The Florida College System Economic Mobility Scorecard:
*Increasing the Educational Attainment of Florida’s Low-Income Students*

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Disclaimer

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Executive Summary

Higher Education and Socioeconomic Mobility in Florida

In January 2019, Governor DeSantis issued Executive Order 19-31 to move Florida’s workforce education from 24th to 1st in the nation and ensure that students are prepared for the dynamic labor market. This initiative requires two million working age Floridians to achieve a short-term credential, far greater than the current enrollment of 700,000 students in the Florida College System. In order to achieve this goal, the state must increase attendance of the demographic comprising the smallest fraction of post-secondary attainment achievers: low-income students. Recent trends have shown increases in post-secondary attainment of low-income students at for-profit and two-year colleges. To advance this trend, we use the foundations set by the Department of Education’s College Scorecard and Opportunity Insight’s Mobility Report Card to create an economic mobility scorecard specifically tailored to the needs of certificate and associates degree programs in the Florida College System. This scorecard is a data-driven tool measuring how well colleges help students from low-income backgrounds transition from one income bracket to another. We likewise investigated how educational outreach programs help increase collegiate access to impoverished students. This portion of our research focused specifically on the Broward Unlimited Potential (Broward UP) program.

Developing an Socioeconomic Mobility Measure of Success

We built our scorecard using individualized and track-level data on income, demographics, and neighborhood characteristics from the Florida Department of Education, Broward College, Broward UP, and the Opportunity Atlas. Given data limitations accessing individualized information on students at all 28 colleges, we tested our model on Broward College, and its sister outreach program Broward UP. Compared to the statewide income distribution, the Broward College and Broward UP student come from a much lower socioeconomic backgrounds. The incomes for both students and parents for these institutions are almost half of the statewide incomes at each percentile. Therefore, in order to receive a high
mobility score, a large portion of these students would need to come from the bottom 30th percentile and have projected incomes high above these starting levels.

With our data, we assigned students to income brackets based on their dependency status, initial student and parental incomes entering college, and their expected earnings post-graduation. Then, we calculated the mobility score: the product of access, the probability a student entered college in the bottom 30th percentile on the income distribution, and success, the probability a student’s earnings are in the top 50th percentile given they were a low-access student. Due to the fact institutions may have varying availability to access, our scorecard is versatile in its ability to work with large variations of data. For colleges facing high limitations in incomes data, we test the correlations between demographic and neighborhood characteristics—such as Pell Grant eligibility, ethnicity, and teen birth rates—to our low-access variable. The variable with the highest correlations are then used as a proxy for access.

For colleges with more advance earnings data or tax-data accessibility, we also provide detailed methods on how this information can be integrated into the scorecard.

**Socioeconomic Mobility Scores within the Florida State College System**

We tested the Florida College System Economic Mobility Scorecard on Broward College. Given our own data limitations, we could not apply it to all 28. The scores of Broward College were high above our baseline benchmarks. Its access score was more than double the national the share of impoverished students at public two-year colleges. Likewise, the success score was more than 10 percentage points higher than our expected success outcomes. Therefore, the mobility score was far above our baseline, moderate performance mobility score of 24%. When applying our scorecard to the Broward UP, we found similar results for the Broward UP participants. These students achieved higher access and success scores than their low-access peers who did not participate.

**Broward College Scores**

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<tbody>
<tr>
<td>Access Score</td>
<td>52.5%</td>
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<tr>
<td>Success Score</td>
<td>93.8%</td>
</tr>
<tr>
<td>Mobility Score</td>
<td>49%</td>
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**Recommended Improvements to Current Programs**

Given the success of Broward UP, we recommend that other collegiate institutions invest in programs like Broward UP that identify the low-income areas within their locale and partner with local outreach groups to bring educational opportunities where these students live. This will greatly increase accessibility levels and thus promote higher economic mobility scores. Likewise, statewide initiatives already in place by the Department of Education to encourage localized apprenticeships, certifications, and associate and applied degree attainment may want to specifically allocate resources and time to support programs like Broward UP.

To produce a more robust socioeconomic mobility scorecard, we encourage institutions to incorporate their own individualized data into our model. The bulk of our student-level demographic and socioeconomic information specifically relates to students enrolled in Broward College and the Broward UP program. Therefore, a larger sample of data from other state colleges would more accurately encapsulate the population and enable our scorecard to provide feedback specific to the needs of every institution in the Florida State College System.
Table of Contents

I. Introduction 1

II. Literature Review 6
   A. Low-Income Students 7
   B. Factors to Identify Low-Incomes Students 8
   C. Measuring College Success 9
   D. Educational Outreach Program 13
   E. Moving Forward 15

III. Data 15
    A. Sample Definition 16
    B. Measuring Incomes 16
    C. Student Characteristics 21
    D. Neighborhood Characteristics 25

IV. Methodology 27
   A. Creating a Florida College System Mobility Scorecard 28
   B. A Basic Mobility Scorecard 33
   C. Enhancing Our Scorecard 35

V. Results 38
   A. Mobility Scores 38
   B. Alternative Measures for Low-Income Access 42

VI. Potential Economic Impacts Associated with the Adoption of the Mobility Scorecard 46

VII. Recommendations 48
    A. Scorecard Advancement 48
    B. Scorecard Usage 49
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Establishing More Broward UPs</td>
<td>50</td>
</tr>
<tr>
<td>VIII. Conclusions</td>
<td>52</td>
</tr>
<tr>
<td>IX. References</td>
<td>55</td>
</tr>
<tr>
<td>X. Appendix</td>
<td>59</td>
</tr>
</tbody>
</table>
I. Introduction

A college education has long been accepted as a way to promote economic advancement. However, inequality in post-secondary access has limited educational attainment in the state of Florida. To combat this, Governor DeSantis issued Executive Order 19-31 to move Florida’s workforce education from 24th to 1st in the nation while ensuring students are prepared for the dynamic labor market. About two million more working age Floridians must achieve a short-term credential to achieve this goal. This is far greater than the current 700,000 students enrolled in the Florida College Systems.¹ Therefore, accomplishing this task requires the state to focus on the demographic of students who make up the smallest fraction of post-secondary attainment achievers: low-income students.

In recent years, national trends show that low-income students have been attending higher education institutions at significantly greater levels.² Specifically, the largest increases in enrollment have been found at for-profit and two-year institutions. This aligns with data from the Florida Department of Education as the Florida College System has been the primary access point for undergraduate education. Within the 2017-2018 academic year of the 733,080 students who pursued higher education, 426,771 (58%) were enrolled in an AA or AS program.³ In light of this, addressing the educational attainment problem amongst low-income students necessitates focusing on increasing enrollment and success at colleges in the state system.

Figure Ia : Map of the Colleges in the Florida College System

Notes: This map displays all 28 State Colleges in their respective locations in Florida. These institutions are aimed “at providing high-quality, affordable academic and career educational programs.” They work to help students maximize their learning experience while meeting the needs of the state and community. Source: Florida Department of Education.
Resources such as the Department of Education’s College Scorecard have previously been used to gather information on collegiate success. However, this measure lacks a means to track changes in socioeconomic status of students due to post-secondary attainment. Meanwhile, existing mobility metrics, such as Opportunity Insights’ Mobility Report Card, base their measure on students ages 19-22 whose degree helped move their lifetime earnings from the bottom 20% of the income distribution to the top 20%. The Florida College System, in contrast, enrolls students who are under 18 to over 65; the average age is 26 years for part time students, who make up 65% of the students enrolled in the system. Additionally, students in the state college system typically earn a workforce certificate or associate's degree. Consequently, the expected median student earnings are $35,000 as a starting salary and $50,900 mid-career; for individuals in the 80th percentile, starting and mid-career outcomes are $38,500 and $57,100 respectively. Given that earnings must be over $75,400 to be considered in Florida’s top 20%, this measure of mobility does not accurately fit Florida state colleges. Therefore, even though offering useful insights, these scorecards fall short of the Florida College System’s needs.

Building on the frameworks set by the College Scorecard and Mobility Report Card, we used administrative data covering Broward College students from 2015-2021 and neighborhood-level data from Opportunity Atlas to construct a socioeconomic mobility scorecard tailored to the nontraditional educational programs — primarily associate degrees and certificate programs — in the state college system of Florida. The scorecard specifically focuses on the use of statistical students' earnings data — both upon entering college and post-degree attainment — to track

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movement across the income distribution. We began by determining the dependency status of students and their corresponding student or parent adjusted gross income to define their initial incomes. With the information provided by the Florida College System Vocational Reports, we employed students’ individual degrees and award types to project earnings post-graduation. After pre- and post-income levels were established, we divided every student into a decile, an income bracket for every 10th percentile. Using this information, the mobility score was defined by the probability an individual started in the bottom 30% of Florida’s income distribution and had projected earnings post-graduation put them in the top 50th percentile. Simply put, it is the product of student accessibility to college and success rates after degree attainment.

**Figure 1b : Mobility Score Calculation Formula**

<table>
<thead>
<tr>
<th><strong>Mobility</strong></th>
<th><strong>Access</strong></th>
<th><strong>x</strong></th>
<th><strong>Success</strong></th>
</tr>
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<tbody>
<tr>
<td>$P(\text{Start in D3 and End above D5})$</td>
<td>$P(\text{Start in D3})$</td>
<td>$\times$</td>
<td>$P(\text{End above D5</td>
</tr>
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**Notes:** This figure presents the formula we use to calculate the mobility scorecard. Mobility is calculated by the probability the individual started in deciles 1 to 3 and earned income in deciles 6-10 post-graduation. This is the product of access, the probability a student starts in the income deciles 1-3, and success, the probability the student ends in decile 6-10 given they started in deciles 1-3.

Due to privacy laws limiting access and publication of students' income data, as well as differences in information availability due to data collection methods, our scorecard was

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6 We used the top 50th percentile as our success measure because our data requires the use of projected earnings of starting incomes for our measure of success, but given lifetime earnings, this percentile could be raised. Likewise, we use this income bracket because the majority of the students are graduating with an associates or workforce certificate. Incomes in the top 50th percentile require students to earn above the median Florida income of $40,000. This number is higher than the average starting earnings of such degrees, therefore our results may underestimate success.

uniquely built to provide versatility. We include three alternative means for achieving an economic mobility score by offering substitute access definitions. For our most basic scorecard, we also determined potential proxies for access using student demographics and neighborhood characteristics. Therefore, with the adaptability of our scorecard, we have provided a data-driven, internal evaluation means for all Florida state colleges to identify how well their institutions allocate their resources towards promoting socioeconomic mobility.

Considering that the largest obstacle facing two-year colleges is balancing the dual objective of offering quality education and maintaining increased access to low-income students' households, we also explored the impacts of local collegiate educational outreach programs on colleges' economic mobility scores. Our research emphasized the outcomes of one particular initiative, Broward Unlimited Potential (Broward UP), as it currently is a sister program of the Florida state college Broward College. Broward UP is a community-centric program that works with organizations to tailor its approach to educating low-income communities. The group uniquely targets the six unproportionally impoverished zip codes within Broward County, where barriers to employment and education are the highest. It helps individuals’ earn post-secondary degrees and/or job certifications through free classes, workforce training, and support services. Using our mobility scorecard we are able to test the success of the program itself, as well as the differences between students of similar low-income backgrounds who were non-participants. The ability to use our metric to educational outreach programs is another distinctive feature of our scorecard. This extension provides colleges with key information regarding the success of their efforts to target low access students, regardless of if they follow the Broward UP model.

9 For more information about the Broward UP program, see Appendix I
The scorecard we created complements prior research on large-scale mobility report cards and their methods for determining the accessibility and success of colleges for students of low-income backgrounds. Our metric’s distinctive ability to work with multi-faceted income definitions enables it to achieve mobility scores over a large scope of accessible information. By building a model tailored to the Florida College System and the attainment of non-traditional degrees, colleges across the state can make informed decisions on resource allocation. Likewise, the extension of our scorecard in measuring educational outreach programs can track the impacts of access initiatives and whether they improved workforce preparedness through higher mobility scores. The Florida College System Mobility Scorecard is a powerful metric that offers profound potential of increased economic benefits for the state.

II. Literature Review

To understand the best way to achieve the governor’s goal and to create a robust measure for the Florida College System, our research investigated four questions: What is the largest socioeconomic demographic of students missing from college enrollment? What are the best factors for indicating that a student falls in this socioeconomic bracket? How should we evaluate the success of colleges in helping these students? And are there any resources or outreach programs that have helped increase both enrollment and students’ socioeconomic mobility? With a thorough investigation of the economic literature, we take a step forward in answering these questions.
II.A Low-Income Students

Historical data shows that over the last few decades, high-skilled labor has increased demand, and the returns from earning a college degree have also been rising. However, the need has been met with stagnant increases in the postsecondary. The exception to this is increased attendance - both in terms of absolute and share of total enrollment - of low socioeconomic students.\(^{10}\) Nevertheless, compared to high-income students, it is much more probable that low-income children will not attend higher education institutions and will achieve no post-secondary degree.\(^{11}\) When low-income students do apply, it is often observed that even high-achieving students do not apply to any selective colleges or universities, despite having the scholastic record to compete at colleges geared for their rigor and academic investment. This is perplexing because not only is the value of a college degree great due to a high demand and limited supply, but low-income students — especially high-achieving students — will be admitted, advance, and graduate at the same rate as their peers from high-income families with analogous qualifications. Likewise, when financial aid is accounted for, low-income students typically experience lower net costs attending institutions with greater resources to invest in them.\(^{12}\)

Economic literature offers three explanations for this behavior.

