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Are the Tickets for Everyone? Heterogeneity of Economic Rewards for Associate's Degree Completion

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Are the Tickets for Everyone?

Heterogeneity of Economic Rewards for Associate's Degree Completion

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Abstract

Associate's degree completion has been billed as the quickest way to upskill the workforce and a ticket to the middle class (Carnevale et al., 2018; Gittell et al., 2017). Yet, over 35 million Americans have left college without a degree (Wheatle et al., 2017). Black and Hispanic students are more likely than White and Asian students to leave college before completing a degree (Shapiro et al., 2017). This study examined if economic benefits differ between those whose highest level of educational attainment is "some college, no degree (SCND)" and an associate's degree, specifically by analyzing heterogeneity and interaction effects between race/ethnicity, sex, citizenship and nativity. Human Capital Theory (HCT) and Intersectionality framed this study. Using data from the Current Population Survey 2019 Annual Social and Economic Supplement, this study employed OLS and logistic regressions to examine heterogeneity in economic rewards. Propensity score matching was also employed to estimate causal treatment effects using observational data. On average, associate's workers reaped more economic rewards than SCND workers. However, in almost every category, the advantage of additional training (completion of the associate's degree) was lost when the worker held at least one socially disadvantaged identity. The economic disadvantage was multiplied for some workers who had more than one disadvantaged identity. The findings of this study support the economic value of completing an associate's degree, and unmask the disparate outcomes in the labor market when examining economic returns for workers of diverse races/ethnicities, sexes and nationalities.

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Acknowledgements

I pursued this journey out of a desire to understand better the opportunity gaps that exist for those who complete postsecondary education and those who do not. This dissertation has given me the chance to examine one piece of this question, but it is certainly not the end of my quest. I believe deeply that each person has gifts and talents that are meant to meet needs in the world. Education can serve as an accelerator and amplifier of these innate abilities. I am so thankful for the many people who have invested in me, helping me grow my skills and passions for creating opportunities that connect peoples' talents with the world's needs.

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Chapter 1: Introduction and Statement of the Problem

Higher education is purported to be both a ticket to individual social mobility and to our nation's economic growth. Since 2000, contributions to national economic growth from increased demand for associate's degree workers has exceeded that of bachelor's degree workers (Gittell et al., 2017). "Good jobs" for associate's degree holders have outgrown other middle skills jobs[1] ten to one, making associate's degree completion the most efficient option for "upskilling" the workforce (Carnevale et al., 2018). A disproportionate number of Hispanic and Black students are enrolled in associate's degrees compared to bachelor's degrees, which have long been viewed as the ticket to the middle class (Carnevale et al., 2020). However, income inequality is higher in the United States than in any of the other G7 nations[2] (Pew Research Center, 2020). The distribution of wealth in the United States between the top ten percent and the bottom fifty percent is more unequal than anywhere else in the world in the twenty-first century (Piketty, 2014).

In the face of increasing economic inequality in the United States, do the economic benefits of associate's degree completion propel underrepresented students – Black, Hispanic[3], non-citizen, non-native – to economic well-being as effectively as they do students who are white, native and United States citizens? Are the economic rewards that are promised to these students delivered equally? If not, who is more or less likely to

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[1] The middle skills pathway refers to credentials between a high school diploma and a bachelor's degree, primarily certificates and associate's degrees.

[2] The G7 nations include Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. These are the largest economies in the world according to the International Monetary Fund.

[3] In this study, I use Black to refer to people who identify as Black or African-American and the term Hispanic to refer to people who identify as Hispanic or Latino/a. I use White for those who are non-Hispanic and identify as White. I use single terms for different racial and ethnic groups – White, Black, and Hispanic – to emphasize clarity. In this study, these racial/ethnic categories are mutually exclusive.

benefit? It is these questions that have motivated this study, which will examine if the

economic benefits of higher education differ between those whose highest level of

educational attainment is some college, no degree (SCND) compared to an associate's

degree, analyzing the heterogeneity of these economic outcomes at the intersection of

race/ethnicity, sex, citizenship and nativity.

Human Capital Theory has traditionally been used as a theoretical framework for

examining the connection between college degree completion and economic growth

(Becker, 1993). The literature consistently shows that workers who complete

postsecondary credentials have higher lifetime earnings than workers who do not

(Carnevale et al., 2011). Many studies have examined the economic rewards for completing

bachelor's degrees. With the growth in middle skills jobs, the demand for workers with

associate's degrees has grown, and the literature suggests that associate's degree

completion also yields economic rewards (Carnevale et al., 2018). While access to college

has grown, time to degree has increased and the population who leave college without

completing a degree has also grown. Estimates suggest 35 million Americans have SCND

(Wheatle et al., 2017). The literature provides evidence that degree completion and

economic rewards are not equally distributed among workers of different races, ethnicities,

and sex (Chetty, Hendren, Jones, & Porter, 2020; Kim, 2002; O'Gorman, 2010). There are no

studies that examine the economic rewards of associate's degree completion for workers of

different citizenships and places of birth (nativity).

In light of these unequal economic distributions to people of diverse and often

marginalized backgrounds, Human Capital Theory has been criticized (Tao, 2018). The

theory of intersectionality acknowledges that people have multiple identities, and they are

experienced congruently, and not distinctly (Carbado et al., 2013). Intersecting identities create opportunity and oppression; one intersectional position may be advantaged compared to one group, but disadvantaged compared to another group (Shields, 2008). Intersectionality is a valuable theoretical framework for this study because it highlights "invisible boundaries…between visible identity categories" (Atewologun, Sealy, & Vinnicombe, 2016, p. 238). There is a dearth of studies that examine economic rewards to associate's degrees completers as they relate to the interaction between multiple components of worker's identities.

The main objective of this study was to understand if economic benefits differ between those whose highest level of educational attainment is SCND and an associate's degree, specifically by analyzing any heterogeneity and interaction effects between race/ethnicity, sex, citizenship and nativity of these economic outcomes. The research questions were as follows:

(1) Do economic rewards for completing an associate's degree differ from SCND when accounting for the intersection of diverse identities?

o Do economic rewards for completing an associate's degree differ from SCND by **race/ethnicity**?

o Do economic rewards for completing an associate's degree differ from SCND by **sex**?

o Do economic rewards for completing an associate's degree differ from SCND by **citizenship**?

o Do economic rewards for completing an associate's degree differ from SCND by **nativity**?

(2) Do race/ethnicity, sex, citizenship and nativity interact to differentially affect

economic rewards for completion of an associate's degree?

This study used data from the Current Population Survey (CPS) 2019 Annual Social

and Economic (ASEC) Supplement which is conducted by the Bureau of the Census for the

Bureau of Labor Statistics; this data was accessed using IPUMS (Ruggles et al., 2018). This

study used descriptive and multivariate analyses to examine economic outcomes by

race/ethnicity, sex, citizenship, and nativity. Ordinary least squares (OLS) regression was

used to examine the association between educational attainment, race/ethnicity, sex,

citizenship, and nativity and the continuous dependent variable, income, after controlling

for other variables (outlined in the methods section). The association between educational

attainment and the other four dichotomous variables selected as measures of economic

benefits (such as health insurance coverage) were analyzed using logistic regression,

holding constant other variables. Additionally, this study utilized propensity score

matching to estimate an individual's propensity to complete an associate's degree,

balancing race/ethnicity, sex, citizenship and nativity as covariates. Given that this is a non-

experimental design, utilizing propensity score matching attempts to control for the

inherent imbalance created by self-selection between those who complete college degrees

and those who do not.

