in subsamples categorized by parental education and federal aid status (Table 3), or in subsamples defined by a combination of the aforementioned socioeconomic characteristics and race (Table 5). Similarly, Tables 7 and 8 highlight how the differences in coefficient values across these groups are not significant.

However, the coefficient of interest is significant ($p < 0.05$) in the subgroup of Black/African American or Hispanic/Latino students in Model 3 (indicating whether or not a student's first job upon graduation requires a bachelor's degree). As shown in Table 4, the estimated marginal effect is 0.1105, suggesting that students of Black/African American or Hispanic/Latino descent are about 11% more likely to be employed in a job that requires a bachelor's degree upon graduation if they attend university in a more urbanized location. Consequently, the difference in coefficients among subsamples by race between White and Black/African American or Hispanic/Latino students and Other Race and Black/African

American or Hispanic/Latino students are significant.[6] The estimated marginal values are about -0.122 ($p < 0.05$) and 0.29275 ($p < 0.05$), respectively, and can be observed in Table 9. However, these results do not hold under the assumptions of multiple hypothesis testing.[7] Therefore, these significant values are likely due to random error.

Regions

As there are regional variations in the composition of human capital, R&D at local firms, and other customs and endowments, I explore how the effects of urbanization vary by institutional regions. I create subsamples and apply my three models to groups based on the following regions:

> New England, Mideast, Great Lakes, Plains, South East, Southwest, Rocky Mountains[8], Far West

Table 6 displays the values of the coefficient of interest for each regional subsample, and the effect of urbanization is not significant across my three models.[9] In the case of regional differences among the urbanization coefficients, the value is significant in one case: the Mideast region compared to the South East region in Model 2 (as shown in Table 11), where the value is about -0.46275 ($p < 0.05$). This means that students attending more urbanized universities in the Mideast region face different effects than students attending universities in the South East region

[6] An F-test would be a more appropriate method for comparing regression coefficients between more than two groups, however this is not possible due to constraints of the public-use data. Therefore, I use the T-test as an alternative.
[7] I apply the Bonferroni correction and set n = 17, where n is the number of hypotheses I am testing.
[8] The Rocky Mountains region sample does not contain the $\boldsymbol{selectivity_i}$ vector due to limited observations and corresponding collinearity concerns.
[9] Due to collinearity issues and a limited sample size, the $\boldsymbol{race_i}$ vector is not included in the regional subsample regressions.

on job placement as measured by employment for pay. After accounting for multiple hypothesis testing, this value is not found to be significant, indicating that this is a result of random error. Similarly, the regional differences in the $urbanization_i$ coefficient are not significant in my first model (Table 10) and third model (Table 12).

VII. Discussion

In my analysis, I consider how the degree of urbanization of a university contributes to its overall quality. In particular, I explore the effect of urbanization on graduates' future earnings and job placement, and observe whether or not urbanization has disparate effects on different student groups (categorized by demographic and socioeconomic characteristics and institutional regions).

I find that urbanization has no significant effect on future earnings or job placement, regardless of the subsample observed. As it is likely that these results are affected by limitations in my model design and data (specifically, limitations of the public-use Baccalaureate and Beyond data set), this topic warrants further research.[10]

Although Moretti (2004b) found that urban areas tended to have a higher percentage of educated and skilled workers overall, he also concluded that there was substantial variation in such populations. As workers and firms had the ability to choose where to locate, they often congregated in areas based on the cost of living, wages, and available amenities. This means that

[10] I rely on the public-use data set in my analysis due to my ineligibility to access the restricted-use Baccalaureate and Beyond data set.

two areas categorized as having the same degree of urbanization may actually have a very different composition of human capital.

Therefore, there is a need to further analyze the locations of institutions, observing other factors in conjunction with urbanization to account for variation among similar-sized cities. The restricted-use Baccalaureate and Beyond data set includes school codes for each observation. Access to this data set would allow for the addition of county and school-specific fixed effects and other state and county-level characteristics to my models. In particular, it would insightful to look at the percentage of college graduates in the labor force, average incomes, and number of firms within a certain radius, as other papers have done (Moretti, 2004a; Rosenthal & Strange, 2008). Including these aspects in my analysis would increase the precision of my results and would likely lead to different conclusions regarding the effect of urbanization on job placement and future earnings.

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VIII. Tables

Table 1: Estimated Marginal Coefficient on Urbanization Variable across Models

Dependent Variable	All
salary	-711.024 (792.930)
employed	0.0435 (0.051)
employedBA	0.00275 (0.022)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 2: Regression Coefficients across Models

Variable	Model 1	Model 2	Model 3
Intercept	14537.279** (2471.654)	0.168 (0.606)	-2.666** (0.290)
Degree of urbanization- City or suburb	-711.024 (792.930)	0.174 (0.204)	0.011 (0.088)
Very Selective	1759.625 (1072.467)	0.214 (0.258)	0.530** (0.106)
Moderately Selective	-921.43 (819.809)	0.520* (0.210)	0.271** (0.091)
Gender- Female	-5137.451** (637.451)	0.028 (0.149)	-0.189** (0.072)
Black or African American	-0.04 (952.872)	-0.557** (0.203)	0.092 (0.138)
Hispanic or Latino	-1551.793 (892.843)	-0.487** (0.182)	-0.046 (0.099)
Asian	4806.727** (1287.323)	-1.159** (0.242)	0.132 (0.128)
Other Race	-3450.807** (1251.564)	-0.260 (0.325)	-0.330 (0.182)
Total income (continuous)	0.006* (0.003)	0.000 (0.000)	0.000* (0.000)
Parents' highest education level- Degree	142.822 (631.250)	-0.019 (0.164)	0.022 (0.071)
Degree of urbanization of student's permanent address- City or Suburb	895.368 (607.534)	-0.138 (0.175)	0.048 (0.079)
ACT derived composite score	330.144** (76.188)	0.054** (0.018)	0.016* (0.007)
Overall GPA for 2015-16 BA degree	3198.161** (687.002)	0.338* (0.167)	0.426** (0.079)
Used Career Services	1601.918** (589.618)	.	0.363** (0.064)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 3: Estimated Marginal Urbanization Coefficient by Socioeconomic Status

Dependent Variable	No Degree or Yes Federal Aid	Degree or No Federal Aid
salary	60.131 (953.741)	-795.897 (908.360)
employed	0.083 (0.061)	-0.017 (0.06)
employedBA	0.0445 (0.028)	0.0005 (0.025)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 4: Estimated Marginal Urbanization Coefficient by Race

Dependent Variable	Black or Hispanic	White	Other Race
salary	-928.921 (2101.725)	-432.798 (871.075)	-5693.686 (3881.243)
employed	0.07325 (0.089)	0.005 (0.0645)	0.15675 (0.24325)
employedBA	0.1105* (0.055)	-0.0115 (0.02525)	-0.18225 (0.13475)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 5: Estimated Marginal Urbanization Coefficient by Race and Socioeconomic Status

Dependent Variable	Black/ Hispanic & No degree or Yes Federal aid	White & No degree or Yes Federal aid	Other Race & No degree or Yes Federal aid
salary	-1837.468 (2392.296)	840.231 (993.710)	-4376.917 (4787.567)
employed	0.13225 (0.09375)	0.059 (0.087)	0.00825 (0.63175)
employedBA	0.12225 (0.074)	0.02975 (0.04475)	-0.05675 (0.17825)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 6: Estimated Marginal Urbanization Coefficient by Region

Dependent Variable	New England	Mideast	Great Lakes	Plains	South East	Southwest	Rocky Mountains	Far West
salary	867.834 (5995.135)	1100.494 (1821.630)	-1149.543 (1500.769)	1282.448 (2056.797)	71.831 (1906.860)	860.810 (2441.251)	-8206.454 (4887.062)	-793.012 (3664.100)
employed	-0.1095 (1.044)	-0.28725 (0.18275)	-0.0425 (0.11525)	0.16325 (0.36875)	0.1755 (0.1015)	0.088 (0.2105)	0.29225 (0.71875)	0.19825 (0.518)
employedBA	0.0385 (0.07975)	-0.05075 (0.049)	0.0405 (0.05475)	0.0225 (0.05525)	0.065 (0.0485)	-0.03275 (0.096)	-0.05775 (0.1235)	0.028 (0.12725)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 7: Differences in Urbanization Coefficients for Model 1

First Subsample	Second Subsample	$\widehat{\beta}_1 - \widehat{\beta}_2$
No Degree or Yes Federal Aid	Degree or No Federal Aid	856.03 (1317.10)
White	Black or Hispanic	496.12 (2275.09)
White	Other Race	5260.89 (3977.79)
Black or Hispanic	Other Race	4764.77 (4413.76)
White & No degree or Yes Federal aid	Black/ Hispanic & No degree or Yes Federal aid	2677.70 (2590.47)
White & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	5217.15 (4889.61)
Black/ Hispanic & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	2539.45 (5352.00)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 8: Differences in Urbanization Coefficients for Model 2