There is increasing evidence that low-income students face a large information gap that frequently prevents them from applying and enrolling in colleges.\(^{13}\) Specifically, it is the lack of access to good information regarding the features and caliber of the institution and the cost of

\(^{10}\) Chetty, et. al., “Mobility Report Card,” 3.
\(^{13}\) Andrews, et.al. , “Recruiting and Supporting”.
This is detrimental to academically qualified students who could attend quality schools and who would likely pay minimal to no out-of-pocket costs for attending such colleges.\textsuperscript{15} It is due to this fact that collegiate scorecards, such as \textit{The College Scorecard} by the Department of Education and the \textit{Mobility Report Card} by the Opportunity Insights group, exist and why other scholarships and cost waivers have been instituted in many colleges. The problem caused by the information gap is exacerbated by the complexity and barriers present during the application process, most notably during the financial aid process. For example, the presence of application fees often turned low-income students away from completing an application. These students are often unaware of collegiate resources, such as cost waivers.\textsuperscript{16}

Another issue is the absence of scholastic resources throughout the childhoods of lower-income students. Typically, if families have limited resources at the time their student is applying to college, it signifies limited resources throughout the child’s lifetime. This problem often persists as the child ages and causes “long-run credit constraints” on the generations that follow.\textsuperscript{17} The lack of resources can also lead to students not being as academically advanced or prepared as their high-income peers. In turn, leading students from low-income families to face both “academic and social mismatch” upon enrolling at better quality schools.\textsuperscript{18}

\textbf{II.B Factors to Identify Low-Income Students}

There are multiple neighborhood-level characteristics indicating a student comes from a low-income background. This information can be used in the absence of individual income.

\textsuperscript{14} Hoxby, et. al., “Expanding College Opportunities”.
\textsuperscript{15} Andrews, et.al., “Recruiting and Supporting”.
\textsuperscript{16} Hoxby, et. al., “Expanding College Opportunities”.
\textsuperscript{17} Andrews, et.al., “Recruiting and Supporting”.
\textsuperscript{18} Andrews, et.al., “Recruiting and Supporting”.
information. The article, *The Opportunity Atlas: Mapping the Childhood Roots of Social Mobility*, investigates the likelihood of economic mobility for individuals based on tract-level characteristics. Typically, racial and ethnic demographics can serve as an indicator, especially if the neighborhood is largely foreign born and minority. Other variables, such as the fraction of single parent-household, teen pregnancy rates, and level of poverty, can be used as an identification for low-income students when rates are high. Low shares of individuals with jobs, low average household incomes, and low test scores indicate low economic mobility. However, these variables increase the chance for greater economic mobility, even if the student comes from an impoverished neighborhood. Similarly, students' mobility rates are higher when they come from neighborhoods where the fraction of single parent households is low. Due to the fact that low-income families face long-run credit restraints and often get caught in the cycle of intergenerational poverty, students facing the greatest income disparities tend to come from places with lower economic mobility. Thus, these factors can serve as helpful indicators that a student will have less access to college and a smaller likelihood of success.

**II.C Measuring College Success**

Combating the information gap, barriers within the application process, and the limited academic resource availability that plague low-income students’ college decision-making is imperative to further increase enrollment into state colleges. Two resources that have been created to bridge the information gap problem while simultaneously serving as an indicator of collegiate success are the Department of Education’s *College Scorecard* and the Opportunity

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20 Andrews, et al., “Recruiting and Supporting”.
Insights’ Mobility Report Card. These success measures serve as the foundation of our scorecard.

The Department of Education: College Scorecard

The College Scorecard was developed to increase transparency and enable potential undergraduate attendants to have access to information on institutional success, thus helping students measure the opportunity costs of individual postsecondary institutions and the overall success of the school at preparing students for success. The measure provides access to collegiate information on average school costs, graduation and retention, financial aid and debt, necessary test scores, acceptance rates, and average earnings post-graduation, which can be further filtered by program and degree. It likewise provides a feature to compare multiple colleges at one time, enabling students to easily weigh the trade-offs of attendance and finding which program best suits the individual’s needs and goals. Apart from college information, the scorecard contains links to federal financial aid services such as the Free Application for Federal Student Aid (FAFSA) and other scholarship links. This helps close the information gap further for low-income students as well as alleviate some of the application and cost barriers associated with post-secondary admissions. Colleges likewise can use the measure as an internal evaluation tool to yearly track progress in student retention and earnings after graduation.

The Department of Education (DOE) built their scorecard with institutional-level information and individualized data regarding specific fields of study and outcomes of the degrees offered at each school. Datasets used are gathered through federal reporting from institutions, data on federal financial aid, and tax information. Most information is drawn from the Integrated Postsecondary Education Data System (IPEDS), enabling more in-depth reports
for schools that report their information. Student costs measures, such as average financial aid a student receives or earnings post-graduation, is collected from the National Student Loan Data System and other tax-data driven measures.

By providing easy access to institutional information regarding costs, success, and academic quality, the College Scorecard is a user-friendly means for overcoming the information gap. Thus, as our model advances, we intend to use the scorecard as a basic framework.

**Opportunity Insights: Economic Mobility Report Card**

Although the College Scorecard provides much information regarding college characteristics, it lacks specific measures of economic mobility and the means to trace the outcomes of students from different socioeconomic backgrounds. The Opportunity Insights researchers have advanced the uses of the College Scorecard by creating a measure of economic mobility primarily for four-year post-secondary institutions. This further enables students and colleges to evaluate how efficiently the school achieves good placements post-graduation and how obtainable it is for low-income students to enroll.

We chose to base our economic mobility measure off of the Opportunity Insights group, specifically their research and creation of the *Mobility Report Card: The Role of Colleges in Intergenerational Mobility*. This paper investigates two main questions: Which colleges in America contribute the most to intergenerational income mobility and how can we increase access to such colleges for children from low-income families.\(^{21}\) Using individualized student and families’ earnings data to compare the outcomes of 19-22 year olds born between the years

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\(^{21}\) The *Mobility Report Card* uses information on college attendance, de-identified federal income tax return to track student earnings in their thirties and initial parent’s household income, and other data collected from the Department of Education’s when assembling the College Scorecard.
of 1980 to 1982, Opportunity Insights calculated economic mobility, defined as “the fraction of students who come from the bottom quintile of the income distribution and end up in the top quintile.” In other words, the product of collegiate access and college placement success post-graduation.

Overall, four main results are concluded: there is substantial variation in access to colleges across the income distribution; depending on the college attended, children from low- and high-income families have similar earnings; there is a large range of mobility rates across colleges; lastly, since 2000 there has been a large increase of the number of children from low-income families attending college.

The first three conclusions reveal that most colleges provide a “level playing field” for its students, whether through the admissions of students or providing higher value-added to children from low-income homes. However, despite a similar baseline and opportunities for success, there is large variation in how accessible colleges are to students with low-income backgrounds. This information is critical to our investigation as it not only provides a benchmark for measuring economic mobility in the Florida State College System, but it also identifies that the main issue of low economic mobility scores is a result of accessibility. Therefore, looking at individualized student placements and earnings post-graduation remains important; however, many colleges have invested large portions of their resources into amplifying their job network and in turn obtain reasonable results at jump-starting their students into careers. In other words, collegiate success measures are more standardized between different institutions. However, accessibility of colleges to low-income students varies largely not only between different types

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22 Chetty, et.al., “Mobility Report Card”, 2-3. The mobility rate is the product of the access and success rate; where access is measured by the fraction of its students who come from families in the bottom quintile and the success rate is the fraction of students reaching the top quintile.

23 Chetty, et.al., “Mobility Report Card”, 2
of colleges (i.e., public, private, 2-year, 4 year), but between schools of the same type. Thus, we intended to emphasize our research on how easily students from low-income backgrounds can attend each college, as this is the greatest determining factor of the mobility score.

The final conclusion regarding the increase in low-income students attending college can be attributed to the increase in their attendance at 2-year colleges and for-profit institutions. It is due to this fact, we decided to narrow our research to purely investigating the economic mobility of Florida’s primarily two-year college programs. These colleges often face a different demographic of students and are influenced by characteristics that vary from those faced at both public and private four-year colleges.

II.D Educational Outreach Programs

Given that accessibility to college is often the determining factor for a lower economic mobility score, colleges need an intentional, data-driven method for helping low-income students overcome the information gap, application barriers, and academic resources. To identify potential solutions already in place within the Florida State College System, we explored outcomes of college-level educational outreach programs. Specifically, we tailored our research to programs whose goal is to increase low-income student enrollment and success, as both these elements are key to obtaining high mobility scores. There have been many tested methods that produce promising results: sending personalized college information and recruiting packets to students, hands-on academic coaching services or mentorships, and financial assistance.\footnote{Imberman, et.al., “Recruiting and Supporting”; Information packets were sent in an experiment researched by Dynarski et al. (2018) wherein the University of Michigan sent recruitment packets promising full-tuition waivers to low-income, high achieving students who were accepted to the university. This study found increased enrollments for the university. Similar results were found in Hoxby and Avery (2013). Bettinger and Baker (2014) and Oreopoulos and Petronijevic (2018) found providing academic coaching to undergraduate students was associated with increased educational attainment as measured by GPA and retention rates. This agreed with results of Angrist}
example, the Hoxby and Turner experiment sent low-income students semi-customized information packets regarding various colleges, their net costs, and no-paperwork fee waivers. Students were also given advice by an expert councilor that would help them select eight or more colleges to apply to; these colleges are designated as "peer" colleges. Results depicted an increase in the number of college applications by 48% and 55% for peer colleges. Students receiving the interventions were also admitted into 31% more colleges, and for peer schools the students were 78% more likely to be admitted. Not only were the application and enrollment decisions altered, but graduation rates increased by 15%.

Other successful programs offer a recruitment component which correlates with increased economic mobility. One example is the Longhorn Opportunity Scholarship at the University of Texas at Austin which focuses on enhanced college quality, grant aid, and academic support services. The program targets students at five different high schools and provides these students scholarships that cover most tuition and fees when paired with Pell Grants, specific course offerings for the scholarship recipients, and extensive support services through free tutoring, peer mentoring, and guaranteed study spaces in residence halls. It is through the comprehensive support that these three mechanisms provide for low-income students, that the program not only raised the educational attainment, but also the earnings of low-income students. It should be noted that other similar programs substituting solely career mentorship for academic-focused support had no positive impact on student placement in college or success post-graduation.

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et al. (2009) which showed peer mentoring led to academic gains for women. Lastly, financial assistance significantly increased grades and graduation rates in Clotfelter et al. (2016) and Page et al. (2019) However, merit aid may reduce the academic performance of students who enroll at schools with lower resources. (Cohodes & Goodman), Nonetheless, low-income students typically do not make up a large portion of merit-based aid (Dynarski, 2000).

25 Hoxby, et. al., “Expanding College Opportunities”.
26 Andrews, et.al., “Recruiting and Supporting”.
Overall, the outreach programs that targeted the multitude of barriers disadvantaged students faced had the best success. However, many of these programs were offered from independent organizations or major university systems. There has been limited research conducted on educational outreach programs correlated primarily with two-year colleges. Therefore, we intend to investigate Broward Unlimited Potential (Broward UP), a localized program in the Florida State College System that’s methods mirror other successful programs.

**II.E Moving Forward**

By drawing on the *College Scorecard’s* framework and tailoring Opportunity Insight’s *Mobility Report Card* to two-year colleges, we can effectively analyze how well the Florida State College system is providing for its students from low-income backgrounds. Specifically, we will look at access and success measures for the college. We will also track outcomes of students participating in the Broward UP program to determine its impacts on student access and success rates to see if it can act as a model for how current state colleges may be able to enhance their economic mobility outcomes through educational outreach programs.

**III. Data**

In this section we describe how we built our analysis sample, define the principal variables, and present our summary statistics.
III.A Sample Definition

Our main sample of children is composed of individuals attending Broward College. Approximately, there are 24,243 people in our sample, with 3970 students who participated in the Broward Up program. A detailed description of the methods we used to construct this sample from the raw data is found in Appendix III.A1. Each student has an identification number which we use to distinguish them. In the reports given by Broward College and Broward Up, we are provided with a variety of information including academic year, student dependency status, and the student’s and parents’ adjusted gross income (AGI). We use the identification number to track the student’s attendance in both the Broward UP program and in Broward college over the 2015-2016 academic year to the 2020-2021 academic year. This information is used to track the degree obtained upon completion as well. The sample also consists of fourteen characteristics from Opportunity Atlas, such as poverty rate, teen birth rates, fraction of foreign household, that can be used as explanatory variables. Apart from individual and parent adjusted gross income- that students’ come from low-income backgrounds.

III.B Measuring Incomes

Incomes Upon Entering College

To determine the socioeconomic status upon entering Broward College or Broward UP, we used individualized data on reported adjusted growth income (AGI) data. For individuals claiming to be independent, we assume the use of their personal AGI, and for those claiming

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27 For a complete list and description of variables used from Broward College and Broward UP data, see Appendix III.A2.

28 For a complete list and description of variables used from Opportunity Atlas, see Appendix III.A3.
dependent status, we use parental AGI. Students attending Broward College have an average adjusted gross income of $23,001 and a median income of $17,192. Their parents' AGI has a mean of $42,685 and median is $30,268.

**Figure III.B1 Distribution of Initial Incomes for Broward College Students**

![Graph showing income distribution for students and parents.](image)

**Notes:** This graph shows the 25th, 50th, and 75th student and parent income percentiles for Broward College attendants. These income levels are the initial levels reported by students upon entering each year. The numbers atop the bars are the earnings level. Students falling in the 25th percentile all fall below the poverty level for the state of Florida.

For students who participated in Broward UP, the mean of student AGI is $21,350 and median income of $17,368. Parental AGI for Broward Up students have a respective mean and median of $32,868 and $26,537. Compared to the median Broward County household income, $59,547, the median household income for a student attending Broward College is about $29,279 less.29 This number increases to $33,010 less for Broward UP parents.

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Notes: This graph shows the 25th, 50th, and 75th student and parent income percentiles for Broward UP participants. These income levels are the initial levels reported yearly by students upon entering Broward College. The numbers atop the bars are the earnings level. Overall, the earnings for Broward UP students and parents are below the state and county levels. The 25th percentile students are all fall under the defined poverty level in state.

From these statistics we can see that Broward UP participants come from lower socioeconomic backgrounds than the typical Broward Student. However, the difference are not great meaning a significant portion of the students attending Broward College come from lower socioeconomic backgrounds as well.30

Incomes Upon Entering College

For students' earnings post-graduation, we used the information on Broward Colleges’ 270 degree and certificate types offered at their institution. Since Broward College does not

30 For further information regarding income differences between Broward College and Broward UP students, see Appendix III.B1.
collect individualized earnings data for post-graduates, we used the Florida Departments of Education Vocational Reports on the Florida College System’s information to find the average expected earnings of each degree.\textsuperscript{31} For ninety-four of the degrees and certifications, we used Broward-specific average earnings of students with that with the specific award type. For example, if a student was getting an A.S. in Nursing, the average earnings of an individual who completes this degree from Broward is $57,952.