Chapter 2: Literature Review

Human Capital Theory

Human Capital Theory (HCT) attempts to explain why some people earn more economic rewards over the course of their lifetimes than others, and how training ultimately contributes to the overall economy (Becker, 1993). In this theory, formal education or training is viewed as one kind of human capital that has an observed impact on earnings and productivity in the United States. By investing in formal education or training, individuals expect to see a return on this investment to their earnings or incomes. The attainment of certain levels of formal education, as signaled by degrees, indicate to employers that a worker is able to produce at a certain rate and level of productivity. Beyond the individual benefit seen by the worker who receives increased wages, the increased productivity of all the workers who received formal education manifested in increased productivity is expected to yield benefits across that economic sector, and ultimately, lead to increased standards of living for the community (Figure 2.1) (Athreya, 2018).

One critique of HCT is that the credentials gained upon completion of various levels of formal education do not actually generate greater productivity in the worker, but rather *signal* to a potential employer that this worker has attained this level of education and therefore is *assumed* to possess a certain level of productivity (Spence, 2002; Weiss, 1995). Some research has shown that employers use certain credentials as a form of proxy for skills and traits they desire in employees (Arkes, 1999). However, not all degrees are equal in this regard. Arkes (1999) found that employers were more likely to value a bachelor's degree over an associate's degree. Perhaps this is because a bachelor's degree signals more

years of education, or perhaps there is an assumption by employers that a person with a

bachelor's degree possess more "unobservable attributes such as motivation, character and

perseverance" (Arkes, 1999, p. 140). There is an ongoing debate in the Human Capital

literature as to whether employers favor increased credentials in hiring because of an

actual increase in productivity of these workers or that employers are merely reacting to a

signal that they assume increased productivity comes with increased credentials.

Figure 2.1

The Role of Human Capital in Economic Growth
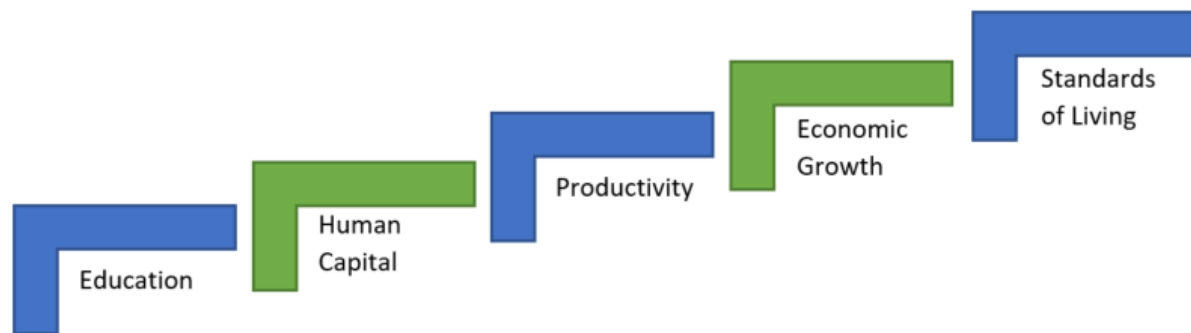
Adapted from "Falling Short: Why We Aren't Meeting the Economy's Demand for College
Graduates?" by K. Athreya, 2018, Federal Reserve Bank of Richmond.

Sheepskin Effects

The literature suggests that workers who have SCND see fewer economic returns

than those who have completed an associate's degree, which is on average a two-year

degree (Carnevale et al., 2011). The Institute for Higher Education Policy estimates there

are over a million workers who have completed at least two years of college but left

without a postsecondary credential (McCambly & Bragg, 2016). Some would argue that

HCT suggests they should be equally compensated as those who have earned an associate's

degree, given the number of years of their schooling is equal to those who complete an

associate's degree. However, the data suggest this is not the case. This phenomenon – equal

amount of schooling that yields a completed degree yielding higher economic returns than those same years of education with no degree – is referred to as "sheepskin effects". Put another way, the completion of a degree in and of itself "credentiates workers as more productive" (Belman & Heywood, 1991, p. 720). Several studies demonstrate that degree completion yields higher economic returns than equal years of school without a credential (Belman & Heywood, 1991; Jaeger & Page, 1996). The literature is clear that there are increased rewards in the labor market for those with completed postsecondary education credentials over those who have some postsecondary training but no credential.

Economic Inequality in the United States

Since the goal of increasing human capital is to increase productivity, and thereby increase economic growth and standards of living, it is important to consider that currently in the United States, there exists stark economic inequality. Income inequality is higher in the United States than in any of the other G7 nations (Pew Research Center, 2020). The distribution of wealth in the United States between the top ten percent and the bottom fifty percent is more unequal than anywhere else in the world in the twenty-first century (Piketty, 2014). U.S. economic inequality began exploding in the 1980s. In the 1970s, the top ten percent held 30-35 percent of national income. In 2010, this same top ten percent held nearly 50 percent of national income. Put another way, 15-20 percent of the share of national income moved from the poorest 90 percent to the richest 10 percent over the span of 40 years. During this time, the richest one percent benefitted from nearly 60 percent of our national income growth; the bottom 90 percent saw their incomes grow at less than .5 percent per year (Piketty, 2014). Economic inequality in the United States continues to increase. The growth of capital income (investments, real estate, etc.) is growing at 4 to 5%

while labor income (a paycheck) has seen .5 to 1% growth. The wealthiest ten percent own

70% of capital wealth, which is growing between 5 and 20% faster than labor income

(Piketty, 2014).

In economics literature, divergence refers to an increasing difference between the

wealthiest and the poorest, whether individuals or countries. The dynamic of rapid growth

of capital income, held by a small minority, as compared to slow growth of labor income in

the United States today, is the greatest force for divergence, the continuous widening of

wealth across the country (Piketty, 2014). Wilkinson and Pickett (2009) have studied how

varying levels of inequality impact a wide variety of social outcomes, including educational

outcomes. Both state and national social outcomes are closely correlated with levels of

educational attainment. Math and literacy scores of eighth graders are lower in states that

have more income inequality. The higher the income inequality in a state, the more

students drop out of high school. These findings demonstrate a negative correlation

between inequality and educational outcomes (Wilkinson & Pickett, 2009).

In the economics literature, convergence refers to "reduction and compression of

inequalities" (Piketty, 2014, p. 21). The greatest force for convergence, the narrowing of

economic inequality, is the distribution of knowledge and skills – education (Piketty, 2014).

And yet, as increased education and training are needed to fuel economic growth in the

twenty first century, the United States has been divesting from higher education. During

the period from 1980 – 2011, the same period that saw such marked increase in the

inequality of wealth distribution, states decreased funding of higher education on average

by 40 percent (Mortenson, 2012). Tuition rose during this period, exceeding inflation by

large margins, with the exception of community colleges (Hout, 2012). The current

divestment in higher education coupled with the divergence of wealth between rich and poor may situate the United States to experience negative economic and social outcomes.