First Subsample	Second Subsample	$\widehat{\beta}_1 - \widehat{\beta}_2$	Marginal $\widehat{\beta}_1 - \widehat{\beta}_2$
No Degree or Yes Federal Aid	Degree or No Federal Aid	0.4 (0.34225)	0.1 (0.08556)
White	Black or Hispanic	-0.273 (0.43966)	-0.06825 (0.10991)
White	Other Race	-0.607 (1.00662)	-0.15175 (0.25166)
Black or Hispanic	Other Race	-0.334 (1.03608)	-0.0835 (0.25902)
White & No degree or Yes Federal aid	Black/ Hispanic & No degree or Yes Federal aid	-0.293 (0.51159)	-0.07325 (0.12790)

White & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	0.203 (2.55085)	0.05075 (0.63771)
Black/ Hispanic & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	0.496 (2.55467)	0.124 (0.63867)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 9: Differences in Urbanization Coefficients for Model 3

First Subsample	Second Subsample	$\hat{\beta}_1 - \hat{\beta}_2$	Marginal $\hat{\beta}_1 - \hat{\beta}_2$
No Degree or Yes Federal Aid	Degree or No Federal Aid	0.176 (0.15015)	0.044 (0.03754)
White	Black or Hispanic	-0.488* (0.24208)	-0.122* (0.06052)
White	Other Race	0.683 (0.54838)	0.17075 (0.13710)
Black or Hispanic	Other Race	1.171* (0.58217)	0.29275* (0.14554)
White & No degree or Yes Federal aid	Black/ Hispanic & No degree or Yes Federal aid	-0.37 (0.34591)	-0.0925 (0.08648)
White & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	0.346 (0.73513)	0.0865 (0.18378)
Black/ Hispanic & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	0.716 (0.77200)	0.179 (0.19300)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 10: Regional Differences in Urbanization Coefficients for Model 1

Region 1	Region 2	$\hat{\beta}_1 - \hat{\beta}_2$
New England	Mideast	-232.66 (6,265.78)
New England	Great Lakes	2017.38 (6,180.13)
New England	Plains	-414.61 (6,338.14)
New England	South East	796.00 (6,291.09)
New England	Southwest	7.02 (6,473.13)
New England	Rocky Mountains	9074.29 (7,734.66)
New England	Far West	1660.85 (7,026.18)

Mideast	Great Lakes	2250.04 (2,360.22)
Mideast	Plains	-181.95 (2,747.50)
Mideast	South East	1028.66 (2,637.13)
Mideast	Southwest	239.68 (3,045.99)
Mideast	Rocky Mountains	9306.95 (5,215.53)
Mideast	Far West	1893.51 (4,091.94)
Great Lakes	Plains	-2431.99 (2,546.12)
Great Lakes	South East	-1221.38 (2,426.61)
Great Lakes	Southwest	-2010.35 (2,865.66)
Great Lakes	Rocky Mountains	7056.91 (5,112.31)
Great Lakes	Far West	-356.53 (3,959.54)
Plains	South East	1210.62 (2,804.73)
Plains	Southwest	421.64 (3,192.20)
Plains	Rocky Mountains	9488.90 (5,302.24)
Plains	Far West	2075.46 (4,201.91)
South East	Southwest	-788.98 (3,097.71)
South East	Rocky Mountains	8278.29 (5,245.90)
South East	Far West	864.84 (4,130.59)
Southwest	Rocky Mountains	9067.26 (5,462.88)
Southwest	Far West	1653.82 (4,402.88)
Rocky Mountains	Far West	-7413.44 (6,108.11)

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Table 11: Regional Differences in Urbanization Coefficients for Model 1

Region 1	Region 2	$\hat{\beta}_1 - \hat{\beta}_2$	Marginal $\hat{\beta}_1 - \hat{\beta}_2$
New England	Mideast	0.711 (4.2395)	0.17775 (1.05987)
New England	Great Lakes	-0.268 (4.2014)	-0.067 (1.05034)
New England	Plains	-1.091 (4.4288)	-0.27275 (1.05034)
New England	South East	-1.14 (4.1957)	-0.285 (1.04892)
New England	Southwest	-0.79 (4.2600)	-0.1975 (1.06501)
New England	Rocky Mountains	-1.607 (5.0700)	-0.40175 (1.26749)
New England	Far West	-1.231 (4.6618)	-0.30775 (1.16544)
Mideast	Great Lakes	-0.979 (0.8642)	-0.24475 (0.21606)
Mideast	Plains	-1.802 (1.6462)	-0.4505 (0.41155)
Mideast	South East	-1.851* (0.8362)	-0.46275* (0.20905)
Mideast	Southwest	-1.501 (1.1150)	-0.37525 (0.27876)
Mideast	Rocky Mountains	-2.318 (2.9665)	-0.5795 (0.74162)
Mideast	Far West	-1.942 (2.1972)	-0.4855 (0.54929)
Great Lakes	Plains	-0.823 (1.5454)	-0.20575 (0.38634)
Great Lakes	South East	-0.872 (0.6143)	-0.218 (0.15357)
Great Lakes	Southwest	-0.522 (0.9599)	-0.1305 (0.23999)
Great Lakes	Rocky Mountains	-1.339 (2.9117)	-0.33475 (0.72793)
Great Lakes	Far West	-0.963 (2.1227)	-0.24075 (0.53067)
Plains	South East	-0.049 (1.5299)	-0.01225 (0.38246)
Plains	Southwest	0.301 (1.6984)	0.07525 (0.42460)

Plains	Rocky Mountains	-0.516 (3.2313)	-0.129 (0.80782)
Plains	Far West	-0.14 (2.5434)	-0.035 (0.63585)
South East	Southwest	0.35 (0.9348)	0.0875 (0.23369)
South East	Rocky Mountains	-0.467 (2.9035)	-0.11675 (0.72588)
South East	Far West	-0.091 (2.1114)	-0.02275 (0.52785)
Southwest	Rocky Mountains	-0.817 (2.9958)	-0.20425 (0.74894)
Southwest	Far West	-0.441 (2.2365)	-0.11025 (0.55914)
Rocky Mountains	Far West	0.376 (3.5438)	0.094 (0.88596)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 12: Regional Differences in Urbanization Coefficients for Model 3

Region 1	**Region 2**	$\hat{\beta}_1 - \hat{\beta}_2$	**Marginal** $\hat{\beta}_1 - \hat{\beta}_2$
New England	Mideast	0.357 (0.3744)	0.08925 (0.09360)
New England	Great Lakes	-0.008 (0.3869)	-0.002 (0.09673)
New England	Plains	0.064 (0.3881)	0.016 (0.09702)
New England	South East	-0.106 (0.3734)	-0.0265 (0.09334)
New England	Southwest	0.285 (0.4992)	0.07125 (0.12480)
New England	Rocky Mountains	0.385 (0.5880)	0.09625 (0.14701)
New England	Far West	0.042 (0.6007)	0.0105 (0.15018)
Mideast	Great Lakes	-0.365 (0.2939)	-0.09125 (0.07347)
Mideast	Plains	-0.293 (0.2954)	-0.07325 (0.07385)
Mideast	South East	-0.463 (0.2758)	-0.11575 (0.06894)
Mideast	Southwest	-0.072 (0.4311)	-0.018 (0.10778)

Mideast	Rocky Mountains	0.0278	0.007
		(0.5315)	(0.13287)
Mideast	Far West	-0.315	-0.07875
		(0.5454)	(0.13636)
Great Lakes	Plains	0.072	0.018
		(0.3111)	(0.07778)
Great Lakes	South East	-0.098	-0.0245
		(0.2926)	(0.07314)
Great Lakes	Southwest	0.293	0.07325
		(0.4421)	(0.11051)
Great Lakes	Rocky Mountains	0.393	0.09825
		(0.5404)	(0.13509)
Great Lakes	Far West	0.05	0.0125
		(0.5541)	(0.13853)
Plains	South East	-0.17	-0.0425
		(0.2941)	(0.07352)
Plains	Southwest	0.221	0.05525
		(0.4431)	(0.11076)
Plains	Rocky Mountains	0.321	0.08025
		(0.5412)	(0.13530)
Plains	Far West	-0.022	-0.0055
		(0.5549)	(0.13873)
South East	Southwest	0.391	0.09775
		(0.4302)	(0.10756)
South East	Rocky Mountains	0.491	0.12275
		(0.5307)	(0.13268)
South East	Far West	0.148	0.037
		(0.5447)	(0.13618)
Southwest	Rocky Mountains	0.1	0.025
		(0.6257)	(0.15642)
Southwest	Far West	-0.243	-0.06075
		(0.6376)	(0.15940)
Rocky Mountains	Far West	-0.343	-0.08575
		(0.7093)	(0.17733)