The Florida Department of Education did not have Broward College-specific earnings data for the remaining 177 programs. As a substitute for sixty-two of the degrees, Broward's award-specific data we are able to obtain statewide earnings for students’ with those degrees are available. For example, Broward-specific information is not available for students graduating with a T.C. in Digital Media Web Production. Therefore, we used the average earnings of this degree from a graduate of the Florida State College System, which is $34,872.

For the remaining 114 degrees that are not reported by the FDOE, we used the overall Broward College average earnings for people with that award level (i.e., AS, ATC, VC, etc.). For example, an A.S. in Marketing Management is not published for Broward or the Florida College System as a whole, therefore we used the average earnings of a student at Broward with an A.S. degree: $51,028. For information regarding the projected earnings of each degree and program, see Appendix III.B2.

\textsuperscript{31} We gather data from the twelve 2018-2019 Workforce Reports, containing the most recent income information. This is the same source that Broward college uses to advertise the potential earnings for their programs.
Figure III.B3: The Breakdown of Award Types Pursued by Broward College Students

<table>
<thead>
<tr>
<th>Degree Type</th>
<th>Number of Students Pursuing</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>19,331</td>
</tr>
<tr>
<td>AAS</td>
<td>154</td>
</tr>
<tr>
<td>AC</td>
<td>5</td>
</tr>
<tr>
<td>AS</td>
<td>3,479</td>
</tr>
<tr>
<td>ATD</td>
<td>25</td>
</tr>
<tr>
<td>BAS</td>
<td>735</td>
</tr>
<tr>
<td>BS</td>
<td>171</td>
</tr>
<tr>
<td>BSN</td>
<td>134</td>
</tr>
<tr>
<td>EPI</td>
<td>3</td>
</tr>
<tr>
<td>TC</td>
<td>155</td>
</tr>
<tr>
<td>VC</td>
<td>51</td>
</tr>
</tbody>
</table>

Notes: This table displays the various award types pursued by the students at Broward College. The state college system focuses on 2-year degree pathways which is reflected by these results with most students pursuing an AA or AS degree.

Figure III.B4: The Distribution of Projected Student Earnings

Notes: Educational attainment plays a crucial role in economic mobility. This figure displays that the vast majority of individuals completing a degree will earn between $50,000-$60,000. This is significantly greater than the 50th percentile, and even the 75th percentile of Broward College and Broward UP students. Thus, degree attainment is likely to greatly increase not only students’ socioeconomic status, but their ability to get out of intergenerational poverty.
Some students pursued multiple degrees throughout their time at college before choosing a major. We sorted the data by the most recent year the student received financial aid. Then, we selected the most recent degree that the student achieved, or was in the process of completing, to determine which degree to use for projected income. Given that these are projected incomes of a student after they graduate, these earnings will likely be underestimates of true average lifetime earnings, as earnings typically do not level out until an individuals’ mid-thirties. This attenuation bias is especially large when comparing earnings of individuals in their twenties.\(^{32}\)

**III.C Student Characteristics**

Using information from Broward College and Broward UP, we identified a student's educational, demographic, and financial aid status using the student identification number. As previously mentioned, the students in our sample obtained at least one of the 270 potential degrees. To more easily identify and compare the academic areas that most Broward students pursued, we created a field of study category based on labels used through the Florida College System and the United States. This classification contains six titles:

- Arts, Humanities, and Communications
- Business, Management, and Administration
- Education, Human Services, and Social Sciences
- Health and Public Safety
- Manufacturing, Transportation, and Construction
- STEM

We assigned the programs to the corresponding categories based on collegiate educational groupings across the state and country. Some of the programs overlap multiple categories. In these cases we used our best judgement given the program description to assign their designated field. To see how we divided up the areas of study, see Appendix III.C1. Figure III.Ca displays the breakdown of both Broward students and Broward UP students’ field of study.

**Figure III.C1 Percentage of Broward College Students in each Field of Study**

*Notes*: This figure displays the different subject fields pursued at Broward College. The Arts, Humanities, and Communications field of study represents the majority of Broward attendants.
Apart from program statistics, the other academic information provided included enrollment status of the student—whether they were full time or part time—and student GPA. Demographic data on gender, race, ethnicity, age, and if the student was a first-generation college student was also used in our analysis. It should be noted that most of the students in our sample are not students right out of college, in fact the average age of a student in our sample is 29 years old. This is an important distinguishing factor from many four-year colleges and a reason our economic mobility scorecard is uniquely tailored to the Florida College System. More graphics on program information and student demographic can be seen in Appendix III.C2.

**Figure III.C2 Distribution of the Age of Broward College Students**

Notes: The majority of the students in our sample are between 20-25 years of age, with almost 70% of all students being between the ages of 20 and 30. Likewise, over half the students fall between ages 26 to 75. This large age range showcases how enrollment for the Florida College System is unique from university data, where the majority of students would be in the 18-19 and 20-25 age range.

33 Chetty, et. al., “Mobility Report Card”.
From financial aid information we identified the type of aid a student received, the award amount, and the year the student received the aid. We totaled the award amounts from year to year to determine the students' overall aid. Given that many colleges use the fraction of students with Pell Grants as a measure of low-income accessibility, we included a dummy variable for if the student received a Pell Grant award. From our sample, 18,615 out of the 24,243 students received the grant.

**Figure III.C3  Comparison of the Number of Students Eligible for Pell Grants at Broward College**

*Notes: This figure shows the number of Broward College students in our sample and their eligibility for Pell Grant scholarships. Over three quarters of the students enrolled at Broward is eligible for some type of Pell Grant. Many colleges use Pell Grant numbers to access low-income students. However, this estimate often overestimates the access variable.*

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18% of these Pell Grant-eligible students participated in Broward UP. Amongst the Broward UP students, 84% received the Pell Grant.

Overall, the student characteristics and demographic information enabled us to investigate which factors most greatly affect the economic mobility of Broward College students.

**III.D Neighborhood Characteristics**

According to the Opportunity Atlas, characteristics of the students’ neighborhoods are also helpful measures to indicate economic mobility. Children’s’ long-term outcomes are considerably impacted by the neighborhoods they grew up in. Moving a few miles away can impact a child’s expected earnings by thousands of dollars yearly, as well as significantly affect the likelihood of teen pregnancy, incarceration, and other life-altering outcomes. Since the students in our sample come from 42 counties and 437 different zip codes in the state of Florida, the use of neighborhood characteristics help showcase the additional socioeconomic barriers each student faces, as well as which students have greater likelihood for economic mobility.

We used fifteen variables found in the Opportunity Atlas and U.S. Census Bureau dataset, which were argued to have the highest correlations in accurately predicting an individual’s economic mobility. These variables include information on the areas’ overall population, labor market, households, and individual demographics. Examples of the variables include poverty rate, average household income, teen birth rate, and job density. To see summary statistics on the variables we use for neighborhood characteristics, see Appendix III.D.

This information was reported for each census tract. Given that we only had the zip code for the students in our sample, we converted each of the variables to reflect zip code information. We did this by averaging the reported tract data. For example, the poverty rate for Broward
Figure III.D1  Florida Counties where Broward College Students Live

Notes: The shaded regions represent counties where Broward College students reside. Because schools in the Florida College System attracts students from across the state, the potential impacts of a mobility scorecard are quite large.
zip code 33004, the zip code contains six tracts with poverty rates of about: 0.1672, 0.1839, 0.4492, 0.1009, 0.1732, and 0.1331. We averaged these values to get a poverty rate of about 20.2% for zip code 33004.

IV. Methodology

In this section we describe the variety of approaches that are used to create an economic mobility score for the Florida College System. First, we discuss the methods we used to build to use the main scorecard given our own limitations to data. This model uses the income data discussed in section III.B. Specifically, we make use of Broward College and Broward UP participants’ initial student and household incomes, based on the dependency status reported, to assign the student to an income bracket. We follow a similar procedure using student’s declared majors, attendance years, and the projected earnings gathered from the Florida College System Vocational Reports to put individuals into their appropriate post-graduation income percentile. With the use of this information, we are able to assemble an access, success, and mobility score, as described in section IV.A. This model is a proof of concept given that we were unable to attain the necessary information for other schools.

Secondly, we address how a more basic version of our primary model which uses proxies for the access score. This alternative would be employed given limited to no information on initial student or household incomes. We created the framework for this measure using the student demographic information discussed in section III.C and neighborhood characteristics in III.D. Proxies are determined using correlation tests.
Lastly, we describe the two refined versions of the scorecard which can be used when more specific income information or access to tax records are available. We are not able to test these models given that we did not have access to the information. However, these models strongly pull from the *Mobility Report Card*. This section primarily discusses improvements that could be made to our methodology given the right data.

**IV.A Creating a Florida College System Mobility Scorecard**

**Defining Access**

The first step in computing the economic mobility score is to determine the probability that a student attending the college comes from the lowest portion of the income distribution. Modeling the *Mobility Report Card*, we used this as our measure of access. In order to define the lowest portion of the income distribution, we used Florida income percentile in 2020 through information from the Current Population Survey.\(^3^5\) Figure IV.Aa depicts the quartile distributions of individual and household incomes for the state.

According to Pew Research, the people in the lowest income bracket make less than two-thirds of the median income.\(^3^6\) Since the 50% percentile for individual incomes is $40,000 and $58,150 for household incomes, the low-income bracket for individual incomes should be about $26,700 for individuals and $38,800 for household incomes. Florida incomes in the 30th percentile fall slightly below this at $25,000 for individual income and $35,226 for household incomes.

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income. Therefore, we will define access as the probability that a student attending the college is at or below the 30th percentile of Florida’s income distribution.

**Figure IV.A1 The Quartile Income Distribution for the State of Florida**

![Income Distribution Chart]

**Notes:** These figures represent the income quartiles individual and household income in Florida. When compared to the income quartiles of Broward College these are significantly larger in each quartile.

To determine who falls in this bracket, we used the individual-level incomes provided of students entering college that were provided by Broward College and Broward UP. As noted in section III.B, students are assigned an initial income based on their reported dependency status. For independent individuals, student adjusted gross income was used. Conversely, dependent students were paired with parental adjusted gross incomes for their starting income. If a student did not have a reported dependency status, household income was used. If this was also not reported, we used student adjusted gross income.

After assigning each student a respective starting income we divided the incomes into deciles. For the observations wherein student income was used, we use the individual income breakdowns provided by the Current Population Survey and every 10% level. These same steps
were followed for the students tied to parental adjusted gross incomes, however we broke them down into deciles by household incomes.37

After completing these breakdowns, we created a binary variable that assigned a 1 to all the individuals with incomes at or under the 30th percentile. All other observations were set equal to 0. The probability that the binary variable equaled 1 was our access score.

**Figure IV.Ab Florida Individual and Household Income Percentiles**

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Individual</th>
<th>Household</th>
</tr>
</thead>
<tbody>
<tr>
<td>10th</td>
<td>$9,000</td>
<td>$14,000</td>
</tr>
<tr>
<td>20th</td>
<td>$18,095</td>
<td>$25,000</td>
</tr>
<tr>
<td>30th</td>
<td>$25,000</td>
<td>$35,226</td>
</tr>
<tr>
<td>40th</td>
<td>$31,104</td>
<td>$45,222</td>
</tr>
<tr>
<td>50th</td>
<td>$40,000</td>
<td>$58,150</td>
</tr>
<tr>
<td>60th</td>
<td>$47,241</td>
<td>$73,014</td>
</tr>
<tr>
<td>70th</td>
<td>$58,000</td>
<td>$92,616</td>
</tr>
<tr>
<td>80th</td>
<td>$75,395</td>
<td>$119,462</td>
</tr>
<tr>
<td>90th</td>
<td>$110,020</td>
<td>$173,000</td>
</tr>
</tbody>
</table>

**Notes:** This chart depicts the decile income brackets we used to determine both the access and success measurements. Access is calculated by the individual and household incomes in the 30th percentile and below. Therefore, for students with initial incomes under $25,000 or if their parents incomes are under $35,266 the student would be categorized as a low-access student.

**Defining Success**

Success was determined by the probability a student had projected earnings at or above the 50th percentile, given they entered college at the bottom 30th percentile. For Florida, the 50th

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37 See Appendix IV.A for a side-by-side comparison of the income distributions of the Broward College students and Broward UP participants in our sample to the state of Florida.
percentile was an individual with income over $40,000. We decided to use this level for multiple reasons. First, students will need to move up at least two deciles of the income distribution and will be categorized as middle class. Secondly, an income of $40,000 for Broward College and Broward UP students is above the 75 percentile for individual adjusted gross income. Finally, given that the average earnings for an Associate’s degree holder in Florida earns $37,242, our success measure expects student incomes to be above this.

To determine if the student is at or above the 50th percentile, we followed the same procedure used to create the access decile for independent students. Using the projected earnings of each student's degree, we sorted them into deciles based on the Current Population Survey. Since we are only looking at the student, we used Florida’s individual incomes to create our distributions at every 10th percent. These breakdowns can be seen above in Figure IV.Ab. Once each student was categorized into their respective earnings bracket, we created a dummy variable placeholder for the individuals at or above the 50th percentile, so that a 1 is placed by students in this bracket and a 0 is given for students who are not. Next, we found the observations where both this variable equals one and where the access dummy variable equals one and created a final dummy variable. This represented the probability that a student is both in the lowest portion of the income distribution upon entering college and graduated college with projected earnings at or above the average Florida earnings. Once again, if a student falls in this category they are given a 1, and if not, a 0. We totaled up the number of observations where this variable equals 1 and divided it by the number of observations, 24,243.

38 If we were able to use lifetime earnings this 50th percentile measure could have been higher. However, given that starting incomes underestimate an individual average earnings, we lowered our success measure accordingly.
Finally, we used the conditional probability formula to calculate the probability that a student is in the top 50th percentile given they entered college in the bottom 30% of the income distribution. With this calculated probability that a student is both in the lowest portion of the income distribution upon entering college and graduated college with projected earnings at or above the average Florida income, we divide it by the access score. This quotient represents the success measure.