Increased Human Capital Fuels Economic Growth

Increased education and training are needed to increase human capital and fuel economic growth in the twenty first century (Piketty, 2014). Studies have showed higher education has a positive impact on economic growth (Tyndorf & Glass, 2017). Tyndorf & Martin (2018) found that "investment in higher education, specifically community college and university graduation (certifications, associate's, and bachelor's degrees), can yield a 1%, 1.3%, and .4% increase in GDP with a 10% increase in graduates over the short term, medium term, and long term, respectively" (p. 497). This study found programs with shorter times to completion, such as certificates and associate's degrees, had a more immediate impact on economic growth, as graduates more quickly reenter the labor force with increased human capital. The authors point out that these short and medium-term returns are an important balance with longer term gains from bachelor's degree completion.

It is predicted that by 2027, 70% of jobs in the United States will require a postsecondary credential (Blumenstyk, 2020). It has also been predicted that by 2022 in the United States, automation will create 58 million more skilled jobs than it eliminates (Lumina Foundation, 2020). To support these technological advances, labor is needed with the appropriate skills, which are most often gained in postsecondary educational programs. Jorgenson, Ho, & Stiroh (2005) report 70% of growth in labor quality between 1977 and 2000 was due to educational advancement of the workforce. Clearly, this was a positive trajectory. However, in a more recent study by the Harvard Business Review, business

leaders were skeptical about the United States' ability to continue to compete globally for a

number of reasons, one of which is inequality in access to quality education and skill

development (Porter & Rivkin, 2011).

Goldin & Katz (2008) suggest that educational attainment is a proxy for the supply

of skilled workers and the skill-based technology used by businesses represents the

demand for skilled workers. These two forces are constantly pushing and pulling on each

other in a race between education and technology. Since the 1980s, the demand for college

related skills has exceeded the available supply (Oreopoulos & Petronijevic, 2013). If the

United States does not increase the educational attainment of its workforce, it will likely

see economic declines which will lead to decreases in American's standards of living

(Baldwin, 2017).

College Degree Completion in the United States

The United States has taken a step backwards in degree completion over the last few

decades. In 1995, the United States was first in the world for first-time college graduation

rates with 32.7% of adults completing college degrees. By 2008, the United States had

fallen to 12th in the world with 37.7% of adults completing college. During that time,

Finland moved from 20.3% to 62.6% to claim first place in 2008 (*Youth Indicators 2011;*

America, 2011). Of the cohort of students who enrolled in higher education in 2009, 52%

completed any degree within six years, leaving nearly half without a degree six years after

enrolling (Shapiro et al., 2015). Additionally, the time it takes to earn a degree has

increased markedly (Bowen et al., 2009; Brooks, 2008). These trends result in increasing

numbers of Americans with some college and no degree (SCND). In 2015, there were 35

million Americans aged 25 and older who had gone to college but not completed a degree (Wheatle et al., 2017). College degree completion is widely seen as the ticket to both individual social mobility and national economic growth, and yet as a nation, the percentage of United States citizens who complete a college degree continues to fall behind global competitors (OECD, 2014).

The Benefits of College Degree Completion

Citizens who complete a college degree earn more, pay more taxes, are more likely to be employed, have positive social mobility, use less public assistance, are healthier, are more active citizens, and are more involved parents (Ma et al., 2016). It is remarkable to consider both the individual impact and social externalities demonstrated by these findings. Not only do college degree completers reap more economic rewards for themselves and their families, but they also contribute more to their communities, both financially and socially. The aggregate impacts of these benefits are hard to encapsulate. While the earning gains for a bachelor's degree are most often touted by news outlets, the earnings differential for completing an associate's degree is 32% more than a worker with a high school diploma (Carnevale et al., 2011). While HCT looks to degrees to yield more productive workers, the data demonstrate the positive impacts are far greater.

The positive externalities of degree completion benefit the larger social fabric in which these college completers live and work. In a recent study, the potential lost lifetime earnings for workers in Virginia who had SCND as compared to those who had completed an associate degree was $28 billion (Lee, 2019). At the lowest state income tax rate in Virginia of 2%, this represents $560 million in foregone state income taxes, which could have funded local schools and other community investments.

Degree completion not only matters for individual students, but also the larger

communities and societies within which these students live and work. On average, those

who complete a bachelor's degree will earn 84% more than high school graduates – $2.8

million dollars over a 40-year career. Those who earn an associate's degree will earn 32%

more than those with a high school degree. Those who have SCND will earn 68% of what a

bachelor's degree holder will earn on average and only 18% more than someone with only

a high school degree (Carnevale et al., 2011). Though the costs of college have risen

dramatically over the last 25 years, the economic benefits associated with completing a

bachelor's degree have kept pace (Hout, 2012).

The Costs of College Degree Completion

The cost of pursuing a college degree has increased sharply over the last 25 years.

Since the 1980s, when economic inequality began to increase, state and federal funding for

higher education decreased, and the cost of college tuition steadily rose (Heller, 2013;

Jackson, 2015; Mortenson, 2012; Putnam, 2015). During the period from 1980 – 2011, the

same period that saw such marked increase in the inequality of wealth distribution, states

decreased funding for higher education on average by 40%, cutting funding for public

institutions disproportionately with every economic downturn (Carey, 2020; Mitchell et al.,

2019; Mortenson, 2012). Tuition rose during this period, exceeding inflation by large

margins, with the exception of community colleges (Hout, 2012). Even with these rising

costs, degree completers will likely pay back the cost of earning a degree with their

increased lifetime earnings (Hout, 2012).

The practice of taking student loans has greatly increased. Approximately two out of

three college students take loans to pay for college, and the average student loan debt is

more than $26,000 (Hillman, 2014). The national student loan debt is over $1.5 trillion

(Friedman, 2018). In an examination of national student loan defaults, Hillman (2014)

found that it is not how much debt a student takes on that is the best predictor of whether

the student defaults on those loans. Rather, it is whether they earn a degree or gain

employment after leaving college, in addition to the sector (for-profit, not-for-profit) of

higher education institution in which the student enrolls, that best predicts how likely they

are to default on their student loans. In this study, which included students who attended

public, private non-profit and private for-profit institutions, 65% of students who did not

earn a degree before leaving college were in default of their student loans (Hillman, 2014).

Taking out loans to attend college, but not completing a degree is costly to the individual in

terms of economic and social mobility.

Inequalities in College Degree Completion

Inequalities in degree completion rates are glaring for students from different

socioeconomic backgrounds. Seventy-eight percent of the highest achieving students from

the poorest families (lowest 20% of incomes) will attend college. Seventy-seven percent of

the lowest achieving students from the richest families (highest 20% of incomes) will

attend college. Simply put, the lowest achieving wealthy students go to college at virtually

the same rate as the highest achieving poor students (Smith et al., 2012). Going to college

does not mean those students will complete a degree. Almost 60% of the highest socio-

economic status (SES) quartile students complete a college degree while just over 10% of

the lowest SES students complete a college degree (Leonhardt, 2018; Putnam, 2015). High-

achieving poor students are less likely (29%) to earn a college degree than low-achieving

rich students (30%) (Putnam, 2015). Of students who enter as Pell Grant recipients, 80%

do not receive a bachelor's degree within four years (Goldrick-Rab et al., 2016). While

poorer students have to overcome considerable odds to complete a college degree, they

also have the most to gain in terms of labor market propsects (Brand & Xie, 2010). Despite

this, poorer students are completing college at much lower rates than their more

economically advantaged peers (Heller, 2013; Putnam, 2015; Smith et al., 2012; Venator &

Reeves, 2015).