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

IX. Figures

Figure 1: Percent of Time Employed (of 12 months after graduation) by Future Plans

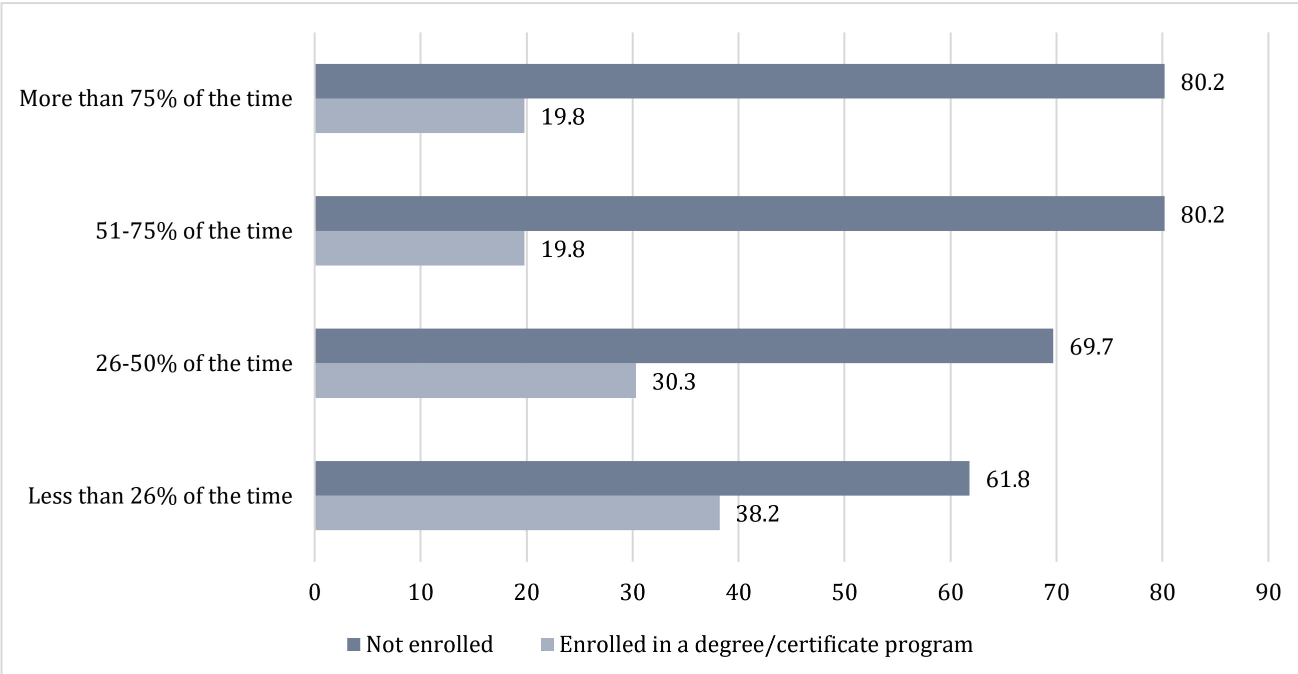


Figure 2: Starting Salary by Parents' Highest Education Level

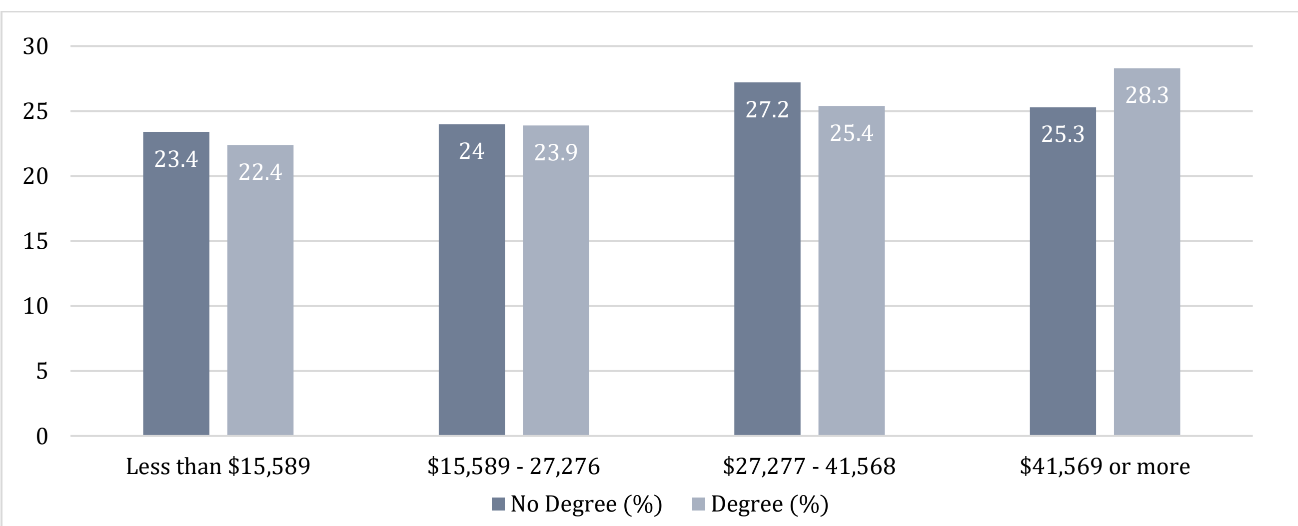


Figure 3: Employment by Parents' Highest Education Level

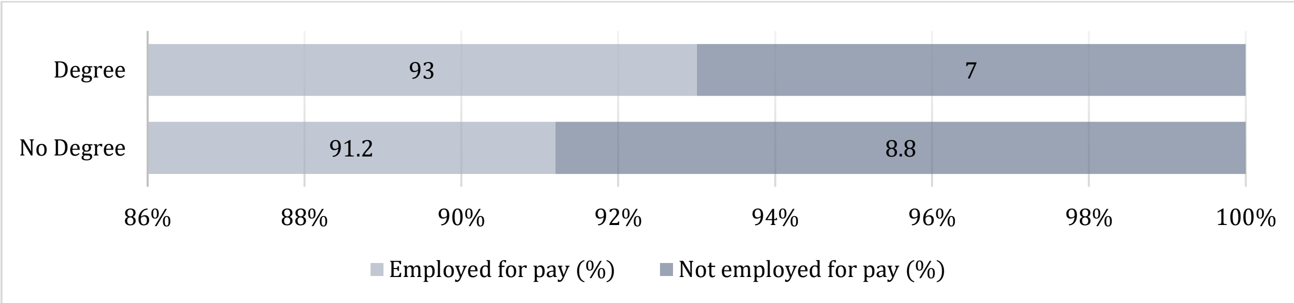


Figure 4: Type of First Job by Parents' Highest Education Level

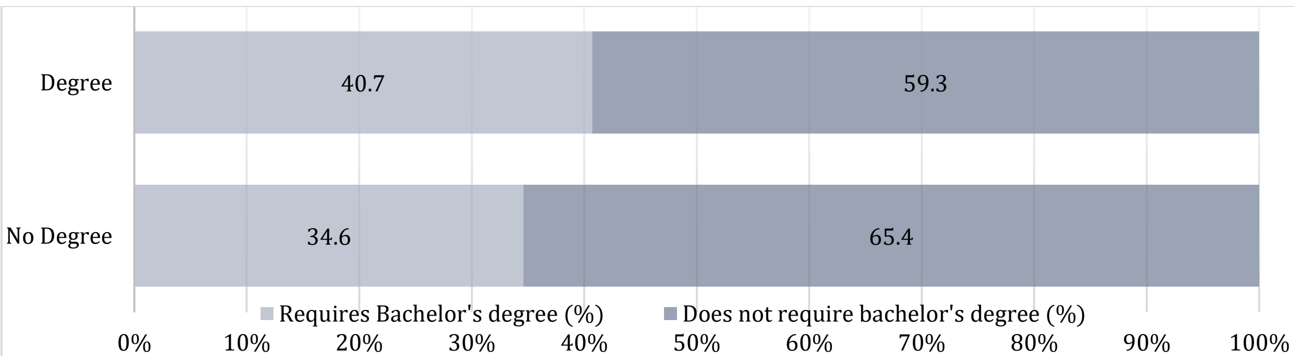


Figure 5: Starting Salary by Race

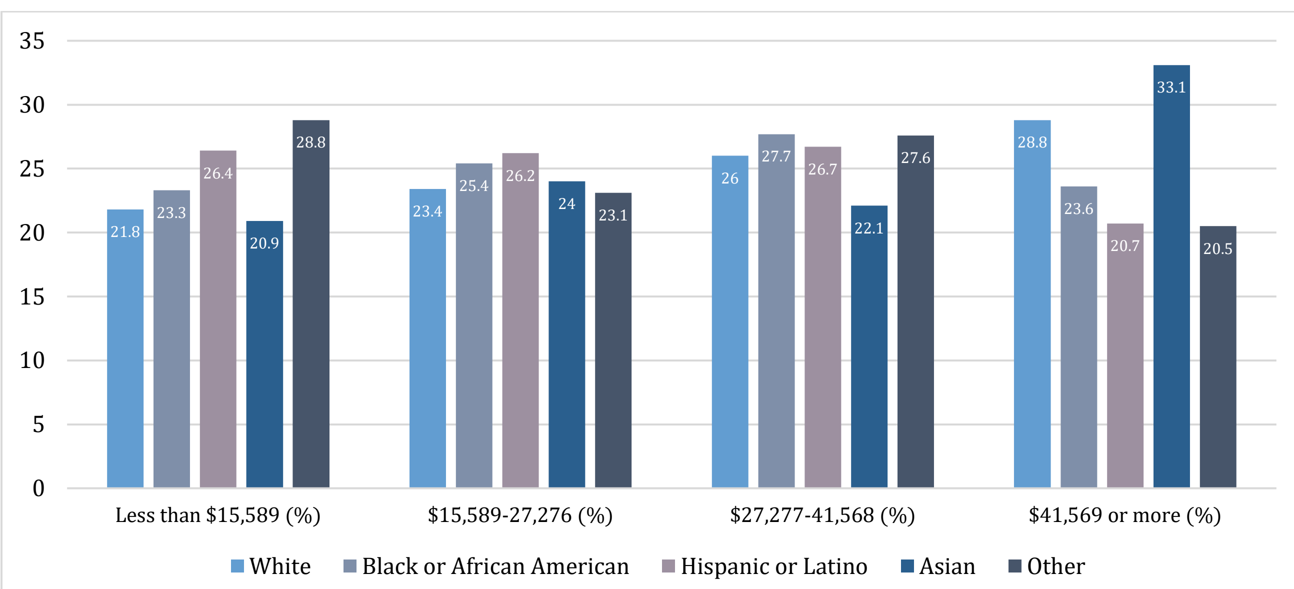


Figure 6: Employment by Race

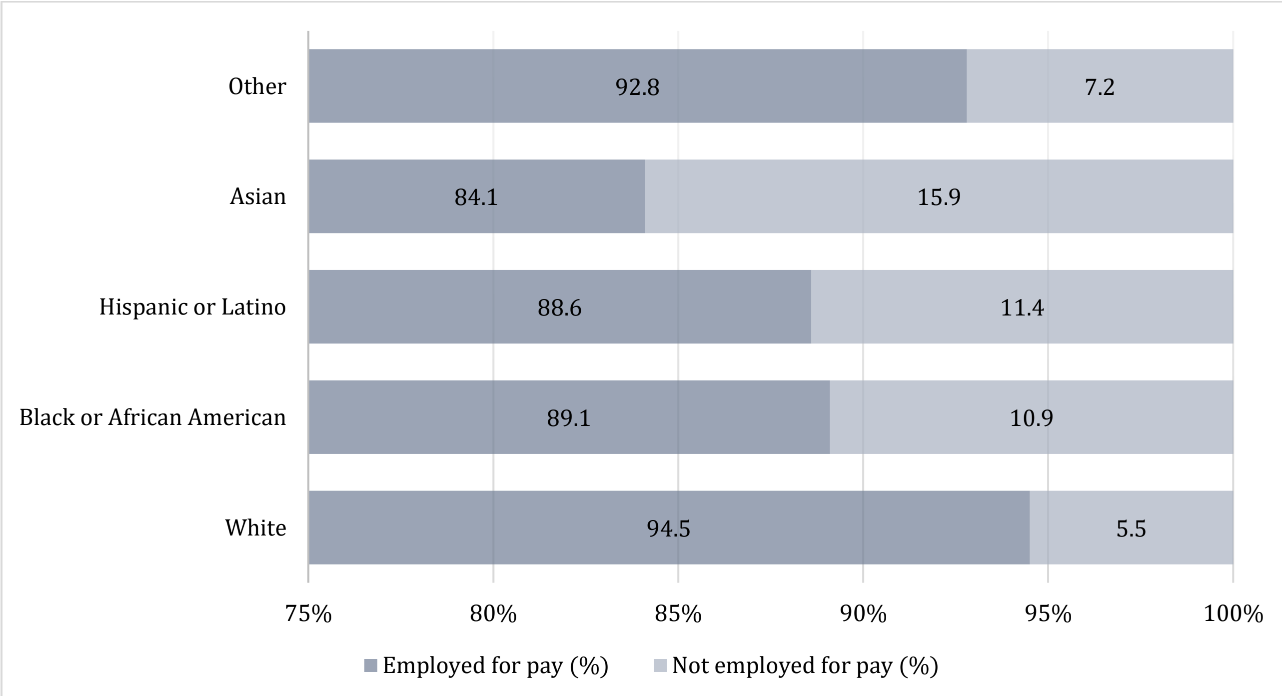


Figure 7: Type of First Job by Race

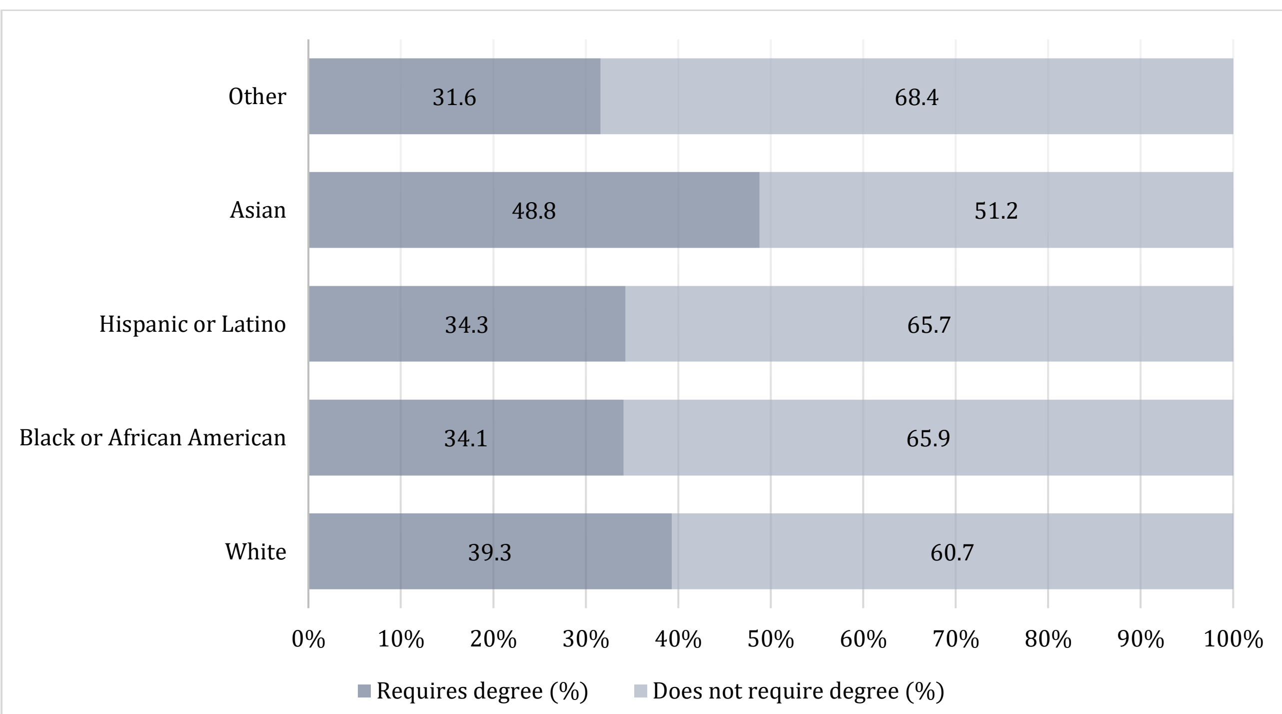


Figure 8: Starting Salary by Pell Grant Amount

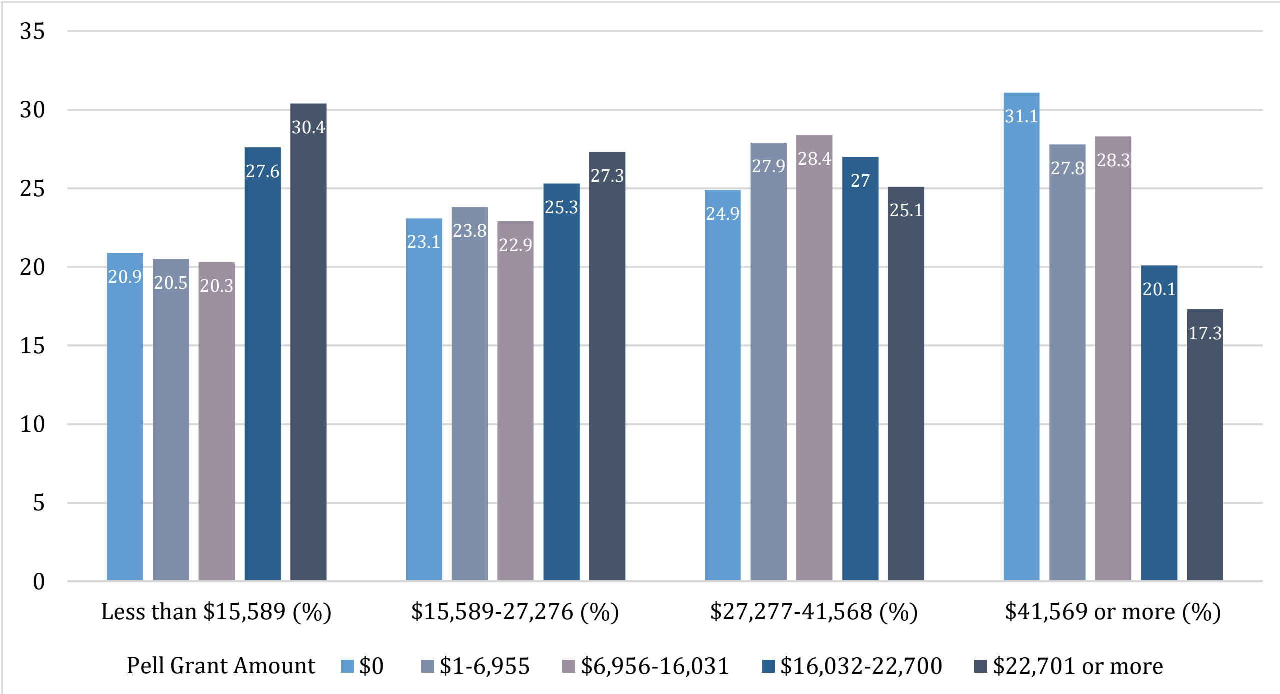