**Calculating the Mobility Score**

Lastly, we defined mobility as the probability a student’s earnings fall in the top 50th percentile and they started college with an individual or household income below the 30 percentile. To calculate this measure, we multiply access by success.\(^{40}\) A visual representation of this can be seen below.

\[
\text{Mobility} = \text{Access} \times \text{Success} \\
P(\text{Start in D3 and End above D5}) = P(\text{Start in D3}) \times P(\text{End above D5 | Start in D3})
\]

For a college to be considered high mobility, they must have an access score above 27% - the national average share of impoverished students at public two-year colleges.\(^{41}\) A successful school is one where over 90% of students end up in the top earnings bracket. Therefore, our temporary baseline comparison for a good mobility score is 24%.

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\(^{40}\) Chetty, et. al., “Mobility Report Card”.

**IV.B A Basic Mobility Scorecard**

The basic scorecard would be used in the case that an institution had limited to no information on student or parental incomes at the time the student entered school. Such a situation may occur due to privacy law limitations or lack of collection. In order to find an alternative to initial income data, and thus our low-income access measure, we ran correlation tests. We tested the access variable created in our main scorecard with the demographic and neighborhood characteristics provided by Broward UP, Broward College, and Opportunity Atlas.42 We used the Pearson Correlation test for evaluating binary variables (i.e. gender, Pell Grant Eligibility, etc.) with access, whereas for the remaining continuous neighborhood-level characteristics (i.e. poverty rate, teen birth rates, etc.) we used the Point-Biserial Correlation tests, a subset of the Pearson Correlation. Given the results from this correlation test, the variables with the highest correlations would be the best proxies for access. For example, if median household income has the highest correlation, then access would be defined as the probability a student comes from a neighborhood where the average income is in the 30th percentile. Likewise, if being from Hispanic ethnicity is a strong indicator for low access, access would be defined as the probability a student is Hispanic. The problem can be easily seen here with such broad definitions of access. A student may be Hispanic or come from a low-income background but have moderate to high wealth. This is why it is necessary for the correlations to be as high as possible. Similarly, this is another reason why this method should only be used in the case when initial student or household income information is missing.

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42 Details on this data can be found in section III.C and III.D, as well as in appendices IIIA.2, IIIA.2, III.C2, and IIID.
Therefore, at minimum the geographic breakdown of students enrolled must be known to compile neighborhood or county level information about the students’ likely upbringings or some type of student demographic information would need to be available. With this, our results and other economic research on how these factors affect mobility can help colleges choose the best access proxy.

In terms of success rate, the measure can still be calculated given degree information and average projected incomes. However, if individualized data for this is not available, the percentage of degrees and programs that students completed can be used as an alternative measure.

Under the assumption that no individualized student information is provided, a data sheet would have to be created where degree and geographic information is randomly assigned to an identification number. Then after computing for the access and success rates, a mobility score could be created. This process would need to be repeated until there is a smooth, normal distribution of what the actual mobility score may be.

Drawbacks of this process is that this score would likely have large standard deviations and would not be very accurate, due to the extensive assumptions being made. This is especially true if characteristics are collected at county level or larger. Therefore, we recommend the use of our main model if possible. However, although not perfect, this basic scorecard enables a mobility rate to be calculated and can give colleges a direction on what may be the best way to move forward.
IV.C Enhancing Our Scorecard

Refined Scorecard

For a refined version of our scorecard, individual reported earnings data post-graduation is needed. Because lifetime earnings typically level out in a person’s mid-thirties, the best reported income we could use would be when the student is this age. Given that our students are 29 on average when they obtain their degree, we could use earnings reported in. The late 30s or early 40s as well. This would be ideal as earnings income right out of college underestimates lifetime earnings.43 This depthness of earnings data would also enable the measure of success to be moved to a higher percentile of achievement, such as individuals who earn in the top 30th or 20th percentile. Similarly, it could give us broader information regarding the individuals for which the Florida College System acted as a steppingstone to achieve more advanced degrees.

However, tracking individuals through time may prove difficult, therefore collection of any information regarding specific student earnings after award attainment will make our scorecard more accurate and robust. One method we recommend is utilizing the alumni network and collecting survey data after students graduate. Also, collecting information regarding earning placements within the first six months or year after graduation could also be used.

Another feature that would enhance our scorecard is the reporting of a student’s graduation year. Currently, we measured attendance and completion by the last reported year a student received financial aid, as all students in our sample received some level of scholarship. However, a more accurate graduation measure would be the specific year a student completed

43 Haider, et. al., “Life-Cycle Variation.”
his or degree. Tracking when a student graduated will also ensure students who attended college but did not receive a degree—such as dropped outs, students attending via the high school dual enrollment program, or students who only attended for a summer class—are removed from the data set.

**Full-Scale Scorecard**

In order to create a complete economic scorecard, the use of tax data would be necessary. Following the collection methods of the *Mobility Report Card*, we provided a summary of how a tax-data driven report would be integrated into our model.

To better measure college attendance at all Florida State College systems, the recommended use of the 1098-T forms supplemented by the Department of Education’s Pell grant records. Each institution in the Florida State College System qualifies for federal financial assistance under the Higher Education Act of 1965, and thus must file a 1098-T form. Likewise, by pairing this information with the Pell grant records, low-income students who pay no tuition will also be accounted for. As discussed in the *Mobility Report Card* paper, the benefits of these sources is that it does not rely on students or parents voluntarily reporting the information. Using these sources for attendance records aligns well to the Current Population Survey and Department of Education’s Integrated Postsecondary Education Data System’s aggregate enrollment counts.\(^{44}\)

With the method notes above, college attendance could be measured as the college the student attended during the calendar year as reported in the 1098-T or NSLDS.\(^{45}\) However, in

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\(^{44}\) Chetty, et. al. “Mobility Report Card”.

\(^{45}\) Chetty, et. al. “Mobility Report Card”.
most cases tax data is not available, student federal financial aid indicators or collegiate identification numbers may be used to track when the individual entered college and when they left. For this, we recommend measuring attendance on the calendar year and using the first college he or she attended that year.

In terms of producing an economic mobility score, the use of income data from 1040 forms and third-party information returns, such as W-2 forms, would be needed. With this information, family income would be defined as the Adjusted Gross Income as reported on the 1040. If a 1040 is not filed out, the sum of wage earnings from the W-2 and unemployment benefits on 1099-G could be used. Similarly, child income could be defined as the total of wage earnings and net self-employment, if positive, based on the 1040 for single filers. Joint filers could be defined as W-2 wage earnings, self-employment income from Form SE, and half of the additional wage earnings on Form 1040 relative to his or her spouse's W-2 earnings. For individuals who did not file, W-2 earnings could be used.

The benefits of using these measures like the Opportunity Insights group is longitudinal data reported incomes rather than averages or projections based on the degree. Likewise, we could pull incomes from specific time frames, such as once an individual at age 35.

Due to limitations in data from privacy laws, we were only able to access the individual-level data provided by Broward College. If a data-sharing agreement among two-year colleges in the state college system could be established. Research using federal financial aid student identification numbers would be a major innovation in the data collection and research in economic mobility for the state. Useful way to track attendance for students between institutions and measure the splash effect that college investments impacts the community. Using the Mobility Report Card as a guide, attendance can be defined as the first institution a student
attends in the calendar year or the most attended college. Graduation years would also be useful for comparison of the final degree a student earned and their respective earnings. Tracking when a student graduated will also ensure students who attended college but did not receive a degree—such as dropped outs, students attending via the high school dual enrollment program, or students who only attended for a summer class— are removed from the data set. More broadly, if a student uses the Florida College System as a steppingstone to attend a State University, tracking if the student earned any higher degree and their employment in turn would help provide more accurate earnings information.

V. Results

V.A Mobility Scores

To begin calculating our mobility score we first looked at the access outcomes. Given that accessibility is defined as the probability a student falls in the 30th percentile of the income distribution, our access score is 52.46%. 12,718 of the observations fall in this bracket. Of these students, 8,490- or 66.76%— are in the 20% percentile, while 2,861 - or 22.50% - are in the 10th percentile. 2328 of the 12,718 students in the 30th percentile of the income distribution are Broward UP participants. Given their reported earnings, 58.64% of the Broward UP students are in the lowest portion of the income distribution.

When computing success we found that the probability a student is in both the access bracket and has expected earnings in the top 50th percentile is 0.4904509. We divided this by the probability a student is in the 30 percentile upon entering college: 0.524605. Therefore, our conditional probability, and success score is equivalent to 0.9348956, or 93.48%
Finally, we computed the mobility score by multiplying the access and success score together and found a Mobility Score for Broward College of 0.4904509, or 49.04%. Figure V.Aa shows how the mobility score differs when the income percentile used to measure success chances.

Figure V.A1 Mobility Score Outcomes for Broward College Students based on Alternative Success Measures

<table>
<thead>
<tr>
<th>Income Percentile Used for Success</th>
<th>Above 40% ($31,104+)</th>
<th>Above 50% ($40,000+)</th>
<th>Above 60% ($47,241+)</th>
<th>Above 70% ($58,000+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success Score</td>
<td>99.4339%</td>
<td>93.4896%</td>
<td>87.9777%</td>
<td>2.3116%</td>
</tr>
<tr>
<td>Mobility Score</td>
<td>52.1635%</td>
<td>49.0451%</td>
<td>46.1535%</td>
<td>1.2127%</td>
</tr>
</tbody>
</table>

Notes: This table was created using an access score of students in the bottom 30% of the income distribution. Then, success was calculated using our initial measure of a student who ends up in the top 50th percentile and compares this to outcomes with success being measured as the top 60th, 40th, and 30th percentile. For the above 40th to above 60th percentile, a little over $15,000 difference in post-graduation incomes, success and mobility scores do not drastically change. However, once success is defined as being in the top 30th percentile, the scores drop significantly.

Holding the accessibility score constant, the success measure shows that Broward College does an excellent job placing students into careers that will help the student overcome intergenerational poverty. There is a substantial decrease in the score when moving from success as measured in student outcomes in the top 40th percentile to those in the top 30th percentile. This is expected for two reasons: first, a majority of the students at Broward College are earning a workforce degree, such as a Technical Certification or an Associate’s degree, and Secondly, we did not use actual lifetime earnings data. The starting income for workforce degrees are typically below or near the median income of $40,000. However, success in the top 30% percentile, or even higher degrees or success, could be more applicable to study if we had access to lifetime
earnings data or were able to track individuals in their mid- to late-thirties, as this is when incomes level out.\(^46\)

Given that starting earnings for Broward College shows such a high success rate at being able to place students in the top 40% of the income distribution, Broward College is effectively placing its students post-graduation. We can see this through looking at the initial adjusted gross income distribution of Broward College students. Only students in the top 25 percentile were making over $30,004 upon entering college, while the median student income was $17,192. For dependent students, their parents’ household incomes at the 50% was $30,268. Thus, a significant portion of the low-income students were making far more than their initial earnings and their parents’ household earnings. These results likewise mirror those in the Mobility Report Card, as most schools typically have moderate to high success scores due to investment in their students, alumni, and network.

To determine how accessible Broward College is to low-income students, we compared Broward College’s access score to Broward College to the average share of impoverished students at public two-year colleges, 27%.\(^47\) Given that Broward has a score almost double this, it is clear they are a high-access school. To determine if one reason for this is due to the existence of the Broward UP program and it’s active recruitment towards helping low-income students achieve post-secondary education, we used the scorecard for purely Broward Up outcomes.\(^48\) These can be seen below in Figure V.Ab:

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\(^{46}\) Haider, et. al., “Life-Cycle Variation.”

\(^{47}\) Smith, "Study Finds More Low-Income Students Attending College."

\(^{48}\) For further investigation on the sensitivity of Mobility Scores to access rate definitions, see Appendix V.A1.
Again, given that the typical accessibility of a college is around 27%, Broward College proves to be highly accessible for students in the Broward UP program. Compared to individuals from similar socioeconomic backgrounds who did not participate, Broward UP increased the accessibility score by about 7.3% and overall mobility score was higher as well. Likewise, when compared to the college as a whole, which had an access score of 52.4605%, we can see that the higher accessibility score of Broward UP participants helped to raise this percentage.

When we look at overall outcomes, we still see that the access score for Broward UP students as a share of total enrollment, 9.6%, is significantly large given that we are comparing it to our entire sample.
Keep in mind that Broward UP is a relatively new program; it started in 2018. Likewise, as of December 2020, there were 2,325 currently enrolled in the program. Thus, when we look at the total number of Broward UP students in our sample of just under 4,000, and in turn the 2,338 classified as being in the bottom 30% of the income distribution, it is not surprising that the probability of pulling a random student who has participated in Broward UP and is a low access, from the 24,243 students in our data, is less than 10%. only 9.6%.

More interesting though, is the evidence given by the success measure. Given the use of the conditional probability formula, the success score inherently measures the probability a low-access Broward UP student had success to the total number of low-access students. Therefore, the probability that a Broward UP student achieved earnings in the top 50th percentile given they started in a low-income background was 99.1409%. This is higher than the success score of students with a similar socioeconomic background who did not participate in Broward UP, 93.72%. Therefore, students who participated in Broward Up had a greater probability of success than those from low-income backgrounds who did not.

Overall, given that Broward College achieved access scores far above the 27% national average, and success rankings above in the high 80s and 90s, the college is performing well in these two areas. Likewise, Broward College’s mobility score is more than double our baseline of 24%. Therefore, the college is a great model of economic mobility in the Florida College system.

V.B Alternative Measures for Low-Income Access

For the use of the more basic scorecard, we ran correlation tests on the demographic and neighborhood characteristics to find possible proxies for access. Out of the 27 variables tested, Pell Grant eligibility had the highest correlation with our variable indicating a student
had low access (correlation = 0.48). With 95% confidence, the correlation was between 0.47 and 0.49. This shows a positive correlation between the access and Pell Grant eligibility. Thus, if a student is qualified for receiving the grant, it is likely that he or she is also a low-income. However, the Pell Grant is not a perfect substitute for incomes as there is only moderately correlation. Nonetheless, it is the best proxy given the information in our sample.

**Figure V.B1 Scatterplot of Access and Pell Grant Eligibility**

![Scatterplot of Access and Pell Grant Eligibility](image)

**Notes:** This graph showcase the scatterplot results for the correlation between the low-access variable and Pell Grant eligibility. Because both of these variables are binary, they only take on values of zero and one. From the slope of the line, it can be seen that there is a positive correlation between the variables and the steepness of the line shows moderate correlation.

The outcomes of other student level characteristics, such as race, ethnicity, and first-generation college students did not have high correlations for our dataset; although statistically significant, the correlations were only slightly above zero. Thus, indicating very weak correlations.