Inequalities in degree completion rates also exist for students from different

racial/ethnic backgrounds (Figure 2.2, Shapiro et al., 2017). For the cohort of students who

began college in 2010, 56% of students finished an associate's or bachelor's degree or

certificate within six years, yet 38% of Black students and 45% of Hispanic students

complete as compared to 62% of white students and 63% of Asian students. When gender

is added as an additional factor, Black men have the lowest completion rate at 33% and

Asian women have the highest completion rate at 69% (Shapiro et al., 2017). For those

students who start their degree at a community college seeking to earn a four-year degree,

these inequalities are even starker. One in four Asian students and one in five white

students starting at community college earned a four-year degree within six years; only one

in 10 Hispanic students and one in 12 Black students did (Shapiro et al., 2017). Black and

Hispanic students are far more likely to attend open access baccealuareate granting schools

or community colleges than White students. In the last two decades, 82% of newly

enrolling White students attended the 468 most selective colleges. Seventy-two percent of

newly enrolling Hispanic students and 68% of newly enrolling Black students attended

baccealuareate granting schools or community colleges (Carnevale & Strohl, 2013). This

disproportionate enrollment in open access insitutions combined with the lower degree

completion rates for Hispanic and Black students exacerbates the inequalities in degree completion.

Figure 2.2

Postsecondary Degree Completion by Race/Ethnicity in Six Years
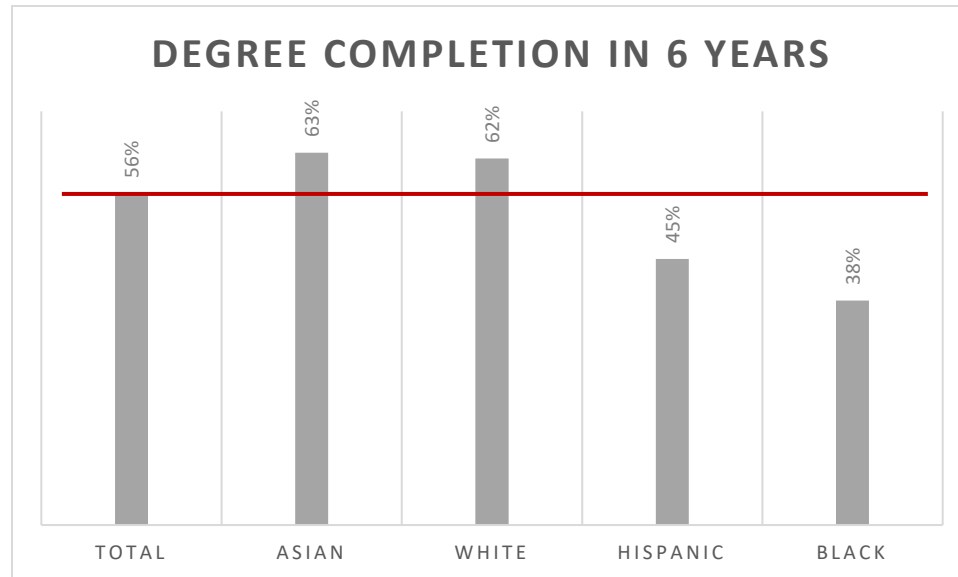
Adapted from "A national view of student attainment rates by race and ethnicity – Fall 2010 cohort (signature report no. 12b)," by D. Shapiro, A. Dundar, F. Huie, P. Wakhungu, X. Yuan, A. Nathan, Y. Hwang, 2017, National Student Clearinghouse Research Center.

College completion is one of the greatest avenues for social mobility and economic growth. The disproportionate share of poor, Black and Hispanic students who leave college without earning a degree has long term implications for their own social mobility, as well as for their children. College dropouts have unemployment and earnings closer to high school graduates than college graduates. Individuals from the bottom of the income distribution who gain a college degree have greater social mobility, and parents pass on their educational advantages to the next generation (Venator & Reeves, 2015). The rate at which children of parents in the top quartile attained college degrees doubled from 40 to 80 percent, while children whose parents are in the bottom two quartiles rose from 10 to

20 percent (Venator & Reeves, 2015). Not only does degree completion impact individual social mobility, but it also impacts intergenerational social mobility (Chetty, Friedman, et al., 2017). An increasing number of poor, Black and Hispanic individuals begin college, shoulder the substantial costs, and leave before completing a degree to help them pay back their debts and improve their economic position.

Some College, No Degree (SCND)

Of the cohort of students who began college in 2009, 52% completed some type of postsecondary degree within six years. Of the same 2009 cohort, 33% of the student who enrolled in 2009 were no longer enrolled in any institution, and had not completed a degree. In this cohort, only 38% of first time community college students obtained a degree or certificate from a two or four year college in six years (Shapiro et al., 2015). The National Student Clearinghouse deduced that as many as 1.2 million students have left college after having completed two years of full-time attendance (McCambly & Bragg, 2016). Typically, an associate's degree is designed to be completed with two years of full-time study. This means over 1 million Americans have engaged in the same amount of postsecondary education as an associate's degree without a credential to show for their learning. The Institute for Higher Education Policy estimates that in 2015, there were 35 million Americans ages 25 or older who had attended some college but had no postsecondary credential (Wheatle et al., 2017). The societal costs of so many citizens not completing the degrees that they have pursued are striking.

From a human capital lens, it represents 35 million workers who have made an investment, whether public or private, in further training, but not finished in order to

realize the added benefit of being a degree completer. The hourly wage for those who have SCND has barely changed since 1975 (Leonhardt, 2018). This collectively adds up to a wealth of foregone lifetime earnings. From a policy perspective, this impacts the tax base, funding for schools, infrastructure, and public safety. It also represents lost productivity from a human capital standpoint. In one estimation: "Providing inadequate training and education for our current 16-24 year olds, according to one estimate, will cost taxpayers an estimated $1.6 trillion – and society an estimated $4.7 trillion – over the next 30 years" (The Saguaro Seminar: Civic Engagement in America, 2016). It is clear that attending college and leaving without a degree has significant individual and collective costs.

Associate's Degree Completion

While bachelor's degree completion is most often viewed as the ticket to the middle class, growth in the "middle skills pathway" has created an alternative option. The middle skills pathway refers to credentials between a high school diploma and a bachelor's degree, primarily certificates and associate's degrees. Colleges award roughly the same number of certificate's and associate's degrees as bachelor's degrees – around 2 million per year. In 2013, sub-baccalaureate education made up 40% of higher education as compared to 24% in 1963. The growth in the middle skills credentials accounts for a large proportion of the growth in higher education as a whole (Kim & Tamborini, 2019).

Between 1991 and 2016, "good jobs" for associate's degree holders grew 83%. According to the Georgetown Center on Education and Workforce, "good jobs" are those in which workers age 25-44 earn at least $35,000/year and workers 45-64 earn at least $45,000/year (Carnevale et al., 2018). As a point of reference, median individual earnings in the U.S. in 2019 were $57,456 for men and $47,299 for women (Semega et al., 2020).

These "good jobs" pay median earnings of $56,000 for workers with less than a bachelor's

degree and pay median earnings of $65,000 when including workers with a bachelor's

degree or higher. The rate of growth in "good" middle skills jobs has far exceeded that of

other middle skills jobs by a rate of 10 to 1 (Carnevale et al., 2018), making associate's

degree completion the most efficient option for "upskilling" (p. 18).

More students are now enrolled in certificate and associate's degrees programs than

bachelor's degree programs (50% compared to 47%) (Carnevale et al., 2020). Over one

third of students, particularly those from historically underrepresented backgrounds such

as Black, Hispanic and poor students, start their college education in a community college.