Figure 9: Employment by Pell Grant Amount

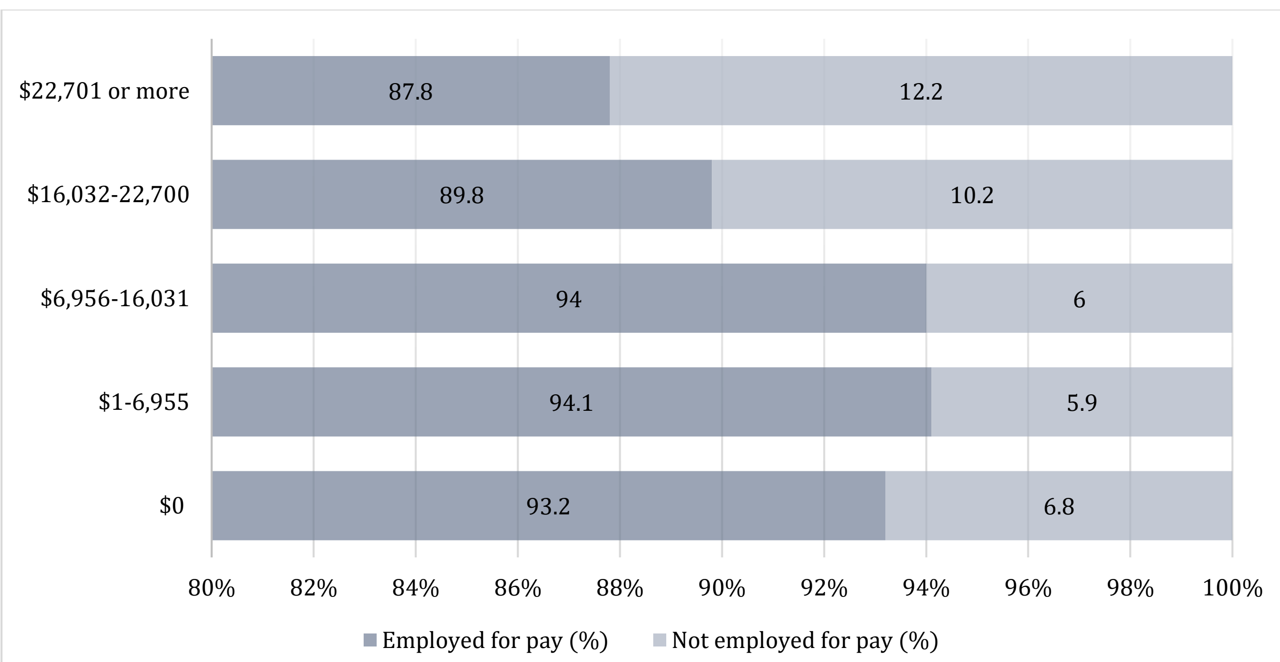
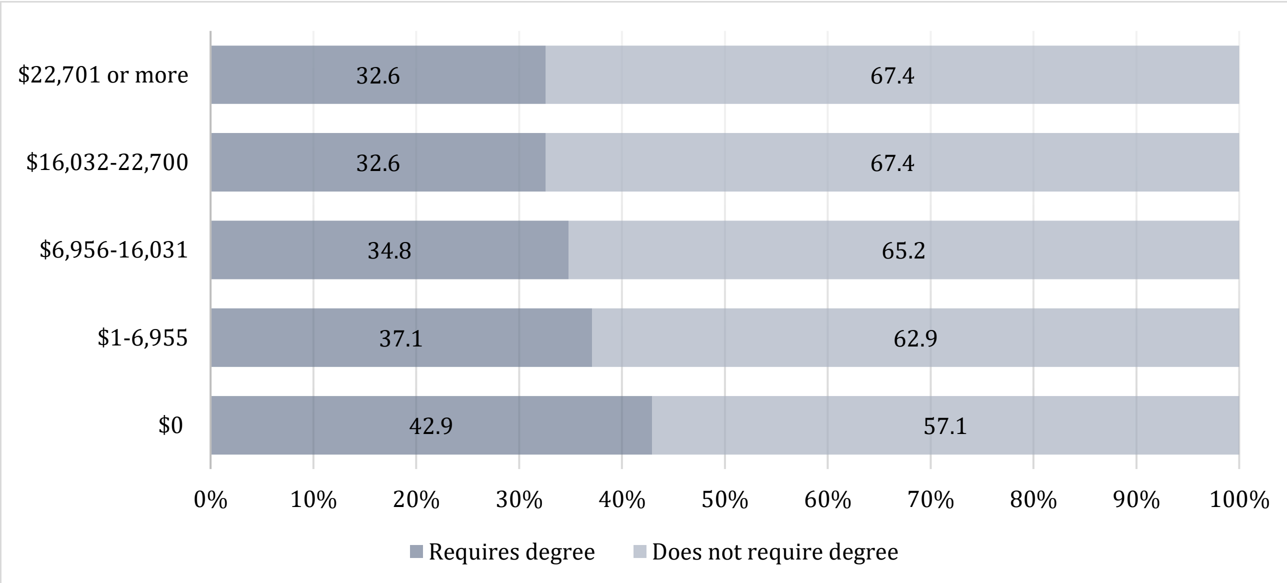


Figure 10: Type of First Job by Pell Grant Amount



X. Appendix

Table 13: Estimated Marginal Urbanization Coefficient across Models[§]

Dependent Variable	All
salary	-492.497 (779.869)
employed	0.0585 (0.0515)
employedBA	0.00875 (0.02225)

Standard errors in parentheses; * p < 0.05, ** p < 0.01   [§] Not including $\boldsymbol{race_i}$ vector in model

Table 14: Model 1 Coefficients of Subsamples by Parental Education

Variable	No Degree or Yes Federal Aid	Degree or No Federal Aid
Intercept	15652.349** (3095.024)	13460.897** (2798.440)
Degree of urbanization- City or suburb	60.131 (953.741)	-795.897 (908.360)
Very Selective	1627.809 (1200.898)	1806.217 (1281.570)
Moderately Selective	-1081.077 (907.781)	960.060 (1050.499)
Gender- Female	-5340.663** (761.068)	-5372.705** (727.944)
Black or African American	1078.993 (1051.582)	348.208 (1105.495)
Hispanic or Latino	-665.252 (1013.217)	-1398.073 (1182.851)
Asian	3499.023* (1527.281)	4877.012** (1516.871)
Other Race	-3023.864* (1493.908)	-4382.343** (1392.066)
Total income (continuous)	0.010 (0.006)	0.003 (0.002)
Degree of urbanization of student's permanent address- City or Suburb	955.252 (762.501)	828.351 (687.582)
ACT derived composite score	243.27** (243.270)	357.056** (86.601)
Overall GPA for 2015-16 BA degree	3291.423** (830.073)	3546.880** (783.963)
Used Career Services	555.185 (679.236)	2046.923** (638.252)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 15: Model 1 Coefficients of Subsamples by Race