If student Pell Grant information is not available, the next option would be utilizing neighborhood characteristics. Of these variables, poverty rate, the fraction of individuals married
at 35 years old, single parent households, and average household incomes have the correlations. Their respective correlation and 95% confidence intervals can be seen below:

**Figure V.B2 Scatterplot of Access with the Four Top Correlated Neighborhood-Level Characteristics**

*Notes:* These scatterplots show a much flatter slope when compared with Figure V.B1. This flatness indicates a much weaker correlations between these variables and the access score. Poverty Rate and Single Parent Households both have slightly positive correlations with access. In contrast, Average Household Incomes and the Fraction of Individuals Married by 35 have slightly negative correlation with age. From these graphs these variables would not be good proxies for access because of their weak correlations with the variable.

As seen above, poverty rate and fraction of single parent households have positive correlations. Thus, the higher these rates are, the more likely the student also falls into the low access bracket. Conversely, average household income and the fraction of individuals who are married by age 35 have a negative correlation to access, meaning an increase in these levels
suggest it is less likely a student is from a low access background. It is important to note that these variables have a much weaker correlation with access than Pell Grant eligibility. As can be seen by the scatter plots, they are highly imperfect.

To compare the use of these proxies to our main model, we used our two best proxies—Pell Grant Eligibility and Poverty Rates—in our scorecard. Figure V.Bc shows the results below.

**Figure V.B3 Comparing the Use of the Top to Proxies to the Primary Model’s Access Score**

<table>
<thead>
<tr>
<th></th>
<th>Primary Model</th>
<th>Basic Model using Pell Grant Eligibility Proxy</th>
<th>Basic Model using Poverty Rate Proxy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Access</strong></td>
<td>52.4605%</td>
<td>76.78505%</td>
<td>18.8838%</td>
</tr>
<tr>
<td><strong>Success</strong></td>
<td>93.4896%</td>
<td>93.7631%</td>
<td>92.3985%</td>
</tr>
<tr>
<td><strong>Mobility</strong></td>
<td>49.0451%</td>
<td>71.9960%</td>
<td>17.4483%</td>
</tr>
</tbody>
</table>

Notes: These models reiterate the correlation test that neither of these variables are ideal for calculating a mobility score, but if information was needed, Pell Grants would be the best alternative access measure. For colleges who use this as their measure, they will likely be greatly overestimating their access and mobility scores. For poverty rate, we consider a student to be low access if they come from a neighborhood where poverty the poverty rate is higher than 20%. We chose this one measure used to define low-income geographic areas.49

Overall, status of Pell Grant eligibility is the best proxy for low-income access. If this is unknown and access has to be based on neighborhood characteristics, places with the highest poverty rates will serve as the best indication of low access. These proxies should only be used if initial income data is not accessible.50

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50 For the correlation results of all variables, see Appendix VI.A
VI. Potential Economic Impacts Associated with the Adoption of the Mobility Scorecard

Strengthening the mobility scores of colleges throughout the college system will likely need the assistance of education outreach programs to overcome the information gap, resource constraints, and barriers found in the application process. Given the success of Broward UP in influencing the economic mobility score and increasing access to low-income students, we researched the economic impacts associated with the initiative.

Using a study done by Florida TaxWatch, we found that Broward UP has already been noted as “a statewide leader for its pioneering efforts to reduce intergenerational poverty by redesigning the way workforce education is delivered.”51 The financial and economic impacts of Broward UP found by Florida TaxWatch point to the significant economic impacts of this program. The organization found that the return on investment for students was 19.27; for each $1 of cost and foregone earnings due to Broward UP participation, each student was expected to gain $19.27 in potential lifetime earnings. After subtracting a student’s opportunity costs, the total private market value of lifetime earnings for 2,325 Broward UP students is $1,377,543,387.52 When compared to their total potential earnings given the median earnings with a high school diploma, $902,796,950, Broward UP students earned just under $475 million more. Per student, this is about $204,192 more. The Florida TaxWatch Report also found that the average employment multiplier of 1.65 across all of Florida’s economic sectors depicts that 65

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52 The TaxWatch group assumes that students who took health science classes gave up 200 hours of their time to class instruction and studying, whereas students who took non-health science classes gave up 50 hours of their time. At an $8.65 minimum wage rate, these opportunity costs translate to about $1,730 and $433, respectively, for each course taken. In reality, course time and commitment may vary among students.
additional indirect jobs will be created for every 100 direct jobs. When executing the multipliers on Broward UP, it is estimated that its 1,928 direct jobs will create 1,253 indirect jobs. Likewise, given the growth in the labor market, it is expected that between 2020 and 2028, Broward County will grow about 12.3%, or gain about 110,541 jobs. Broward UP helps provide the supply for workers as 83% of Broward UP students are projected to get a job within a year of completing their respective degree or certificates. These students will generate about $71,870,364 in personal income. It is interesting to note that about 1,385 of these job placements are pursued by students who participated in Broward UP’s non-credit/non-degree seeking awards, “indicating a low-cost alternative to traditional higher education methods.” This suggests that similar programs may help colleges allocate resources more efficiently to help promote socioeconomic mobility while helping to achieve the governor’s goal to be first in the nation for workforce education. With the success of this model, we expect the results to be exponentiated should other colleges tailor the framework to fit their community.

Advancing mobility and low-income educational outreach programs will likewise have great economic impacts due to the fact that about 68% of alumni from two-year colleges stay in Florida. Over a ten-year window, each $1 added to gross revenue is associated with the generation of an additional $9.20 to $13.08 for Florida personal income. For the expected work life of students completing their degree in the Florida State College system, every $1 added to Gross revenue is associated with the generation of $31.40 to $44.88 of additional Florida personal income.\(^5\) Because Broward UP-like programs mitigate intergenerational mobility, students are expected to go off of public assistance programs as well. For Broward UP

specifically, the state’s cost savings ranges between about $1.1 million to $22.4 million yearly. This would only be exponentiated if implemented at other colleges.

VII. Recommendations

VII.A Scorecard Advancement

As mentioned in section IV, our scorecard is a proof of concept and its advancement relies on more specific, individualized data. By collecting as much information regarding student backgrounds, income- both pre- and post-secondary attainment- as well as graduation and retention details, our scorecard will be more robust in producing a complete depiction of college-level economic mobility. One recommendation we make for collecting this information is sending surveys to students to track income outcomes post-graduation. Tracking student outcomes will enable a more precise measure of success and in turn, a more exact mobility score. Specifically, tracing earnings data across a ten-to-fifteen-year period after a student graduates would be ideal as this will give time for average lifetime earnings to level out. However, any means of more specific earnings information, even if it is simply one year to five years out, would enhance the success measure’s accuracy.

Moving forward, researchers may want to test the correlations between the access measure and eligibility for financial assistance programs as access proxies. In our sample, a large portion of the information regarding if a student or parent received or qualified for Supplemental Security Incomes (SSI), Supplemental Nutrition Assistance (SNAP), free or reduced lunches, Temporary Assistance for Needy Families (TANF), and/ or the Women,

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54 Calbro, “Independent Assessment”. 
Infants, Children nutrition program (WIC) was not available. Thus, we were unable to test these measures correlations with access. However, we believe further investigation of the use of qualification for financial assistance as an access proxy would be beneficial as it could serve as potential indicators for low access and may be used as proxies in the absence of income data. Ideally, the correlation tests could be rerun using all the information available from the Florida State Colleges, as more observations would enable results more accurate to those of the total population.

VII.B Scorecard Usage

To make use of the information provided by our primary mobility scorecard, we recommend using it as an internal evaluation tool. By comparing access to the national average of 27%, colleges can use the access, success, and mobility scores to determine how well they are allocating resources. If a college has been highly investing in a program to increase accessibility, but continues to see stagnant, declining, or overall low access score, the metric could serve as a tool to open discussion for alternative methods moving forward.

Likewise, given the contrasts in the earnings, taxes, and the programs chosen by students attending each state college, the definition of wealth brackets and the possibility for certain income outcomes may be drastically different. Using state-wide individual and household income deciles, we created a baseline analysis to test mobility. However, individual schools can alter the numbers for the income distributions in their area for more specific results. This can help schools narrow in on which income brackets are most struggling as well as give localized data for more informed decisions.
Additionally, because the colleges in the state system are of a similar type, with the integration of most or all the colleges’ income and earnings data into our metric a mobility score for the Florida College System can be calculated. This score can act as a baseline value for how well colleges are performing compared to the rest of the state. This would enable institutions to begin experimenting and isolating factors at colleges with high levels of mobility. Similar to how four-year intuitions currently frequently look to the U.S. News Rankings for top universities, a large-scale metric which identified key success indicators for two-year institutions could also hold a similar level of influence. If the rankings were made public and became standardized, it would be very easy to see which two-year colleges were outperforming others in socioeconomic mobility. As a result, colleges with lower rankings would be incentivized to improve, due to concerns of reduced funding and enrollment or pushback from the state government to increase workforce preparedness. On the other side of the spectrum, colleges performing at the highest level could expect increased funding. Therefore, a large-scale metric incorporating data from the entire Florida College System could leverage public engagement to foster competition between universities to ultimately improve the effectiveness of both the state's economy and its colleges.

**VII.A Establishing More Broward UPs**

We also recommend the use of Broward UP as an educational outreach program model. Following in the arguments of Florida TaxWatch, we believe schools and policymakers should incorporate the Broward UP framework as a model for the rest of the state” by encouraging partnerships between postsecondary intuitions, communities, and local organizations. The Florida College System is ideally positioned as it allocates many

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55 Calbro, “An Independent Assessment”.
of its resources to student’s career development and technical education at lower costs while maintaining connections with the surrounding communities. By focusing on the establishment of similar workforce development programs which target the barriers faced by low-income students, higher education will be provided for students in populations who typically do not access it.\textsuperscript{56} As seen in our results, students from the bottom 30\% of the income distribution who participated in Broward UP achieved higher success than those who did not participate. Due to the fact that low-income students are one of the largest socioeconomic groups with the lowest levels of post-secondary attainment, by establishing a Broward UP-like program statewide, the Florida College System can help to increase student’s workforce education completion. In turn, supporting the governor’s goal to increase workforce education rankings.

Apart from the education benefits, is the impact it has on the families and future generations of low-income students as well as the state economy. By providing individuals with the greater opportunities in accessing and completing a post-secondary degree, educational outreach programs also help to lessen intergenerational poverty. Consequently, this will lower spending on welfare programs while increasing the revenue provided by skilled labor.

Given that Broward UP is a bottom-up approach, the framework can take on the needs of individual communities. Utilizing its uniquely designed to assist students in the most impoverished zip-codes, we recommend that colleges who adopt the model tailor its approaches to best fit their targeted community. For example, students in the most impoverished zip codes surrounding Northwest Florida State College may lie with the rural areas surrounding the college. The needs of students from these areas are likely to differ from the impoverished students from city zip codes in Broward.

\textsuperscript{56} Calbro, “An Independent Assessment”.
A final recommendation we have is to create a student identification number system for students that participate in the educational outreach programs tied to the Florida College System. This would enable students' outcomes to be tracked throughout the program and their outcomes if they graduate from one of the Florida colleges.

VIII. Conclusion

Using data covering Broward College students from 2015-2021 and the Florida College System Vocational Reports, this paper has distinguished the income distributions of student’s pre- and post- degree attainment for Broward College. With this, the accessibility of Broward College to low-income students, and in turn, the success of Broward College at placing students into careers raising their position in the income distribution, has been defined. For institutions lacking income data, we test potential proxy variables and recommend factors that can be used in lieu of the traditional access score. This allows flexibility for colleges to adapt our mobility scorecard given the student demographic information they have available. Overall, by multiplying the access and success scores, an economic mobility report is established. Though we only were able to produce results for Broward College given our own data limitations, this metrics provides a proof of concept and framework wherein other state colleges can import their data and correspondingly receive their economic mobility report. This can likewise be expanded to determine the mobility score for the Florida College System as a whole.

The Florida College System Mobility Scorecard acts as a feedback mechanism regarding how well a college is allocating sources to support economic mobility. Through integration of more individual-level data into the scorecard, the scorecard will provide more accuracy and
value for the colleges. The establishment of this metric enables policymakers to initiate incentive programs to increase collegiate mobility scores. Likewise, students can use the information to make more informed decisions about the impacts of college attendance.

As seen in studies regarding economic outcomes of obtaining a post-secondary degree, we likewise expect statewide economic development from increased mobility and attainment.\textsuperscript{57} Broader economic impacts include increased personal income, gross revenue, and job creation. With the expansion of access, the Florida College System can also help alleviate the intergenerational poverty issue. This simultaneously will enable decreased expenditure - by millions of dollars - on public assistance programs.\textsuperscript{58}

Our investigation on methods to help low-income students overcome access barriers showcased that the educational outreach model of Broward UP proved to be a noteworthy initiative. It’s mobility report displayed increased accessibility and success for low-income participants. Therefore, students involved in Broward UP were the granted tools needed to help expand their pursuit and admittance into post-secondary institutions. When compared to their low-income peers who did not participate, students who took part in Broward UP achieved higher levels of success in moving up the income distribution.

In using the Broward UP framework and tailoring it to the needs of the respective low-income areas surrounding each of the Florida state colleges, we believe recent trends of increased attendance of low-income students at two-year colleges will be reinforced. This will help augment overall workforce completion rates. Paired with the use of our metric to promote economic mobility in the Florida College System, colleges will help students become qualified

\textsuperscript{57} Neal, et. al.," An Independent Assessment".
\textsuperscript{58} Calbro, “An Independent Assessment”.
employees in a market highly demanding their skilled labor. Thus, not only helping students benefiting from increased earnings, but the metric supports the needs of businesses as well.

As the state of Florida advances on the nation stage in workforce preparedness by certification and degree attainment, we strongly encourage the implementation of a mobility metric and educational outreach programs to increase attainment of the individuals often missing from the collegiate demographic: low-income students. Through adopting the economic mobility scorecard, the college system signals to the rest of the state that there is value in helping students from low-income backgrounds obtain post-secondary degrees. From the results shown for Broward College and Broward UP, it is clear that when given the tools, low-income individuals achieve high academic and economic performance. This is further substantiated by economic literature wherein low-income students have similar levels of success as their high-income peers. It is neither a lack of work ethic nor limited capacity for learning that holds these students back. Rather, it is the absence of support, resources limitations, and financial barriers preventing low-income students from obtaining degrees at higher rates.