Black and Hispanic students are disproportionately enrolled in certificate and associate's

degree programs as compared to bachelor's degree programs (Figure 2.3). Of Hispanic

students enrolled in higher education, 62% are in certificate and associate's degree

programs and 38% in bachelor's degree programs. Among Black students, 56% are

enrolled in certificate and associate's degree programs compared to 44% bachelor's degree

programs. The inverse is true of White students, with 53% enrolled in bachelor's degree

programs and 47% in certificate and associate's degree programs (Carnevale et al., 2020).

Figure 2.3

Distribution of Student Enrollments by Degree Type and Race/Ethnicity
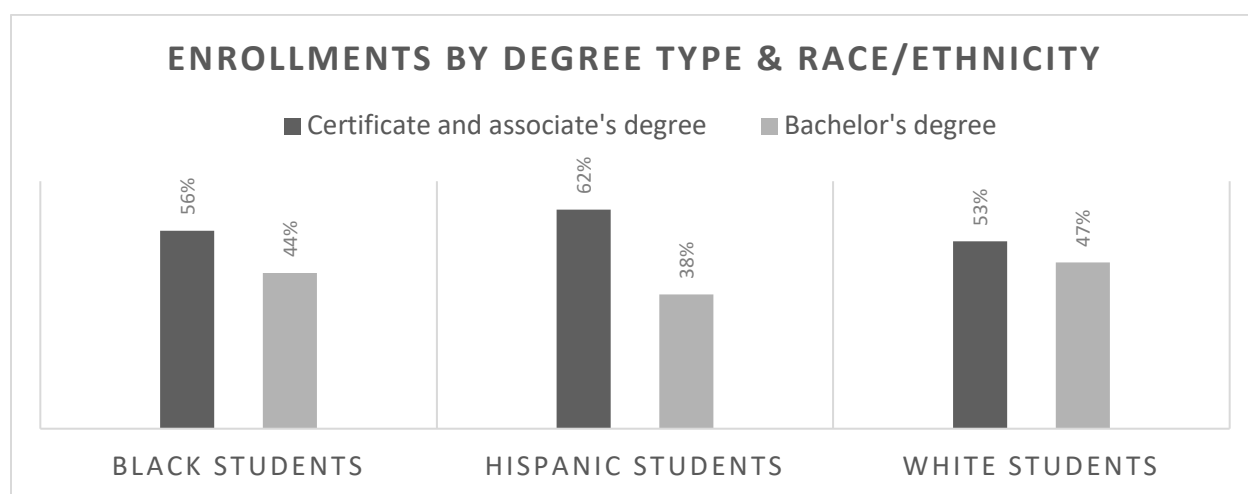
Adapted from "The overlooked value of certificates and associate's degrees," by A. P. Carnevale, T. I. Garcia, N. Ridley, & M.C. Quinn, 2020, Georgetown Center on Education and the Workforce.

The Economic Impact of Associate's Degrees

Between 1991 and 2016, "good jobs" for associate's degree holders grew 83%. This rate of growth has far exceeded that of other middle skills jobs by a rate of 10 to 1 (Carnevale et al., 2018), making associate's degree completion the most efficient option for "upskilling" (p. 18). Gittell, Samuels, & Tebaldi (2017) found in the last two decades, "substitution toward workers with associate's degrees has increased U.S. earnings, aggregate labor quality, and productivity, and that these effects are concentrated in the health care, trade, and government sectors" (p. 600). Workforce participation of associate's degree holders is nearly 10% higher than workers with SCND (Gittell et al., 2017). Additionally, while workforce participation declined amongst SCND and bachelor's degree holders during the recession of the 2000s, workforce participation amongst associate's degree holders stayed stable. The demand for these workers was led by the healthcare,

retail and construction industries. Since 2000, contributions to national economic growth

from demand for associate's degree workers has exceeded that of bachelor's degree

workers (Gittell et al., 2017). While increasing numbers of students have continued to

enroll in associate's degree programs, the wage advantage has remained stable, evidencing

the growing demand for middle skills workers (Marcotte et al., 2005).

The economic impact of associate's degree completion on individuals has been

examined by a number of scholars (Grubb, 2002; Jaggars & Xu, 2016; Kim & Tamborini,

2019; Liu, Belfield, & Trimble, 2015; Tamborini, Kim, & Sakamoto, 2015). These studies

have found that the economic returns on sub baccalaureate education have increased since

such data became available in the 1970s (Grubb, 2002). Kim & Tamborini (2019) found

substantial payoffs for sub-baccalaureate education, with some associate's degree groups

out-earning some bachelor's degree groups based on the fields of study. For example, men

with an associate's degree in a technical field earned more in the first 20 years of working

than liberal arts or humanities bachelor's graduates. Both men and women benefit from

increased economic benefits associated with completing an associate's degree, especially

an occupational associate's degree[4] (Bailey et al., 2004). It is worth noting that when

analyses are limited to adults with significant pre-enrollment wages, economic returns are

lower (Dadgar & Trimble, 2015).

While there have been studies disaggregating economic benefits by race at the

associate's level, they are 20 years old and rely on the same data set, the National

Education Longitudinal Study (Averett & Dalessandro, 2001; Bailey et al., 2004; Belfield &

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[4] Occupational associate's degrees are designed to culminate at the completion of the associate's degree program. Transfer associate's degrees are designed for students to transfer to a baccalaureate granting institution.

Bailey, 2011; Marcotte et al., 2005). This presents an opportunity to examine more recent

data from a different source to see if the findings in the literature are confirmed, or if the

economic rewards for associate's degree completion has changed over time. Another

opportunity presented by the current state of the literature is to enhance the research on

how economic rewards to associate's degree completion vary by different identities. The

next section of this review will examine the current literature disaggregated by each of the

key independent variables in this study – race/ethnicity, sex, citizenship and nativity.

Differences in Economic Impact by Race and Ethnicity

A broad study of differences in economic performance between racial and ethnic

groups found "systematic evidence of negative discrimination" for Asian, Indian, Black,

Vietnamese, Cuban, Mexican, Puerto Rican, and Native American males (Darity et al., 1996).

Both the Black-White and Hispanic-White wage gap increased in the 1980s (McCall, 2005).

More than half of the Black-White wage gap in the 1990s could be accounted for by the

differences in human capital accumulation (O'Gorman, 2010). The earnings gap between

Hispanic and non-Hispanic workers is also largely explained by differences in human

capital (J. Kim, 2002). Stoll (2010) observed that racial inequalities in economic outcomes

for racial/ethnic minority men widened as educational levels increased. Raj Chetty and his

colleagues documented that Black Americans have much lower rates of upward social

mobility, driven largely by differences in wages and employment between Black and White

men. There were no such differences between Black and White women (Chetty et al.,

2020).

When specifically examining economic returns to associate's degrees, one study

found that Black men earned less than White men with similar levels of education, but the

difference between Black women and White women was insignificant (Bailey et al., 2004). Grubb (2002) found that both Black men and women saw higher returns to associate's degree completion than White men and women. Averett & Dalessandro (2001) find that Black women have higher economic returns at all levels of educational attainment compared to White men and White women. They also suggest that the lower completion rates of Black and Hispanic students contributed to the differences in economic outcomes. Clearly, these findings are conflicting, evidencing the need for further study in this area.