Variable	Black or Hispanic	White	Other Race
Intercept	24790.756** (5165.298)	14630.919** (2648.674)	-3211.910 (9770.281)
Degree of urbanization- City or suburb	-928.921 (2101.725)	-432.798 (871.075)	-5693.686 (3881.243)
Very Selective	3805.106 (1978.477)	596.340 (1314.679)	3423.745 (4657.052)
Moderately Selective	1462.001 (1484.579)	-1662.036 (987.638)	-1622.891 (4312.537)
Gender- Female	-1390.861 (1250.430)	-5561.073** (680.042)	-9466.020** (2264.041)
Total income (continuous)	0.005 (0.011)	0.007* (0.003)	-0.004 (0.009)
Parents' highest education level- Degree	-292.420 (1307.610)	494.030 (696.877)	196.038 (2091.107)
Degree of urbanization of student's permanent address- City or Suburb	3020.456 (1779.890)	677.264 (671.318)	5055.969 (3989.741)
ACT derived composite score	-53.139 (144.198)	371.706** (94.229)	540.378* (237.682)
Overall GPA for 2015-16 BA degree	598.900 (1548.735)	3073.636** (769.402)	8269.175** (2329.092)
Used Career Services	263.746 (1054.674)	1427.438* (691.856)	4942.028* (2130.818)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 16: Model 1 Coefficients of Subsamples by Race, Parental Education, and Federal Aid

Variable	Black/ Hispanic & No degree or Yes Federal aid	White & No degree or Yes Federal aid	Other & No degree or Yes Federal aid
Intercept	25382.679** (5383.749)	17234.721** (3620.828)	-11622.793 (11395.773)
Degree of urbanization- City or suburb	-1837.468 (2392.296)	840.231 (993.710)	-4376.917 (4787.567)
Very Selective	3197.030 (2155.369)	49.048 (1541.146)	5113.167 (4459.162)
Moderately Selective	1844.331 (1536.310)	-2898.323* (1216.795)	2327.212 (3962.930)
Gender- Female	-1394.914 (1380.076)	-6164.476** (896.776)	-10122.111** (2604.229)
Total income (continuous)	0.012 (0.016)	0.013 (0.007)	-0.004 (0.027)
Degree of urbanization of student's permanent address- City or Suburb	3291.866 (2022.922)	536.897 (805.440)	4639.021 (4702.803)

ACT derived composite score	-57.797 (172.500)	245.500* (113.240)	638.251** (225.841)
Overall GPA for 2015-16 BA degree	688.746 (1651.239)	3273.050** (913.540)	9361.587** (2550.891)
Used Career Services	-373.521 (1262.804)	521.550 (841.555)	2626.156 (2138.373)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 17: Model 1 Coefficients by Regional Subsamples

Variables	New England	Mideast	Great Lakes	Plains	South East	Southwest	Rocky Mountains	Far West
Intercept	-12346.92 (9085.58)	23827.83** (6957.89)	-3790.75 (6150.10)	20529.20** (7677.29)	15693.50** (3911.43)	18749.85* (7344.90)	24131.24* (11701.62)	27580.11* (8568.66)
City or suburb	867.83 (5995.14)	1100.49 (1821.63)	-1149.54 (1500.770)	1282.45 (2056.80)	71.83 (1906.86)	860.81 (2441.25)	-8206.45 (4887.06)	-793.01 (3664.10)
Very Selective	2086.16 (3777.17)	-819.94 (2591.01)	8562.20** (3219.82)	6517.89 (4529.44)	3067.32 (1957.84)	411.05 (3922.46)	-12346.65** (3100.27)	-4783.52 (2703.46)
Moderately Selective	72.072 (3180.74)	-3817.16 (2306.84)	5028.58** (1856.78)	2677.44 (2590.26)	1239.05 (1715.56)	-2056.30 (2422.59)	-11094.35** (2868.54)	- 9286.67** (2190.25)
Gender- Female	-6169.26** (2053.08)	-3493.51* (1533.24)	-5897.95** (1380.90)	-6346.68** (2086.77)	-4871.73** (1097.62)	-3741.29 (2387.88)	- 6738.50* (2682.65)	-5656.45** (1878.80)
Total income (continuous)	-0.002 (0.008)	0.005 (0.007)	0.007 (0.008)	-0.010 (0.009)	0.002 (0.005)	0.007 (0.012)	0.004 (0.021)	0.022 (0.018)
Parents' highest education level- Degree	193.02 (2365.649)	1794.80 (1637.897)	-658.50 (1427.359)	-163.72 (1967.530)	7.11 (1274.769)	2327.73 (1818.720)	5466.23* (2423.357)	-1487.48 (2050.859)
Address: City or Suburb	2463.87 (2655.40)	-172.78 (1594.83)	968.90 (1436.64)	749.71 (1882.92)	2582.08 (1452.80)	1969.21 (2254.95)	-356.86 (2575.490)	82.56 (2568.48)
ACT derived composite score	337.08 (292.57)	222.19 (156.19)	738.59** (172.76)	-320.80 (223.60)	263.14 (149.42)	128.326 (219.57)	411.82 (313.28)	480.46 (249.99)
Overall GPA for 2015-16 BA degree	10817.45** (1932.74)	934.23 (2086.05)	4525.86** (1650.75)	5315.60* (2612.79)	2126.95* (1024.52)	2510.78 (2114.91)	4090.67 (3329.68)	565.04 (1809.70)
Used Career Services	354.34 (2262.32)	2197.94 (1277.36)	4300.06** (1614.61)	2998.21* (1424.11)	1768.08 (1133.01)	-4788.80 (2453.01)	1502.78 (2048.49)	958.58 (1701.57)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 18: Wage Regression Coefficients when Regions are included as Covariates

Variable	Coefficient
Intercept	14063.957** (2494.423)
Degree of urbanization- City or suburb	-492.497 (779.869)
Very Selective	1885.591 (1106.707)
Moderately Selective	-1005.313 (822.176)
Gender- Female	-5103.849** (634.772)
Black or African American	243.097 (971.733)
Hispanic or Latino	-879.632 (933.721)
Asian	5268.218** (1258.766)
Other Race	-3169.101** (1205.160)
Total income (continuous)	0.006* (0.003)
Parents' highest education level- Degree	177.458 (635.366)
Degree of urbanization of student's permanent address- City or Suburb	939.617 (613.318)
ACT derived composite score	312.498** (75.640)
Overall GPA for 2015-16 BA degree	3130.347** (689.641)
Used Career Services	1505.531* (585.951)
New England	205.398 (1602.528)
Mideast	383.967 (1175.978)
Great Lakes	2591.941* (1279.771)
Plains	1469.071 (1201.401)
South East	452.082 (1105.600)
Southwest	-601.362 (1203.721)
Rocky Mountains	1856.953 (1317.782)

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Table 19: Model 2 Coefficients of Subsamples by Parental Education

Variable	No Degree or Yes Federal Aid	Degree or No Federal Aid
Intercept	0.080 (0.774)	0.136 (0.697)
Degree of urbanization- City or suburb	0.332 (0.244)	-0.068 (0.240)
Very Selective	0.278 (0.274)	0.368 (0.288)
Moderately Selective	0.672** (0.225)	0.678 (0.232)
Gender- Female	0.092 (0.168)	-0.056 (0.179)
Black or African American	-0.636** (0.233)	-0.488 (0.257)
Hispanic or Latino	-0.448* (0.196)	-0.744 (0.206)
Asian	-1.279** (0.269)	-1.006 (0.294)
Other Race	-0.011 (0.470)	-0.287 (0.450)
Total income (continuous)	0.000 (0.000)	0.000 (0.000)
Degree of urbanization of student's permanent address- City or Suburb	-0.033 (0.216)	-0.148 (0.219)
ACT derived composite score	0.049* (0.022)	0.045 (0.023)
Overall GPA for 2015-16 BA degree	0.272 (0.188)	0.460 (0.199)

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Table 20: Model 2 Coefficients of Subsamples by Race

Variables	Black or Hispanic	White	Other Race
Intercept	-0.309 (1.150)	0.250 (0.901)	-0.057 (1.981)
Degree of urbanization- City or suburb	0.293 (0.356)	0.020 (0.258)	0.627 (0.973)
Very Selective	0.589 (0.439)	-0.074 (0.362)	-0.257 (0.641)
Moderately Selective	0.690* (0.312)	0.421 (0.342)	-0.050 (0.537)
Gender- Female	-0.107 (0.253)	-0.048 (0.198)	0.457 (0.441)

Total income (continuous)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Parents' highest education level- Degree	-0.327 (0.224)	0.162 (0.235)	0.212 (0.395)
Degree of urbanization of student's permanent address- City or Suburb	-0.323 (0.453)	-0.120 (0.187)	-0.096 (1.045)
ACT derived composite score	0.028 (0.039)	0.066** (0.022)	0.072 (0.037)
Overall GPA for 2015-16 BA degree	0.535 (0.317)	0.263 (0.208)	-0.098 (0.474)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 21: Model 2 Coefficients of Subsamples by Race, Parental Education, and Federal Aid