By investing in the economic mobility scorecards, institutions showcase the falsehoods behind the connotations that “low-income” means “failure,” “inability,” or “a hopeless cause.” It instead signals to communities, to states, and -most importantly - to the individuals who just happen to be born or have fallen into an unfortunate circumstance, that there is hope, opportunity, and prosperity for their future. For even just the action of promoting economic mobility within the Florida State College system may lead to just as many intangible benefits, as the tangible ones. A whole demographic whose potential has been limited by circumstance can now further make their mark upon the world.

59 Andrews, et.al. , “Recruiting and Supporting”
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56


-study-finds-more-poor-students-attending-college

X. Appendix

I. Information on Broward UP

Broward UP is a relatively new education outreach program started in 2018. The community-centric initiative works with organizations, such as the Boys and Girls Club, to tailor its approach to educating low-income communities. The group works with disadvantaged communities to help individuals obtain higher education degrees and/or job certifications through providing free educational opportunities, workforce training, and support services. What makes the Broward UP unique is that it specifically targets six unproportionally impoverished zip codes within Broward County where barriers to employment and education are the highest. These zip codes are primarily minority residents, “which have historically faced disproportionately high unemployment rates, low educational attainment, and low household income levels compared to Broward County as a whole.” For example, the average unemployment rate in 2019 was around 3.0 percent for Broward County and the median household income was $59,500, yet in the six targeted communities of Broward UP, the rate was between 9.8 percent to 15.2 percent unemployment and median household income was $46,300. Likewise, postsecondary attainment for individuals 25-64 years averaged 43.9 percent for the county, in comparison to Broward UP communities where it was only 27%. Focusing specifically on these areas enables Broward UP to target students in the most at-risk communities and offer them a means to overcome multiple roadblocks low-income students face with postsecondary attainment. The hands-on recruitment component, educational training and mentorships, and the direction of resources to tackle multiple of the issues faced by disadvantaged students aligns the program with the recipe for success provided by economic literature.

Figure 1. Broward UP Students Enrolled in Broward College by Zip Code

Notes: This Figure displays the concentration of Broward UP students in our sample based on their zip codes. These are the six most impoverished zip codes in Broward County and where Broward UP focuses its outreach.
Figure 2. Map of Broward UP Communities

Notes: This Figure showcases the areas of Broward County. The Orange areas are the six zip codes that Broward UP focuses its initiatives. Source: Florida TaxWatch: An Independent Assessment of the Value of Broward UP
**III.A1 Sample Construction**

This appendix provides description of how we built the sample in our analysis.

**Making Zip Code, Tract, and County Level Data for Florida**

To begin, we created a datasheet that contained zip code, census tract, and County level data. We obtained the zip code and tract information using information from the United States Zip Codes, consisting of 172,038 observations. This was necessary because some of the datasets consisted of groupings by tract (Opportunity Atlas) while others (i.e., Broward College, Broward UP) had student residence information by zip code. Because our scorecard is tailored to the Florida State College System, we filter the data to only include the state of Florida and merge county information to connect the zip codes to their specific county names.

**Filtering Neighborhood Level Characteristics**

Using the data from Opportunity Atlas, we create a dataset on household characteristics. We use their information on tract, area name, density of jobs in 2013, and the percentage of foreign-born households, single parent, fraction with short work commutes, and poverty between years 2012 and 2016. We also include the average individual and household income when a person is 35, teenage birth rates, fraction of individuals married at age 35, the employment rate when a person is 35, the fraction of individuals and household in the top 20%, and the percentage of adults who stayed in the same commuting or tract as they grew up in. Once again, we filter these variables to only include those within the state of Florida.

Some tracts contained no values for the respective characteristic; therefore, we dropped these observations. In order to compare how a students’ neighborhood affects their access to college, we have to transform our tract-level characteristics to zip code-level. We combine the Opportunity Atlas data with our zip code dataset. This dataset includes 8,082 observations. Upon doing this, we average the tracts' characteristics by zip code. For example, when computing the poverty rate for Broward zip code 33004, the zip code contains six tracts with poverty rates: 0.1672, 0.1839, 0.4492, 0.1009, 0.1732, and 0.1331. We average these values together to get a poverty rate of 0.20215 for zip code 33004.

**Individual Characteristics and Projected Income**

With the enrollment, demographic, financial aid, income, and program/degree provided by Broward College and Broward UP, we create a dataset containing all the individualized information of each student. This dataset contains Broward College initial income information for students years 2016-2021, Broward UP initial incomes for years 2016-2021, financial award information, and enrollment demographic data. We merge these datasets together by student identification number.

Due to the fact that we were unable to obtain individualized information regarding a students’ income post-graduation, we created a potential earnings variable based on the school, degree, and program the student graduated with. We drew this information from income reports from the Florida Department of Education and combined this with the other student data.
With all student income, demographic, and neighborhood characteristics in one dataset, we filtered out students whose identification numbers were duplicated. This occurred when a student attended the college for multiple years. We assumed that students last year of attendance and financial aid was the year they graduated. We also used their most current declared major / program as the identifier to determine future earnings. After this was complete, we were left with 24,243 unique observations.

**Building Income Distributions for our Scorecard**

In order to compute economic mobility, we had to determine the income brackets where students’ initial individual or parent incomes fell as well as what portion of the income distribution. To do this, we broke dependent students into brackets based on how they compared to Florida 2020 income distributions. We did the same for independent students by using student adjusted gross income, but we broke it down into deciles by Florida’s 2020 individual income distributions. Finally, we broke potential earnings by Florida’s 2020 individual incomes into distribution of 10%. We used the Sarah Flood, Miriam King, Renae Rodgers, Steven Ruggles and J. Robert Warren’s Integrated Public Use Microdata Series Income breakdowns as obtained from the Current Population Survey. These breakdowns can be seen below:

<table>
<thead>
<tr>
<th>Percentile</th>
<th>Individual</th>
<th>Household</th>
</tr>
</thead>
<tbody>
<tr>
<td>10th</td>
<td>$9,000</td>
<td>$14,000</td>
</tr>
<tr>
<td>20th</td>
<td>$18,095</td>
<td>$25,000</td>
</tr>
<tr>
<td>30th</td>
<td>$25,000</td>
<td>$35,226</td>
</tr>
<tr>
<td>40th</td>
<td>$31,104</td>
<td>$45,222</td>
</tr>
<tr>
<td>50th</td>
<td>$40,000</td>
<td>$58,150</td>
</tr>
<tr>
<td>60th</td>
<td>$47,241</td>
<td>$73,014</td>
</tr>
<tr>
<td>70th</td>
<td>$58,000</td>
<td>$92,616</td>
</tr>
<tr>
<td>80th</td>
<td>$75,395</td>
<td>$119,462</td>
</tr>
<tr>
<td>90th</td>
<td>$110,020</td>
<td>$173,000</td>
</tr>
</tbody>
</table>

For example, if the student made between $14,000 and $25,000, they were in the 2nd decile, or bottom 20% of the income distribution.

**Building an Access Dummy**

Using the deciles created above, we created an indicator variable where those students who had a starting income in the bottom 30% were assigned a 1. Those not falling in this distribution were assigned a 0. We chose the bottom 30% because the U.S. describes the “lowest income” to be ⅔ of the median income. Since the median individual income for Florida is $40,000 and the median household income is $58,150, two-third is about $26,700 and $38,800.
respectively. The Florida 30th percentile falls slightly below this at $25,000 for individual income and $35,226 for household income.

This indicator was used to determine the probability a student was a low access student.

**Building Placeholder Dummies to be Used When Calculating Success**

To determine our success measure, we also needed to create a placeholder that could be substituted into the conditional probability measure. Since we defined success as the probability be a student’s projected income was in the top 50% given that they started in the bottom 30%, we first build a dummy equal to one if a student had projected earnings at or above $40,000 (the top 50\(^{th}\) percentile). If a student’s earnings were below this, they were given a 0.

Next, we created a dummy that was set equal to 1 when both the access and placeholder variable was equal to 1 for that student. Otherwise, the student was assigned a 0. With this indicator, we were able to calculate the probability for success.

**Building Proxy for Low Access and**

After testing alternative proxies for low access, we created new access variables for the variables with the highest correlations to the initial access variable. These two variables were Pell Grant eligibility and poverty rate.

Because the Pell Grant was already put in a dummy format equal to 0 and 1, we did not need to create a new access variable. For poverty rate, however, we did need to create a new variable. This access variable equaled 1 if the student came from a neighborhood where the poverty was greater than or equal to 20%. Otherwise, it equaled 0.

We used the same formulas to calculate the new success measures given the new proxies. With the completion of this process, our sample dataset was complete.
III.A2 Definitions of Student-Level Variable

This appendix provides a list of definitions for the individual-level variables used in our analysis. Our sources are Broward College and Broward UP enrollment, income, and financial aid data. For projected annual earnings, we used information from the Florida College System 2019 Vocational Reports.

**Student Identifiers:** The two variables below are used to track student attendance, aid, and other demographic information given by Broward UP and Broward College

- **Student Identification Number (SC_STDNT_ID):** This is the student identification number used by Broward College and Broward UP to differentiate between students and track their attendance over time.

- **Financier Identification Number (WW_STDNT_ID):** The Financier identifier number is the financial aid identifier assigned when a student is first added to Financier files. This is not a public identifier, but rather an on-campus identification number. However, given additional information this informant can be linked to a public identifier without having to find and change key portions and records within the Financier files.

**Zip Code (SC_ZIP_CD):** The reported zip code a student lives in upon semester entry.

**Student Adjusted Gross Income (WF_IS_S_AGI):** The student adjusted gross income is combined with untaxed income in the calculation of student contribution.

**Parent Adjusted Gross Income (WF_IS_P_AGI):** The parents' adjusted gross income is combined with untaxed income in the calculation of parent contribution (PC).

**Dependency Status (WF_IS_C_DEP):** as a part of the application editing and processing performed by the Central Processing System (CPS), the student's dependency status is determined. We define a dependent as D and X, and independent student as I and Y.

- D Dependent
- I Independent
- X Dependent/rejected
- Y Independent/rejected

**Pell Grant Eligibility (WF_IS_C_PELL_ELIG):** As a part of the editing and processing of the federal financial aid application, the Central Processing System (CPS) determines whether the student is eligible for a Pell Grant. If a student is eligible for a Pell Grant, it is signified by Y.

**Projected Annual Earning (annual_earnings):** The projected annual earnings of a student post-degree completion. These earnings are drawn from the Florida Department of Education’s 2018-2019 Florida College System Vocational Reports. For 94 of the programs, Broward-specific average earnings of students were available. For 62 degrees, where Broward award-specific data was not available, we used statewide earnings for students’ with those degrees are available. For the remainder of the programs, we used the award type receive (i.e. AA, TC, etc.) to determine the overall average Broward College earnings for people with that award level.
GPA (S_ALL_GPA)- The student’s grade point average

Program of Study Identification Number (ST_PGM_ID) – The program identification number that is used to identify the track/major a student is pursuing. There are 270 different programs that students in our sample have pursued at Broward College

Program Name (Program_Name): The area of study/program that a student is getting a degree in (i.e. Nursing, avionics, etc.). There are 270 different programs that students in our sample have pursued at Broward College

Award Type (AwardType): The degree level a student achieves. There are 11 different award types: AA, AAS, AC, AS, ATD, BAS, BS, BSN, EPI, TC, and VC.

Ethnicity (Ethnicity): The reported student ethnicity. Students can either report Hispanic or Non-Hispanic. If the student did not report, they are stored under “Unreported”

First Generation College Student (FirstGenCollege): An indicator variable signifying if the student is the first individual in his or her family to attend college.

Gender (Gender): An indicator for if a student is male or female. Students who do not report their gender are stored under “Unreported”

Race (Race_Desc): A student’s reported race. The available response are: White, Black, Asian, American Indian, and Pacific Islander. For students who did not report their race, they are stored under “Not Reported.”

Enrollment Status (PartTime_FullTime): An indicator variable signifying if the student is or was a part time or full-time student

Year Financial Aid was Received (WF_AID_YEAR): The year the financial aid award was received. We filter this variable so that it only the most recent year of attendance is used. This helps us track graduations

Total Financial Aid and Scholarship Amount (SumAward): The total amount of financial assistance a student received in a year
III.A3 Definitions of Neighborhood-Level Variables

This appendix provides a list of definitions and sources of neighborhood-level variables used in the paper. Our primary source is the Opportunity Atlas Data which uses the US Census Bureau’s 2010 Census Tract Relationship Files.