A portion of the overall earnings gap can be attributed to differences in human capital, due to more White and Asian students completing associate's degrees than Black and Hispanic students (Grubb, 2002). Even accounting for these differences in degree completion and considering the conflicting findings between some studies, associate's degrees appear to yield greater economic benefits to White degree completers, as compared to Black and Hispanic degree completers. It is important to note that when economic impact is analyzed by race/ethnicity and sex, additional differences are observed in the economic impact. There is a need for further analysis that takes both race/ethnicity and sex into account.

Differences in Economic Impact by Sex

Studies have consistently found that women reaped greater benefits from completing an associate's degree than men (Dougherty, 2005; Jepsen et al., 2014; C. Kim & Tamborini, 2019; V. Liu et al., 2015). Men and women study transfer associate's degrees[5] in fairly equal proportions. However, when transfer associate's degrees are excluded from the

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[5] Transfer associate's degrees are structured with the intention of a student transferring to a baccalaureate granting institution. Occupational associate's degrees are designed to culminate at the completion of the associate's degree program.

analysis, men and women study markedly different academic fields when earning

occupational associate's degrees. Women most commonly study nursing and allied health;

men most commonly study computer science, engineering, and mechanics (Dadgar &

Trimble, 2015). Nursing degrees led to the highest returns to income: one study found a

300% return for nursing degrees (Liu et al., 2015) and another found 37% for women and

27% for men (Dadgar & Trimble, 2015). An earlier study showed that if nursing was

removed from the analysis, the economic benefit to completing an associate's degree for

women decreased 33% (Kane & Rouse, 1995). While associate's degrees appear to yield

greater economic benefits for women, this may be mainly related to the disparate

occupations men and women pursue following associate's degree completion.

Differences in Economic Impact by Citizenship and Nativity

While there is currently no literature that specifically examines the economic impact

of associate's degree completion by citizenship or nativity, there is substantial literature

that examines broader economic outcomes by differences in citizenship and nativity. In the

context of this study, "citizenship" refers to whether the individual is a citizen of the United

States at the time of the data collection. "Nativity" refers to whether the person was born in

the United States. A person born in the United States or born abroad to parents who are

U.S. citizens is considered "native" in this study. These categories certainly have some

overlap, but are distinct in that persons born in the United States are granted U.S.

citizenship, but not all U.S. citizens were born in the United States.

There have been consistent earnings differences between immigrant and native

workers for decades. These differences have increased from the 1970 Census when

immigrants who had been in the country less than 5 years earned 38 percent less than

similarly experienced native workers to the 1990 Census where recent immigrants earned 55 percent less than native workers (Lubotsky, 2007). Another study from the 1970s found that non-native men initially earned less, but equaled or exceeded the earnings of native men after having been working in the country for ten to 15 years (Chiswick, 1978). A more recent study found that the longer immigrants are in the country, the smaller the earnings gap became, closing by ten to 15 percent during the immigrant's first 20 years in the country. There is some disagreement as to the effect of selective out-migration on these figures (Lubotsky, 2007). Not only do naturalized immigrants (those who become citizens) earn higher wages, they also have been observed to have lower rates of unemployment and tend to be in occupations deemed more desirable (Chi & Coon, 2020). The largest boost to earnings typically occurs as a one-time boost following naturalization (Peters et al., 2020).

Country of origin has been shown to account for a significant degree of the wage gap between immigrants (Abramitzky et al., 2014; Borjas & Tienda, 1993; Bratsberg et al., 2002; Chi & Coon, 2020; Korzeniewicz & Albrecht, 2015). Legal immigrants earn 30 percent more than undocumented workers from the same regions (Borjas & Tienda, 1993). In one study, 80% of undocumented immigrants to the U.S. and Canada were from Mexico and Central America (Picot & Hou, 2011). Because undocumented immigrants have a much higher wage disadvantage, this can skew the data unless it is accounted for. The wage disadvantage of undocumented immigrants increases with age (Borjas & Tienda, 1993). In another study of wage differentials by country of origin, Chinese, Mexican and Filipino immigrants experience a greater wage penalty prior to attaining citizenship, while Indian immigrants earned higher wages than other immigrants (Chi & Coon, 2020). Employers of low-skill workers have been shown to prefer non-native workers over native workers, due

to employers' desire for high levels of control over low skill workers, and the perception

amongst employers that they have more control over non-native workers (Shih, 2002).

More studies show that great advantages to wage growth and available occupations

are gained by becoming a citizen (Borjas & Tienda, 1993; Bratsberg et al., 2002; Picot &

Hou, 2011). Employers in the United States are legally allowed to use citizenship as a

qualification for employment, and do not need to justify this selection. Accordingly, it is

difficult to ascertain why so many white-collar jobs require citizenship. Some suggest it is

because U.S. citizens may hold U.S. passports, allowing for ease of travel which may be

important for certain jobs. Another suggestion is that employers may assume a citizen is

more likely to stay in the United States, and therefore in that job or company for a longer

period of time than a non-citizen who may decide to return to their home country

(Bratsberg et al., 2002). It is unknown if nativity and citizenship impact economic rewards

to associate's degree completers who are likely to be working middle skills jobs. This study

aims to examine this gap in the literature.

Intersectionality

As outlined above, the literature provides a variety of studies examining the

differential returns to economic rewards for associate's degree completers by sex and

race/ethnicity. There is a need for a better understanding of whether economic rewards

are different for workers according to citizenship and nativity. Additionally, there are no

studies that examine the interaction effects of the intersection of all of these identities. To

frame this aspect of this study, I will employ the theory of intersectionality.

The theory of intersectionality was introduced in 1989 in reference to the ways race and sex intersected to accentuate the marginalization of Black women (Carbado et al., 2013; Crenshaw, 1989). While intersectionality is rooted in the traditions of Critical Race Theory and feminist theory, scholars have built on this work in the years since applying the concept of intersectionality to a range of identities, power dynamics, systems and structures. Intersectionality examines how discrimination in society and in institutions is multi-layered, often examining the intersection of gender, race, class and nation (Chapman & Benis, 2017). The theory of intersectionality provides a framework for understanding how these systems are not distinct social hierarchies, but in fact, "mutually construct one another" (Collins, 1998, p. 63).

Using this framework, intersectionality acknowledges that people have multiple identities, and they are experienced congruently, and not distinctly. "Race is 'gendered' and gender is 'racialized,' so that race and gender fuse to create unique experiences and opportunities for all groups" (Browne & Misra, 2003, p. 488). For instance, the experiences of White women and Black women are different – though they are both women, the differences in their races impacts their experiences of womanhood and the world. These intersecting identities also have implications for how people experience social systems and power structures, including higher education and the workforce. Intersectionality research examines the experiences of marginalized individuals, seeking to understand their positions of advantage or disadvantage (Liu et al., 2019; Rodriguez et al., 2016; Styhre & Eriksson-Zetterquist, 2008).

Scholars have suggested intersectionality helps to examine "bundles" of individual's demographic attributes (Liu et al., 2019). Intersecting identities create opportunity and

oppression; one intersectional position may be advantaged compared to one group, but disadvantaged compared to another group (Shields, 2008). Intersectionality is a valuable theoretical framework for this study because it highlights "invisible boundaries...between visible identity categories" (Atewologun, Sealy, & Vinnicombe, 2016, p. 238). Research has shown that people with more than one social disadvantage – whether it be race, sex, or nationality – experience a significantly greater wage penalty than workers with only one disadvantaged social identity (Woodhams et al., 2015a). These findings underscore the importance of disaggregating data both for analyses and for policy recommendations, as each social identity group has unique educational and workforce experiences and challenges.