Variables	**Black/ Hispanic & No degree or Yes Federal aid**	**White & No degree or Yes Federal aid**	**Other & No degree or Yes Federal aid**
Intercept	-0.121 (1.316)	-0.682 (1.190)	2.235 (3.088)
Degree of urbanization- City or suburb	0.529 (0.375)	0.236 (0.348)	0.033 (2.527)
Very Selective	0.812 (0.458)	-0.121 (0.444)	-0.743 (0.621)
Moderately Selective	0.821** (0.316)	0.766 (0.416)	-0.760 (0.459)
Gender- Female	-0.095 (0.273)	0.105 (0.242)	0.553 (0.525)
Total income (continuous)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Degree of urbanization of student's permanent address- City or Suburb	-0.294 (0.485)	0.093 (0.252)	-0.074 (1.248)
ACT derived composite score	0.015 (0.045)	0.085** (0.026)	0.047 (0.045)
Overall GPA for 2015-16 BA degree	0.363 (0.341)	0.304 (0.279)	-0.363 (0.479)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 22: Employment Regression Coefficients when Regions are included as Covariates

Variables	**Coefficients**
Intercept	0.368 (0.611)
Degree of urbanization- City or suburb	0.234 (0.206)
Very Selective	0.203 (0.272)
Moderately Selective	0.421 (0.219)
Gender- Female	0.031 (0.151)
Black or African American	-0.418* (0.203)
Hispanic or Latino	-0.298 (0.181)
Asian	-1.141** (0.257)
Other Race	-0.275 (0.324)
Total income (continuous)	0.000 (0.000)
Parents' highest education level- Degree	0.006 (0.168)
Degree of urbanization of student's permanent address- City or Suburb	-0.136 (0.179)
ACT derived composite score	0.049** (0.018)
Overall GPA for 2015-16 BA degree	0.331 (0.171)
New England	0.040 (0.288)
Mideast	-0.401 (0.206)
Great Lakes	0.363 (0.268)
Plains	0.797 (0.410)
South East	-0.309 (0.220)
Southwest	-0.301 (0.252)
Rocky Mountains	-0.036 (0.703)

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Table 23: Model 2 Coefficients by Regional Subsamples

Variables	New England	Mideast	Great Lakes	Plains	South East	Southwest	Rocky Mountains$^{\Phi}$	Far West
Intercept	0.689 (6.210)	1.795 (1.510)	-1.701 (2.366)	4.069 (5.597)	-1.260 (1.068)	0.059 (2.247)	-0.894 (7.699)	0.924 (2.979)
Degree of urbanization- City or suburb	-0.438 (4.176)	-1.149 (0.731)	-0.170 (0.461)	0.653 (1.475)	0.702 (0.406)	0.352 (0.842)	1.169 (2.875)	0.793 (2.072)
Very Selective	0.210 (2.188)	0.471 (0.652)	0.131 (0.775)	-4.276 (3.935)	0.306 (0.480)	0.525 (0.702)	.	-0.017 (0.380)
Moderately Selective	0.242 (2.187)	0.646 (0.573)	0.418 (0.673)	-1.949 (3.884)	0.555 (0.432)	0.248 (0.648)	.	0.602 (0.352)
Gender- Female	0.459 (0.595)	0.274 (0.266)	0.081 (0.497)	-0.300 (1.839)	0.321 (0.291)	0.177 (0.613)	-0.981 (3.700)	-0.783 (0.534)
Total income (continuous)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)
Parents' highest education level- Degree	0.581 (0.956)	0.088 (0.336)	0.029 (0.663)	-0.083 (1.998)	0.476 (0.288)	0.319 (0.490)	-1.092 (1.347)	-0.882* (0.373)
Degree of urbanization of student's permanent address- City or Suburb	-0.447 (1.901)	-0.824* (0.418)	-0.497 (0.853)	-1.905 (1.975)	0.009 (0.351)	-0.124 (0.798)	-0.640 (0.940)	-0.178 (0.973)
ACT derived composite score	0.023 (0.075)	0.022 (0.042)	0.115 (0.060)	0.100 (0.114)	0.063* (0.030)	0.049 (0.048)	0.009 (0.249)	0.055 (0.048)
Overall GPA for 2015-16 BA degree	0.598 (0.526)	0.303 (0.368)	0.686 (0.534)	0.301 (0.898)	0.278 (0.241)	0.191 (0.735)	1.492 (2.781)	0.049 (0.541)

Standard errors in parentheses; * p < 0.05, ** p < 0.01 $^{\Phi}$ $\boldsymbol{selectivity}'_i$ vector not included due to limited sample

Table 24: Model 3 Coefficients of Subsamples by Parental Education and Federal Aid

Variables	No Degree or Yes Federal Aid	Degree or No Federal Aid
Intercept	-2.592** (0.360)	-2.745** (0.332)
Degree of urbanization- City or suburb	0.178 (0.112)	0.002 (0.100)
Very Selective	0.441** (0.142)	0.603** (0.132)
Moderately Selective	0.255* (0.114)	0.367** (0.116)
Gender- Female	-0.212* (0.090)	-0.191* (0.080)
Black or African American	0.181 (0.150)	0.175 (0.157)

Hispanic or Latino	0.058 (0.107)	-0.087 (0.138)
Asian	0.119 (0.166)	0.029 (0.149)
Other Race	-0.231 (0.222)	-0.454* (0.205)
Total income (continuous)	0.000 (0.000)	0.000* (0.000)
Degree of urbanization of student's permanent address- City or Suburb	0.084 (0.097)	0.022 (0.091)
ACT derived composite score	0.017 (0.009)	0.020* (0.008)
Overall GPA for 2015-16 BA degree	0.358** (0.098)	0.415** (0.093)
Used Career Services	0.324** (0.081)	0.399** (0.073)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 25: Model 3 Coefficients of Subsamples by Race

Variable	Black or Hispanic	White	Other Race
Intercept	-2.337** (0.655)	-2.659** (0.342)	-4.252** (1.021)
Degree of urbanization- City or suburb	0.442* (0.220)	-0.046 (0.101)	-0.729 (0.539)
Very Selective	0.491* (0.220)	0.474** (0.131)	1.021* (0.497)
Moderately Selective	0.325 (0.216)	0.200 (0.118)	0.664 (0.470)
Gender- Female	-0.042 (0.161)	-0.246** (0.079)	-0.103 (0.219)
Total income (continuous)	0.000 (0.000)	0.000** (0.000)	0.000 (0.000)
Parents' highest education level- Degree	-0.006 (0.160)	0.075 (0.093)	-0.102 (0.211)
Degree of urbanization of student's permanent address- City or Suburb	-0.028 (0.217)	0.039 (0.088)	0.929* (0.401)
ACT derived composite score	0.011 (0.017)	0.021** (0.008)	-0.005 (0.022)
Overall GPA for 2015-16 BA degree	0.246 (0.177)	0.408** (0.097)	0.920** (0.266)
Used Career Services	0.332* (0.132)	0.354** (0.080)	0.495* (0.218)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 26: Model 3 Coefficients of Subsamples by Race, Parental Education, and Federal Aid

Variables	Black/ Hispanic & No degree or Yes Federal aid	White & No degree or Yes Federal aid	Other & No degree or Yes Federal aid
Intercept	-2.359** (0.790)	-2.123** (0.513)	-5.020** (1.464)
Degree of urbanization- City or suburb	0.489 (0.296)	0.119 (0.179)	-0.227 (0.713)
Very Selective	0.349 (0.252)	0.170 (0.216)	1.586* (0.633)
Moderately Selective	0.303 (0.246)	-0.012 (0.191)	1.207 (0.626)
Gender- Female	-0.050 (0.185)	-0.360** (0.118)	-0.489 (0.304)
Total income (continuous)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Degree of urbanization of student's permanent address- City or Suburb	-0.086 (0.267)	0.144 (0.136)	0.491 (0.575)
ACT derived composite score	0.026 (0.021)	0.001 (0.014)	-0.001 (0.031)
Overall GPA for 2015-16 BA degree	0.201 (0.210)	0.418** (0.140)	1.082** (0.371)
Used Career Services	0.211 (0.163)	0.327** (0.116)	0.158 (0.325)

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Table 27: Employment (BA) Regression Coefficients when Regions are included as Covariates

Variables	Coefficients
Intercept	-2.899** (0.305)
Degree of urbanization- City or suburb	0.035 (0.089)
Very Selective	0.514** (0.106)
Moderately Selective	0.285** (0.091)
Gender- Female	-0.187** (0.072)
Black or African American	0.064 (0.138)
Hispanic or Latino	0.016 (0.101)
Asian	0.196 (0.133)