Tract: A geographic area within the county defined by the census. It often is the limits of a town, city, or other administrative areas. (Opportunity Atlas)


Household Income: Opportunity Insights defines both parental household income and children household income. They are defined in the same way except in the treatment of non-filers. Using W-2 data they measure children's annual household income using the wage earnings reported on their W-2 for children that do not file tax returns. They calculate and define the children's individual incomes using an adjusted Gross income measurement that is subtracted by their total wages reported on 1040 forms and divided by total tax filers. In situations that children have no tax and information returns both individual and household incomes are filed as zero. They also use income years between 2014 and 2015 to measure children’s individual and household income as their mean annual incomes for children between 31 and 37, As well as reports for ages 24,26, and 29. (Opportunity Atlas)

Teen Birth Rate: Teenage births are defined as women being aged 13-19 and claiming a dependent that was born in that age range. Unfortunately, the measure is not perfect since the proxy only covers children whose mothers claim them as dependents. Opportunity insights states: “the aggregate level and spatial pattern of teenage births in our data are closely aligned with estimates based on the American Community Survey, with an (unweighted) correlation across states of 0.79.” (Opportunity Atlas)

Fraction of Individuals who are married at 35 years old: Fraction of children who grew up in this area who are married in 2015 (in their mid-30s). Estimates have a margin of error; for example, standard error at tract level for children with parents at 25th percentile is 3% pooling race and gender groups and 4% for black men. (Opportunity Atlas, Income Tax Records)

Individual Income Rate: Average annual individual income in 2014-15 for children (now in their mid-30s) who grew up in this area. Estimates have a margin of error; for example, standard error at tract level for children with parents at 25th percentile is $1,577 pooling race and gender groups and $2,697 for black men. (Opportunity Atlas, Income Tax Records)
**Fraction of Households in the Top 20 Percent of the Income Distribution**: An indicator for children reaching the top 20% and top 1% of the income distribution based on the U.S. Census’ individual incomes definition. (Opportunity Atlas)

**Fraction of Individuals in the Top 20 Percent of the Income Distribution**: An indicator for children reaching the top 20% and top 1% of the income using Census’ household income definitions. (Opportunity Atlas)

**Percent of Individuals Living in Commuting Zones who also grew up there**: Fraction of children who grew up in this area who in 2015 still live in one of the Commuting Zones (metro areas) in which they grew up. Estimates have a margin of error; for example, standard error at tract level for children with parents at 25th percentile is 3% pooling race and gender groups and 6% for black men. (Opportunity Atlas; Income Tax Records)

**Percent of Individuals who still lives in the Census Tract that they grew up in**: Fraction of children who grew up in this area who in 2015 still live in one of the Census tracts in which they grew up. Estimates have a margin of error; for example, standard error at tract level for children with parents at 25th percentile is 3% pooling race and gender groups and 6% for black men. (Opportunity Atlas; Income Tax Records)

**Short Commutes**: (2000, 2006-2010). The share of workers with a short commute to work are constructed using tract-level data from table NP031B of the 2000 Decennial Census, both obtained from the NHGIS database. Fraction with a short commute to work is computed by taking the share of people who commute less than 15 minutes to work over all workers 16 years and over who did not work at home (Opportunity Atlas)

**Density of Jobs**: (2013) The measure of job density at the tract level shown in the Opportunity Atlas is constructed combining block-level information on total number of jobs in 2013 from the Workplace Area Characteristics (WAC) data files in the LEHD Origin-Destination Employment Statistics (LODES) provided by the Census Bureau and tract-level information on land area in square miles from the 2010 Census Gazetteer Files. We likewise compute job density as the number of jobs per square mile in each tract. (Opportunity Atlas)

**Single Parent Share**: (1990, 2000, 2006-2010): The Opportunity Insights’ group defines the share of single parents in each tract as “the number of households with female head (and no husband present) or male head (and no wife present) with own children under 18 years old, divided by the total number of households with own children present.” They draw from tables NP19 of the 1990 Census, tables NP018E and NP018G of the 2000 Census, and table B11003 of the 2006-2010 American Community Survey for the measure in 2010. (Opportunity Atlas)

**Percent of Individuals who are Foreign Born**: (2010). The percent of individuals who are foreign born is constructed from the Opportunity Atlas which divides the number of foreign-born residents in the 2010 Census by the sum of native- and foreign-born residents (long form SF3a, table NP021A) obtained from the NHGIS database.
**III.B1 Additional Information on the Income Distributions of Broward College and Broward UP’s Adjusted Gross Student and Parent Income**

This appendix provides information on the range, mean, median, and quartile distribution of both student and parent adjusted gross incomes. This information is provided both for Broward College students and Broward UP participants.

**Broward College:**

**Students’ Adjusted Gross Incomes**

<table>
<thead>
<tr>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
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<td>$0.00</td>
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**Parents’ Adjusted Gross Incomes**

<table>
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<th>25%</th>
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**Broward UP:**

**Students’ Adjusted Gross Incomes**

<table>
<thead>
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**Parents’ Adjusted Gross Incomes**

<table>
<thead>
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<th>Minimum</th>
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<td>$0.00</td>
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<td>$17,107.00</td>
<td>$26,537.00</td>
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### III.B2 Project Florida Incomes using the 2018-2019 Florida Department of Education Vocational Reports

This section of our analysis discloses the projected incomes we used for students based on the workforce reports of the Florida Department of education. An * indicates that Broward College specific information on that degree and award type was not available. Therefore, the Florida College System earnings for that degree and award type were used. A ** indicates that neither Broward College Specific nor Florida College System earnings for that degree and award type were available. Therefore, the average earnings of the award type (i.e. AA, AS, TC, etc.) for Broward College was used.

#### AA

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### AAS

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<td>Hospital-Based Nuclear Med Tech*</td>
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BAS

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BS

<table>
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<tr>
<td>Aerospace Science**</td>
<td>56360</td>
<td>Middle Grades Mathematics**</td>
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<tr>
<td>Environmental Science</td>
<td>46796</td>
<td>Physical Science**</td>
<td>56360</td>
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<td>Exceptional Student Education</td>
<td>50000</td>
<td>Secondary Biology**</td>
<td>56360</td>
</tr>
<tr>
<td>Middle Grades General Science**</td>
<td>56360</td>
<td>Secondary Mathematics**</td>
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BSN

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<td>RN to BSN**</td>
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### EPI

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### TC

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<tr>
<td>Accounting Tech Operations</td>
<td>41700</td>
<td>Engineering Technology Support</td>
<td>46640</td>
</tr>
<tr>
<td>Accounting Tech Specialist</td>
<td>42252</td>
<td>Entrepreneurship</td>
<td>43788</td>
</tr>
<tr>
<td>Accounting Technology Mngt</td>
<td>37096</td>
<td>Event Management*</td>
<td>36132</td>
</tr>
<tr>
<td>Airport Management**</td>
<td>47004</td>
<td>FAA Aircraft General Mechanics*</td>
<td>52016</td>
</tr>
<tr>
<td>Audio Technology*</td>
<td>35036</td>
<td>Film Production Fundamentals**</td>
<td>47004</td>
</tr>
<tr>
<td>Automotive Service Technician</td>
<td>29456</td>
<td>Fire Science Management**</td>
<td>47004</td>
</tr>
<tr>
<td>Avionics*</td>
<td>52106</td>
<td>Food And Beverages Management*</td>
<td>35180</td>
</tr>
<tr>
<td>Building Construction Special*</td>
<td>60720</td>
<td>Front-End Web Specialist**</td>
<td>47004</td>
</tr>
<tr>
<td>Business Management</td>
<td>43940</td>
<td>General Auto Service Tech</td>
<td>29456</td>
</tr>
<tr>
<td>Business Operations</td>
<td>42520</td>
<td>GIS Specialist**</td>
<td>47004</td>
</tr>
<tr>
<td>Business Specialist</td>
<td>41380</td>
<td>Graphic Design Production*</td>
<td>31592</td>
</tr>
<tr>
<td>Child Care Center Management</td>
<td>29104</td>
<td>Graphic Design Support*</td>
<td>30328</td>
</tr>
<tr>
<td>Cisco CCNA**</td>
<td>47004</td>
<td>Homeland Security Specialist*</td>
<td>33748</td>
</tr>
<tr>
<td>Cisco CCNP Certificate Program**</td>
<td>47004</td>
<td>Informatics Specialist*</td>
<td>40756</td>
</tr>
<tr>
<td>CNC Machinist*</td>
<td>41144</td>
<td>Information Technology Analyst (Option 2)</td>
<td>43944</td>
</tr>
<tr>
<td>Commercial Flight Operations</td>
<td>33664</td>
<td>Information Technology Support Specialist</td>
<td>43168</td>
</tr>
<tr>
<td>Computer Programmer*</td>
<td>47152</td>
<td>Logistics &amp; Transportation*</td>
<td>52048</td>
</tr>
<tr>
<td>Computer Programming Specialist</td>
<td>50832</td>
<td>Marine Electrician</td>
<td>36276</td>
</tr>
<tr>
<td>Crime Scene Technician*</td>
<td>35104</td>
<td>Marine Propulsion Technician</td>
<td>35192</td>
</tr>
<tr>
<td>Criminal Justice Technology*</td>
<td>39064</td>
<td>Marine Systems Technician**</td>
<td>47004</td>
</tr>
<tr>
<td>Cybersecurity*</td>
<td>45508</td>
<td>Marine Technology**</td>
<td>47004</td>
</tr>
<tr>
<td>Data Management &amp; Analytics**</td>
<td>47004</td>
<td>Marketing Operations**</td>
<td>47004</td>
</tr>
<tr>
<td>Digital Media Web Production</td>
<td>34872</td>
<td>Medical Assisting Specialist*</td>
<td>33060</td>
</tr>
<tr>
<td>Digital Media/Multimedia Production*</td>
<td>36736</td>
<td>Medical Office Management</td>
<td>38984</td>
</tr>
<tr>
<td>Early Childhood Development</td>
<td>31044</td>
<td>Microsoft MCSA-Window Server 2012**</td>
<td>47004</td>
</tr>
<tr>
<td>Electronics Aide**</td>
<td>43416</td>
<td>Microsoft MCSE Certificate**</td>
<td>47004</td>
</tr>
</tbody>
</table>
### TC Continued

<table>
<thead>
<tr>
<th>Degree</th>
<th>Projected Earnings</th>
<th>Degree cont.</th>
<th>Projected Earnings cont.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion Picture Production**</td>
<td>47004</td>
<td>Paramedic</td>
<td>47286</td>
</tr>
<tr>
<td>Network Server Administration</td>
<td>45052</td>
<td>Preschool Specialization</td>
<td>27488</td>
</tr>
<tr>
<td>Network Technician</td>
<td>51060</td>
<td>Radiation Therapy Specialist*</td>
<td>53360</td>
</tr>
<tr>
<td>Office Management</td>
<td>38984</td>
<td>Risk &amp; Insurance Management**</td>
<td>47004</td>
</tr>
<tr>
<td>Office Specialist</td>
<td>38436</td>
<td>Rooms Division Management*</td>
<td>40468</td>
</tr>
<tr>
<td>Office Support</td>
<td>39532</td>
<td>Web Designer**</td>
<td>47004</td>
</tr>
<tr>
<td>Oracle System Administrator**</td>
<td>47004</td>
<td>Web Programming Specialist**</td>
<td>47004</td>
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</table>

### VC

<table>
<thead>
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<th>Degree</th>
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<th>Degree cont.</th>
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<td>Air Pow Mechanic**</td>
<td>41940</td>
<td>Correctional Probation Officer</td>
<td>59280</td>
</tr>
<tr>
<td>Airfrm Mechanic*</td>
<td>52106</td>
<td>Crossover From Corrections to Law Enforcement Officer</td>
<td>59280</td>
</tr>
<tr>
<td>Avionics*</td>
<td>52106</td>
<td>Massage Therapy*</td>
<td>59280</td>
</tr>
<tr>
<td>Broward Correctional Pro Academy</td>
<td>59280</td>
<td>Medical Assistant*</td>
<td>59280</td>
</tr>
<tr>
<td>Broward Police Academy</td>
<td>74476</td>
<td>Pharmacy Technician Program*</td>
<td>59280</td>
</tr>
<tr>
<td>Correctional Officer Academy</td>
<td>59280</td>
<td>Serv Aid Aca</td>
<td>59280</td>
</tr>
</tbody>
</table>
III.C1 Field of Study Breakdowns based on Broward College Programs

This appendix shows how we broke down different programs into six fields of study brackets. We based these breakdowns on fields of studies used in the Florida College System and two-year colleges across the United States. Some of the majors may overlap brackets. In these cases, we put them in the category that we believed it fit best in based on other school categorizations.

Arts, Humanities, and Communications:

- Associate in Arts
- Associate in Arts Honors
- Advertising
- Art
- Art/Graphic Design
- Audio Technology
- Digital Media Web Production
- Digital Media/Multimedia Prod
- Digital Media/Multimedia Tech
- Digital Media/Multimedia Tech
- English
- Film Production Fundamentals
- Film Production Technology
- Graphic Design
- Graphic Design Production
- Graphic Design Support
- History
- Journal
- Liberal Arts
- Mass Communications
- Motion Picture Production
- Music
- Music Education
- Music Performance
- Music Technology
- New Media Communication
- Radio & Tv Broadcasting
- Spanish
- Theatre Performance

Business, Management, and Administration

- Accounting
- Accounting Tech Operations
- Accounting Tech Specialist
- Accounting Technology
- Accounting Technology Management
- Associates in Arts International Partnership
- Business Administration
- Business Administration International Partnership
- Business Analytics
- Business Management
- Business Operations
- Business Specialist
- Entrepreneurship
- Finance
- Food And Beverages Management
- Human Resources Management
- International Business Management
- Marketing Management
- Marketing Operations
- Office Careers
- Office Management
- Office Management
- Office Software Specialization
- Office Specialist
- Office Support
- Paralegal Studies
- Pre-Law
- Project Management
- Pub Rel and Organizational Communication
- Risk & Insurance Management
- Rooms Division Management
- Sports, Fitness and Rec Management
- Supervision and Management
- Supply Chain Management
- Web Designer
Education, Human Services, and Social Sciences

- Child Care Center Management
- Culinary Arts Management
- Early Childhood Development
- Early Childhood Education
- Exceptional Student Education
- Social Psychology
- Social Work
- Anthropology
- Economics-Business Track
- Educator / Teacher
- Educator Preparation Institute
- English Teacher Education
- Event Management
- Hospitality & Tourism Management
- Hospitality Administration
- Human Services
- International Relations
- Middle Grades General Science
- Middle Grades Mathematics
- Political Science
- Preschool Specialization
- Psychology

Health and Public Safety

- Broward Correctional Pro Academy
- Broward Police Academy
- Correctional Officer Academy
- Correctional Probation Officer
- Crime Scene Technician
- Crime Scene Technology
- Criminal Justice
- Criminal Justice Technology
- Crossover From Corrections to Law Enforcement Officer
- Dental Assisting
- Dental Hygiene
- Diagnostic Medical Sonography
- Dietetics
- Emergency Management
- Emergency Medical Services
- Emergency Medical Tech
- Exercise Science and Wellness
- Fire Science Management
- Fire Science Technology
- Forensic Science
- Grad Nur Int
- Health Information Technology
- Health Science Navigator
- Health Service Administration
- Health Services Management
- Homeland Security Specialist
- Hospital-Based Nuclear Med Tec
- Hospital-Based Radiation Therapy
- Hospital-Based Radiography
- LPN/RN Transition
- Massage Therapist
- Medical Assisting
- Medical Assisting Specialist
- Medical Laboratory Technology
- Medical Office
- Medical Office Management
- Medical Tech
- Nuclear Medicine Technology
- Nursing (RN)
- Nutritional Science
- Paramedic
- Pharmacy
- Pharmacy Technician Program
- Physical Therapist Assistant
- Polygraph
- Pre-Med Dentistry
- Pre-Optometry
- Pre-Physical Therapy
- Pre-Veterinary Medicine
- Pre-Occupational Therapy
- Professional Pilot Technology
- Radiation Therapy
- Radiation Therapy Specialist
- Radiography
- Respiratory Care
- RN to BSN
- Service Aid Academy
- Vision Care Tech/Opticianry
### Manufacturing, Transportation, and Construction