There have been a number of studies that utilize intersectionality as a theoretical framework to examine differences in economic or labor outcomes (Babbitt, 2013; Browne & Misra, 2003; Chapman & Benis, 2017; Cheng, 2016; Diedrich et al., 2011; Hodges, 2020; Jones & Day, 2018; M. Kim, 2009; Mitra, 2003; Nawyn & Gjokaj, 2014; Ressia et al., 2017; Torres Stone et al., 2006; Woodhams et al., 2015a, 2015b). The findings are quite mixed. Scholars who have examined economic inequalities recommend analyzing these differences within racial and gender groups, as looking at the data in aggregate can mask significant differences and inhibit understanding of existing inequalities (McCall, 2001). Some of the methodological problems with studying intersectionality are rooted in "the complexity that arises when the subject of analysis expands to include multiple dimensions of social life and categories of analysis" (McCall, 2001, p. 1772). Therefore, it is hard to compare the differing findings of these studies, as each has been done within a very specific and purposefully complex context. With that said, it is useful to survey the current

literature to better understand how scholars have attempted to understand the interaction

effects of multiple dimensions of identity on economic and labor outcomes, including

differences in earnings, occupational choices and the magnification of disadvantages

When examining differences in earnings, Black women experience larger gender

than race penalties (M. Kim, 2009). Black men experienced greater racial penalties than

gender penalties. Another study found that Black women, Hispanic women, and some

groups of Asian women fall below White women and men of their race/ethnicity in wages,

job authority and occupational position (Browne & Misra, 2003). Not only do women of

diverse races experience different outcomes in the labor market, their outcomes also

varied by socioeconomic status, immigration status and language proficiency (Torres Stone

et al., 2006). There are other factors that differentiate earnings for women of different

races. For instance, changes in work negatively impacted married White women's wages,

and positively impacted married Black women's wages (Cheng, 2016).

In addition to difference in earnings, research using the framework of

intersectionality points to differences in occupational choice for people of diverse

identities. First, gender ideologies are held strongly among the class of workers without

bachelor's degrees (Hodges, 2020). Both social class and gender ideologies have been

shown to impact attitudes toward postsecondary education and notions of appropriate

work (Damaske & Frech, 2016). These ideologies may limit occupational choices due to

understandings of what occupations a worker "like them" should pursue. The concept of

"appropriate labor" – who is best suited for certain jobs based on demographic

characteristics rather than skills – not only limits individual's choice of occupation, but has

also been seen to stereotype female and non-White workers into lower paid occupations

such as domestic work, food service, and care work (Wooten & Branch, 2012). Black

women are segregated into primary "female" jobs and therefore have a lesser wage

differential (Mitra, 2003). Primarily "female" jobs include non-supervisory and

management roles (Lazear & Rosen, 1990), as well as care occupations, which have lower

entry barriers, benefits and pay (Hodges, 2020). Paid care work is a large proportion of the

labor market for workers with less than a bachelor's degree, and has been identified as a

primary nexus of labor market disadvantages for both race and gender (Duffy, 2005, 2007;

Hodges, 2020; Yavorsky et al., 2016). When examining occupational hierarchies, white men

dominate the upper levels (verticals), and women and non-White workers are horizontally

distributed across service and non-manual occupations (Hodges, 2020). Additionally,

empirical research has found that men with disadvantaged identities are disproportionality

more likely than other men to work in female-dominated, low-status work (Woodhams et

al., 2015a). Men and women also make different choices about when to take a lesser job

versus dropping out of the workplace. In one study, both male and female migrant workers

in Australia suffered downward occupational mobility in their new country: men were

more likely to accept underemployment and women more likely to drop out of the

workforce (Ressia et al., 2017). The differences in occupational choices at the intersection

of identity amplify economic inequalities.

The bargaining power of workers, both individual and collective, has been shown to

be a primary determinant of earnings (Folbre, 2012). Workers who hold one more

disadvantaged position have less individual bargaining power, which is likely to impact

earnings. Pay penalties are also linked to taking time out of the workforce. Approximately

one-third of women who are employed are working in a part-time capacity, and the least

advantaged women are the least likely to work full-time (Damaske & Frech, 2016). Earnings inequalities at the intersection of gender, race and nativity, have a magnifying effect, "with the advantages conferred from one privileged status increasing the effects of other privilege statuses, which become larger over time" (Nawyn & Gjokaj, 2014, p. 85). Intersectionality provides a framework to understand the unequal impact of social identities on earnings and occupational choice. In combination, the literature shows that these forces amplify economic inequalities for workers who possess multiple disadvantaged identities.

The concept of intersectionality is important to this study, as intersecting identities has been shown to have differential effects on economic and labor outcomes. Currently, I have found no studies that utilize the theory of intersectionality to examine differential economic rewards by race/ethnicity, sex, citizenship and nativity to associate's degree completion. It stands to reason that intersecting identities may have differential impacts on the economic returns to associate's degree completion. As policy makers continue to encourage an increasingly diverse population of traditionally disadvantaged workers to complete associate's degrees, billed as a path to upskill the workforce and enhance social mobility, a clearer understanding of the economic rewards experienced by associate's degree workers of different intersecting identities is important.

Contribution to the Literature

While overall, studies have pointed to economic rewards for those who complete associate's degrees, there are inconsistences in the literature as to how these economic rewards are distributed among people of different races, ethnicities, sexes, citizenships and

nativities. While there have been studies disaggregating economic benefits by race at the associate's level, they are 20 years old and rely on the same data set, the National Education Longitudinal Study (Averett & Dalessandro, 2001; Bailey et al., 2004; Belfield & Bailey, 2011; Marcotte et al., 2005). Within this literature, there have been conflicting findings related to how Black and White women's economic returns to associate's degrees compare (Alfonso et al., 2005; Averett & Dalessandro, 2001; Chetty et al., 2020). There is a gap in the literature examining economic returns to associate's degree completion by citizenship and nativity (Belfield & Bailey, 2011). No studies have looked at the interaction effects between all of these intersecting identities.

Given that the different aspects of each person's identity are intersecting and experienced in concert, this study will examine this intersection of sex, race/ethnicity, citizenship, and nativity on the economic benefits reaped by those who complete an associate's degree compared to those who have SCND. The growth in middle skills jobs, the efficacy of associate's degree completion in upskilling the workforce, and the disproportionate percentage of community college students who are from underrepresented groups situate this as a valuable research question that stands to contribute to deepening understanding of how associate's degree completion may contribute to national economic growth and individual social mobility in our increasingly diverse country.

Chapter 3: Methods

Study Objectives

The main objective of this study was to understand whether economic benefits

differ between those whose highest level of educational attainment is SCND and an

associate's degree, specifically by analyzing the heterogeneity by race/ethnicity, sex,

citizenship and nativity of these economic outcomes.

Research Questions

(1) Do economic rewards for completing an associate's degree differ from SCND when

accounting for the intersection of diverse identities?

- o Do economic rewards for completing an associate's degree differ from SCND

by **sex**?

- o Do economic rewards for completing an associate's degree differ from SCND

by **race/ethnicity**?

- o Do economic rewards for completing an associate's degree differ from SCND

by **nativity**?

- o Do economic rewards for completing an associate's degree differ from SCND

by **citizenship**?

(2) Do **race/ethnicity, sex, citizenship and nativity interact to differentially affect**

economic rewards for completion of an associate's degree?