Other Race	-0.274 (0.187)
Total income (continuous)	0.000* (0.000)
Parents' highest education level- Degree	0.022 (0.072)
Degree of urbanization of student's permanent address- City or Suburb	0.057 (0.079)
ACT derived composite score	0.016* (0.007)
Overall GPA for 2015-16 BA degree	0.421** (0.079)
Used Career Services	0.346 (0.064)
New England	0.243 (0.130)
Mideast	0.319** (0.114)
Great Lakes	0.389** (0.121)
Plains	0.129 (0.146)
South East	0.238* (0.103)
Southwest	0.114 (0.128)
Rocky Mountains	-0.073 (0.178)

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 28: T-Statistics for Differences in Urbanization Coefficients for Model 1

First Subsample	Second Subsample	T-Statistic
No Degree or Yes Federal Aid	Degree or No Federal Aid	1.168731627
White	Black or Hispanic	-0.62093583
White	Other Race	-0.60300536
Black or Hispanic	Other Race	-0.32236844
White & No degree or Yes Federal aid	Black/ Hispanic & No degree or Yes Federal aid	-0.57271914
White & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	0.079581333
Black/ Hispanic & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	0.194154009

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 29: Model 3 Coefficients by Regional Subsamples

Variables	New England	Mideast	Great Lakes	Plains	South East	Southwest	Rocky Mountains	Far West
Intercept	-3.868** (1.035)	-2.778** (0.706)	-2.544** (0.758)	-3.760** (1.044)	-3.055** (0.511)	-1.844 (0.951)	-3.365 (2.792)	-2.180* (1.040)
Degree of urbanization-City or suburb	0.154 (0.319)	-0.203 (0.196)	0.162 (0.219)	0.090 (0.221)	0.260 (0.194)	-0.131 (0.384)	-0.231 (0.494)	0.112 (0.509)
Very Selective	-0.004 (0.212)	0.120 (0.257)	0.916** (0.331)	0.315 (0.604)	0.688** (0.207)	0.058 (0.320)	-0.190 (0.714)	1.181** (0.290)
Moderately Selective	0.292 (0.235)	-0.172 (0.253)	0.843** (0.306)	0.425 (0.397)	0.385* (0.188)	0.013 (0.236)	0.337 (0.474)	0.653** (0.246)
Gender- Female	-0.241 (0.184)	-0.171 (0.195)	-0.281 (0.155)	-0.287 (0.252)	-0.136 (0.120)	0.080 (0.264)	-0.398 (0.287)	-0.352 (0.236)
Total income (continuous)	0.000 (0.000)	0.000 (0.000)	0.000* (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Parents' highest education level-Degree	0.336 (0.249)	0.010 (0.178)	0.142 (0.212)	0.244 (0.286)	-0.145 (0.118)	0.227 (0.257)	0.510 (0.540)	-0.413 (0.220)
Address: City or Suburb	0.300 (0.332)	0.495** (0.187)	0.013 (0.176)	-0.191 (0.224)	0.040 (0.176)	0.145 (0.412)	0.129 (0.623)	-0.363 (0.282)
ACT derived composite score	0.033 (0.024)	0.033* (0.016)	0.014 (0.017)	0.000 (0.020)	0.008 (0.014)	0.013 (0.026)	0.015 (0.052)	0.007 (0.022)
Overall GPA for 2015-16 BA degree	0.554* (0.249)	0.440* (0.212)	0.183 (0.191)	0.738** (0.265)	0.585** (0.146)	0.190 (0.275)	0.516 (0.585)	0.347 (0.211)
Used Career Services	0.637** (0.205)	0.243 (0.148)	0.506** (0.188)	0.807** (0.209)	0.150 (0.120)	0.159 (0.291)	0.591 (0.491)	0.354* (0.148)

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Table 30: T-Statistics for Differences in Urbanization Coefficients for Model 2

First Subsample	Second Subsample	T-Statistic
No Degree or Yes Federal Aid	Degree or No Federal Aid	1.172187754
White	Black or Hispanic	-2.015892218*
White	Other Race	1.245483858
Black or Hispanic	Other Race	2.011442654*
White & No degree or Yes Federal aid	Black/ Hispanic & No degree or Yes Federal aid	-1.069627768
White & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	0.470667716
Black/ Hispanic & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	0.927460362

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Table 31: T-Statistics for Differences in Urbanization Coefficients for Model 3

First Subsample	Second Subsample	T-Statistic
No Degree or Yes Federal Aid	Degree or No Federal Aid	0.649936311
White	Black or Hispanic	0.218067731
White	Other Race	1.322565311
Black or Hispanic	Other Race	1.079524672
White & No degree or Yes Federal aid	Black/ Hispanic & No degree or Yes Federal aid	1.033672663
White & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	1.066987167
Black/ Hispanic & No degree or Yes Federal aid	Other & No degree or Yes Federal aid	0.474486203

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$

Table 32: T-Statistics for Regional Differences in Urbanization Coefficients for Model 1

Region 1	Region 2	T-Statistic
New England	Mideast	-0.03713
New England	Great Lakes	0.32643
New England	Plains	-0.06542
New England	South East	0.126529
New England	Southwest	0.001085
New England	Rocky Mountains	1.173198
New England	Far West	0.236379
Mideast	Great Lakes	0.953316
Mideast	Plains	-0.06623
Mideast	South East	0.390069
Mideast	Southwest	0.078688
Mideast	Rocky Mountains	1.78447
Mideast	Far West	0.462741
Great Lakes	Plains	-0.95518
Great Lakes	South East	-0.50333
Great Lakes	Southwest	-0.70153
Great Lakes	Rocky Mountains	1.380377
Great Lakes	Far West	-0.09004
Plains	South East	0.431634
Plains	Southwest	0.132084
Plains	Rocky Mountains	1.789601
Plains	Far West	0.493933
South East	Southwest	-0.2547
South East	Rocky Mountains	1.578048
South East	Far West	0.209375

Southwest	Rocky Mountains	1.659795
Southwest	Far West	0.375623
Rocky Mountains	Far West	-1.2137

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 33: T-Statistics for Regional Differences in Urbanization Coefficients for Model 2

Region 1	Region 2	T-Statistic
New England	Mideast	0.1677085647
New England	Great Lakes	-0.0637887398
New England	Plains	-0.2463400422
New England	South East	-0.2717074149
New England	Southwest	-0.1854442722
New England	Rocky Mountains	-0.3169643681
New England	Far West	-0.2640624242
Mideast	Great Lakes	-1.132809012
Mideast	Plains	-1.094639872
Mideast	South East	-2.2136382*
Mideast	Southwest	-1.346134203
Mideast	Rocky Mountains	-0.7813982622
Mideast	Far West	-0.8838652513
Great Lakes	Plains	-0.5325610476
Great Lakes	South East	-1.41951596
Great Lakes	Southwest	-0.5437839285
Great Lakes	Rocky Mountains	-0.4598647612
Great Lakes	Far West	-0.453675065
Plains	South East	-0.03202914722
Plains	Southwest	0.1772248119
Plains	Rocky Mountains	-0.1596884312
Plains	Far West	-0.05504474594
South East	Southwest	0.3744225737
South East	Rocky Mountains	-0.1608389461
South East	Far West	-0.04309931682
Southwest	Rocky Mountains	-0.2727186084
Southwest	Far West	-0.1971788461
Rocky Mountains	Far West	0.1060995684

Standard errors in parentheses; * p < 0.05, ** p < 0.01

Table 34: T-Statistics for Regional Differences in Urbanization Coefficients for Model 3

Region 1	Region 2	T-Statistic
New England	Mideast	0.9535200631
New England	Great Lakes	-0.02067507897
New England	Plains	0.164916688
New England	South East	-0.2839089945
New England	Southwest	0.5708947223
New England	Rocky Mountains	0.6547117255
New England	Far West	0.06991828221
Mideast	Great Lakes	-1.24192053
Mideast	Plains	-0.9918990668
Mideast	South East	-1.678903256
Mideast	Southwest	-0.1670034759
Mideast	Rocky Mountains	0.0526848447
Mideast	Far West	-0.577522965
Great Lakes	Plains	0.2314143741
Great Lakes	South East	-0.334962974
Great Lakes	Southwest	0.6628060279
Great Lakes	Rocky Mountains	0.7272828651
Great Lakes	Far West	0.0902341873
Plains	South East	-0.5780942023
Plains	Southwest	0.4988103342
Plains	Rocky Mountains	0.5931470827
Plains	Far West	-0.03964626882
South East	Southwest	0.9088305836
South East	Rocky Mountains	0.9251446749
South East	Far West	0.2717005395
Southwest	Rocky Mountains	0.1598227334
Southwest	Far West	-0.3811151689
Rocky Mountains	Far West	-0.4835703051

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$