- Air Pow Mech
- Air Traffic Control
- Airfrm Mech
- Airport Management
- Airport Operations Management
- Automotive Service Technician
- Aviation Administration
- Aviation Maintenance Management
- Aviation Maintenance Management
- Aviation Operations
- Avionics
- Building Construction Specialist
- Building Construction Technician
- Commercial Flight Operations
- Dealer Specific Auto Technology
- FAA Aircraft General Mechanics
- General Auto Service Tech
- Logistics & Transportation
- Marine Electrician
- Marine Propulsion Technician
- Marine Systems Technician
- Marine Technology

### STEM (Science, Technology, Engineering, and Math)

- Aerospace Engineering
- Aerospace Science
- Architecture
- Biochemistry
- Biology
- Biomed Engineering
- Biomedical Engineering Tech
- Chemical Engineering
- Chemistry
- Cisco CCNA
- Cisco CCNP Certificate Program
- Civil Engineering
- CNC Machinist
- Coastal & Ocean Engineering
- Computer & Information Engineering
- Computer & Information Science
- Computer And Network Security
- Computer Engineering
- Computer Information Tech
- Computer Programmer
- Computer Programming Specialist
- Computer Science
- Computer Systems Specialist
- Cybersecurity
- Data Management & Analytics
- Ecology
- Electrical-Electronics Engineering
- Electronics Aide
- Engineering Science
- Engineering Technology
- Engineering Technology Support
- Engineering-General
- Environmental Science
- Environmental Science Tech
- Front-End Web Specialist
- Geo Info Sys
- GIS Specialist
- Industrial And Systems Engineering
- Industrial Management Tech
- Informatics Specialist
- Information Technology
- Information Technology Analyst
- Information Technology Support Specialist
- Management Information Systems
- Marine Engineering Management
- Marine/Aquatic Biology
- Mechanical Engineering
- Microsoft MCDBA
- Microsoft MCSA-Window Server 2012
- Microsoft MCSE Certificate
- Microsoft Specialist
- Network Administration - MCSE
- Network Server Administration
- Network Technician
- Networking Services Technology
- Networking Systems Technology
- Oracle System Administrator
- Physical Science
- Secondary Biology
- Secondary Mathematics
- Software Development
- Tech Support Specialist
- Technology Management
- Technology Project Management
- Web Development
- Web Programming Specialist
- Zoology
III C2. Visualizations of Broward College Students’ Characteristics and Demographics

This appendix offers more visuals on the demographics and characteristics of Broward College students.

Figure 3. Breakdown of Broward College Students by Race

Notes: The majority of students attending Broward College, according to those who reported their race, are of a minority background. Specifically, minority students make up a little over 45% of the sample. Because we can expect that Broward College a significant part of its enrollment be low-access students. Overall, there are 9,579 Black students, 9,432 White, 897 Asian, 223 American Indians, and 103 Pacific Islanders. 3,909 students did not report their race.
Figure 4. Comparison of the First Generation and Non-First Generation Students enrolled at Broward College

First Generation Student

Non-First Generation Student

Notes: 53% of the students at Broward College who are in our sample are the first students in their families to achieve post-secondary attainment.

Figure 5. Breakdown of Broward College Students’ Gender

Notes: Females make up at 63% percent of our sample. This is consistent with overall Broward College enrollment data wherein the male to female ration is around 41:59.
Figure 6. Ethnicity Share of Broward College Students

Notes: Hispanics make up at least 53% of the enrollment, given that we do not know the ethnicity of 9% of students. About 30% of Broward County is Hispanic, thus the college’s ethnic breakdown is more heavily Hispanic than the county. (Source: Data USA)

Figure 7. Student Grade Point Average Breakdown

Notes: This figure displays the GPA of students entering college. The students who have a GPA over 4.0, likely participated in some type of dual-enrollment program or other took college classes in high school. The majority of students had a GPA between 2.5-4.0, thus, most students achieved moderate to higher academic performance before entering college
### III.D Summary Statics of Our Neighborhood-Level Variables

This appendix displays the summary statistics for the thirteen neighborhood-level characteristics that we gathered from the Opportunity Atlas.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>25</th>
<th>50%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty Rate</td>
<td>2.06%</td>
<td>50.208%</td>
<td>14.97%</td>
<td>10.527%</td>
<td>13.070%</td>
<td>18.704%</td>
</tr>
<tr>
<td>Average Household Income</td>
<td>$22,576.13</td>
<td>$60,433.86</td>
<td>$39,954</td>
<td>$34,642</td>
<td>$39,980</td>
<td>$45,682</td>
</tr>
<tr>
<td>Teen Birth Rate</td>
<td>3.475%</td>
<td>50.54%</td>
<td>16.44%</td>
<td>10.33%</td>
<td>15.53%</td>
<td>20.24%</td>
</tr>
<tr>
<td>Fraction of Individuals Married at 35 years old</td>
<td>13.592%</td>
<td>52.543%</td>
<td>3.564%</td>
<td>31.97%</td>
<td>36.02%</td>
<td>0.4217%</td>
</tr>
<tr>
<td>Average Individual Income</td>
<td>$19,358.89</td>
<td>$39,072.57</td>
<td>$29,128</td>
<td>$25,968</td>
<td>$28,988</td>
<td>$32,298</td>
</tr>
<tr>
<td>Fraction of Household in the Top 20%</td>
<td>3.427%</td>
<td>9.876%</td>
<td>17.63%</td>
<td>11.909%</td>
<td>16.950%</td>
<td>22.400%</td>
</tr>
<tr>
<td>Fraction of Individuals in the Top 20%</td>
<td>6.068%</td>
<td>38.339%</td>
<td>19.86%</td>
<td>14.65%</td>
<td>19.35%</td>
<td>24.69%</td>
</tr>
<tr>
<td>Percent of Individuals who live in the Census Tract they grew up in</td>
<td>99.36%</td>
<td>35.829%</td>
<td>19.88%</td>
<td>18.03%</td>
<td>19.91%</td>
<td>21.73%</td>
</tr>
<tr>
<td>Percent of Individuals Living in the Commuting Zones they grew up in</td>
<td>46.848%</td>
<td>81.635%</td>
<td>62.25%</td>
<td>58.55%</td>
<td>62.30%</td>
<td>65.76%</td>
</tr>
<tr>
<td>Share of Workers with Short Commutes</td>
<td>5.445%</td>
<td>57.027%</td>
<td>17.34%</td>
<td>20.07%</td>
<td>16.87%</td>
<td>20.07%</td>
</tr>
<tr>
<td>Density of Jobs</td>
<td>6.83</td>
<td>46,311</td>
<td>1,670</td>
<td>1,190.2</td>
<td>1,637.2</td>
<td>2,023.4</td>
</tr>
<tr>
<td>Single Parent Household Share</td>
<td>8.61%</td>
<td>70.895%</td>
<td>38.97%</td>
<td>32.61%</td>
<td>38.83%</td>
<td>44.62%</td>
</tr>
<tr>
<td>Percent of Individuals who are Foreign-Born</td>
<td>2.67%</td>
<td>76.112%</td>
<td>34.19%</td>
<td>27.60%</td>
<td>35.23%</td>
<td>39.91%</td>
</tr>
<tr>
<td>Employment Rate</td>
<td>66.408%</td>
<td>81.907%</td>
<td>75.44%</td>
<td>73.77%</td>
<td>75.66%</td>
<td>77.09%</td>
</tr>
</tbody>
</table>
Notes: For individual and student incomes, Broward UP students have the lowest incomes for the 25th and 50th percentiles. However, the lowest 75% percentile is Broward College incomes (which include both Broward UP participants and non-participants). For household and parental incomes, Broward College quartiles are consistently the lowest. This is likely because the number of low-income students from households across the state contains more households with low incomes. Overall, across both individual and household incomes, Broward College and Broward UP participants fall far below the states’ income distributions. For most of quartiles, the institutions outcomes are almost half that of the state. the
**V.A Analysis on how Mobility Scores Change with a Different Definitions for Access**

The 100% poverty level for Florida is considered to be individuals whose income falls beneath $12,760, according to Florida Health. This is about the bottom 15% of the income distribution. Using this measure for access we get the results below:

Access = 11.8013%

<table>
<thead>
<tr>
<th>Income Percentile Used for Success</th>
<th>Above 40% ($31,104+)</th>
<th>Above 50% ($40,000+)</th>
<th>Above 60% ($47,241+)</th>
<th>Above 70% ($58,000+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success Score</td>
<td>99.3359%</td>
<td>94.2329%</td>
<td>89.3394%</td>
<td>2.237%</td>
</tr>
<tr>
<td>Mobility Score</td>
<td>11.723%</td>
<td>11.1207%</td>
<td>10.5433%</td>
<td>0.264%</td>
</tr>
</tbody>
</table>

The success and access scores when access is measure as the portion of individuals who started in the bottom 15% of the income distribution is much lower. However, 12.3% of Broward County residents are impoverished, so the total number of students who would come from the bottom 15% should be expected to be around this 12.3%. Therefore, Broward College does a mediocre job at recruiting impoverished students as a share of total enrollment. However, more investment into students from especially impoverished backgrounds is encouraged as these students face the biggest barriers to post-secondary attainment.

Following in the of Chetty, et. al. in the *Mobility Report Card Paper*, we also tested the sensitivity of our mobility results by defining access as students in the bottom 20% of the income distribution.

Access = 35.0204%

<table>
<thead>
<tr>
<th>Income Percentile Used for Success</th>
<th>Above 40% ($31,104+)</th>
<th>Above 50% ($40,000+)</th>
<th>Above 60% ($47,241+)</th>
<th>Above 70% ($58,000+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success Score</td>
<td>99.3359%</td>
<td>31.755%</td>
<td>30.106%</td>
<td>0.7538%</td>
</tr>
<tr>
<td>Mobility Score</td>
<td>33.47467%</td>
<td>11.1207%</td>
<td>10.5433%</td>
<td>0.264%</td>
</tr>
</tbody>
</table>

Again, the mobility and access score is not as high as the original measure. However, the access score is still above the national average of 27% so Broward College’s is accessible and has an above average mobility score.
VI.A Correlation Results for Potential Proxies

This appendix looks at the correlation output of 26 potential proxy variables with access.

**Neighborhood-Level Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation Coefficient</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty Rate</td>
<td>0.0997</td>
<td>(0.0872, 0.1122)</td>
</tr>
<tr>
<td>Average Household Income</td>
<td>-0.0912</td>
<td>(-0.1037, -0.0787)</td>
</tr>
<tr>
<td>Teen Birth Rate</td>
<td>0.0881</td>
<td>(0.0756, 0.1006)</td>
</tr>
<tr>
<td>Fraction of Individuals Married at 35 years old</td>
<td>-0.0944</td>
<td>(-0.1068, 0.0819)</td>
</tr>
<tr>
<td>Average Individual Income</td>
<td>-0.0904</td>
<td>(-0.1028, -0.0779)</td>
</tr>
<tr>
<td>Fraction of Household in the Top 20%</td>
<td>-0.0847</td>
<td>(0.0972, -0.0722)</td>
</tr>
<tr>
<td>Fraction of Individuals in the Top 20%</td>
<td>-0.0829</td>
<td>(-0.0954, -0.0704)</td>
</tr>
<tr>
<td>Percent of Individuals who live in the Census Tract they grew up in</td>
<td>0.0464</td>
<td>(0.0339, 0.059)</td>
</tr>
<tr>
<td>Percent of Individuals Living in the Commuting Zones they grew up in</td>
<td>0.0679</td>
<td>(0.0553, 0.0804)</td>
</tr>
<tr>
<td>Share of Workers with Short Commutes</td>
<td>-0.0112</td>
<td>(0.0201, 0.0453)</td>
</tr>
<tr>
<td>Density of Jobs</td>
<td>0.0327</td>
<td>(0.0201 – 0.0453)</td>
</tr>
<tr>
<td>Single Parent Household Share</td>
<td>0.0943</td>
<td>(0.0818 – 0.1068)</td>
</tr>
<tr>
<td>Precent of Individuals who are Foreign-Born</td>
<td>0.0272</td>
<td>(0.0146, 0.0398)</td>
</tr>
<tr>
<td>Employment Rate</td>
<td>-0.0876</td>
<td>(-0.1001, -0.0751)</td>
</tr>
</tbody>
</table>
### Demographic Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation Coefficient</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pell Grant Eligibility</td>
<td>0.4841</td>
<td>(0.4744, 0.4938)</td>
</tr>
<tr>
<td>Part Time Student</td>
<td>-0.058</td>
<td>(-0.0705, -0.0454)</td>
</tr>
<tr>
<td>Race: American Indian</td>
<td>0.0113</td>
<td>(-0.0013, 0.0238)</td>
</tr>
<tr>
<td>Race: Asian</td>
<td>0.0181</td>
<td>(0.0055, 0.0307)</td>
</tr>
<tr>
<td>Race: Black</td>
<td>0.0616</td>
<td>(0.0491, 0.0741)</td>
</tr>
<tr>
<td>Race: White</td>
<td>-0.0803</td>
<td>(-0.0928, -0.0678)</td>
</tr>
<tr>
<td>Race: Pacific Islander</td>
<td>0.0000</td>
<td>(-0.0126, 0.0125)</td>
</tr>
<tr>
<td>Gender: Female</td>
<td>0.006</td>
<td>(-0.0066, 0.0186)</td>
</tr>
<tr>
<td>Gender: Male</td>
<td>-0.007</td>
<td>(0.0198, 0.0053)</td>
</tr>
<tr>
<td>First Generation College Student</td>
<td>-0.0112</td>
<td>(0.0201, 0.0453)</td>
</tr>
<tr>
<td>Ethnicity: Hispanic</td>
<td>0.0596</td>
<td>(0.0471 – 0.0722)</td>
</tr>
<tr>
<td>Ethnicity: Non-Hispanic</td>
<td>0.034</td>
<td>(0.0217 – 0.0468)</td>
</tr>
</tbody>
</table>