Hypotheses

H(1) Workers whose highest level of degree attainment is an associate's degree will

reap more economic rewards (as measured by five different economic indicators)

than workers whose highest level of degree attainment is some college, no degree
(Averett & Dalessandro, 2001; Grubb, 2002; Jaggars & Xu, 2016; C. Kim &
Tamborini, 2019; Tamborini et al., 2015).

- o H$_1$A: Females with an associate's degree will reap more economic rewards
  than males with an associate's degree, but SCND males will reap more
  economic rewards than SCND females (Averett & Dalessandro, 2001; Bailey
  et al., 2004; Dadgar & Trimble, 2015; Kane & Rouse, 1995).
- o H$_1$B: Black and Hispanic workers at both educational levels (SCND and
  associate's degree) will reap fewer economic rewards than White workers
  (Lee, 2019).
- o H$_1$C: Non-native workers at both educational levels (some college, no degree
  and associate's degree) will reap fewer economic rewards than native
  workers (Singh & Kposowa, 1996).
- o H$_1$D: Non-citizen workers at both educational levels (some college, no
  degree and associate's degree) will reap fewer economic rewards than
  workers who are US citizens (Bratsberg et al., 2002; Nawyn & Gjokaj, 2014;
  Picot & Hou, 2011).

H(2) There will be statistically significant associations among race/ethnicity, sex,
nativity and citizenship.

- o H$_2$A: Black men will reap fewer economic rewards than White males, White
  females and Black females (Averett & Dalessandro, 2001; Bailey et al.,
  2004).

- o H$_2$B: Non-native Black workers will reap more economic rewards than native Black workers (Shih, 2002).

- o H$_2$C: Hispanic citizens will reap more economic rewards than non-citizens (Borjas & Tienda, 1993; Bratsberg et al., 2002; Picot & Hou, 2011).

Participants

This study used the Current Population Survey (CPS) 2019 Annual Social and Economic (ASEC) Supplement which is conducted by the Bureau of the Census for the Bureau of Labor Statistics; these data were accessed using IPUMS (Ruggles et al., 2018). The CPS is the official government source for employment and unemployment statistics, and is conducted monthly. The ASEC survey provides labor force data as well as data on work experience, income, and noncash benefits. For persons over 15 years old, comprehensive work experience information includes employment status, occupation, and industry, as well as hours worked per week, total income and income components. Noncash income sources include food stamps, school lunch program, employer-provided group health insurance plan, employer provided pension plan, personal health insurance, Medicaid, Medicare, military health care, and energy assistance. Demographic data refer to the time of the survey, while employment data refer to the prior year. Demographic variables include age, sex, race, household relationship, and Hispanic origin, as well as educational attainment and nativity. Specifically, I will utilize IPUMS CPS to access this data set (Ruggles et al., 2018).

The universe for the ASEC survey is the civilian noninstitutional population of the United States living in housing units and members of the Armed Forces living in civilian

housing units on a military base or in a household not on a military base. Housing units are

selected using a probability sample. There are 826 sample areas that comprise 1,328

counties and cities, with representation in every state and the District of Columbia. Sample

design is intended to produce estimates for the nation, and are not recommended to be

used for estimating specific metropolitan areas. The units of observation are individuals,

families, and households. This study used individuals as the unit of analysis. The 2019 ASEC

includes 180,101 individual records. This sample was additionally limited as follows (see

Appendix A, Table A1 for further detail):

- o **Highest level of education attainment** (EDUC) – The values included are
  Some college but no degree (SCND), Associate degree– occupation/vocation
  program, and Associate degree in college – academic program, which are
  combined into one Associate's value.
- o **Age** (AGE) – This study included participants between the ages of 25-65 to
  better represent the population most likely to have completed a degree and
  to be in the workforce (Cellini & Chaudhary, 2012; Dadgar & Trimble, 2015).
- o **Labor force** (LABFORCE) – I only included those who indicated they
  participated in the labor force in the previous week in this analysis.
- o **Enrolled in school** (SCHLCOLL) – Any respondent currently in school was
  excluded from this analysis.
- o **Class of worker** (CLASSWLY) – I selected those who worked for wages and
  exclude those who were self-employed and unpaid family workers.

- **Full or part time** (FULLPART) –I limited this sample to individuals who worked full time, defined as 35 hours or more of work in a week, and recorded for the previous year.

- **Weeks worked** (WKSWORK1) – I limited this sample to individuals who worked at least 39 weeks in the previous year.

Study Variables

Independent and Control Variables

The CPS 2019 ASEC dataset in IPUMS contains the following variables that were used in this study. In order to address the research questions of this study, this analysis treated education, race/ethnicity, sex, citizenship and nativity as primary independent variables, and marital status, nurse, age, and metro region as control variables. By examining these variables, this research examined economic outcomes at the intersection of diverse identities. Table 3.1 lists the primary independent and control variables, the level of measurement for each variable, and the variable description.

All categorical independent variables were recoded as binary to allow for logistic regression analysis. I combined the two associate's degree categories to one for this analysis, as this study examines the impact of associate's degree completion overall. I created a combined race/ethnicity variable for this analysis (Chetty et al., 2020). I will utilize the following values from the race (RACE) variable: *White*, *Black*, *American Indian*, *Asian*, and *Multiracial*. Hispanic origin (HISPAN) has nine available responses. I combine Mexican, Puerto Rican, Cuban, Dominican, Salvadorian, Central American, South American, and Other Hispanic into one *Hispanic* value. Altogether, my race/ethnicity variable consists

of: *White*, *Black*, *American Indian*, *Asian*, *Multiracial*, and *Hispanic*. These are mutually exclusive categories. If a respondent indicated any of the available Hispanic origin responses, that individual is reflected in the Hispanic category rather than the race that was selected. To analyze citizenship as a dichotomous variable, I combined Born in the U.S., Born in U.S. outlying, Born abroad of American parents, and Naturalized citizen into one *Citizen* value. Nativity indicates whether the individual was born in the United States, with the option to disaggregate by the parents' nativity, or birthplace. For the purposes of this study, I am interested in the individual's nativity, not their parents, so I analyzed this as a dichotomous variable. I combined four possible responses for *Native* – both parents native-born; father foreign, mother native; mother foreign, father native; both parents foreign. Foreign born is considered *Not Native*.

I included four other control variables based on previous literature (Table 3.1.) Literature suggests marriage can have different impacts on economic outcomes, making this important to control for (Cheng, 2016). I created *Ever Married* and *Never Married* values to analyze dichotomously. Several studies have examined whether there are disproportionate returns to associate's degree completion based on occupation. While findings have been somewhat mixed, nursing has consistently been found to be an outlier, disproportionally increasing returns and representing a sizeable proportion of associate's degree completers, making this important to control for (Carnevale et al., 2020; Dadgar & Trimble, 2015; Grubb, 2002; Jepsen et al., 2014; V. Liu et al., 2015). I created a *Not a Nurse* and *Nurse* values, and analyzed dichotomously.

Table 3.1

Independent and Control Variables

Variable Name	Values	Description
Education	Associate's SCND	Educational attainment, as measured by the highest year of school or degree completed.
Race/Ethnicity	White Black American Indian Asian Multiracial Hispanic	Identifies and classifies racial and ethnic origin.
Sex	Male Female	Gives each person's sex.
Citizenship	Citizen Not a Citizen	Reports citizenship status.
Nativity	Native Not Native	Classifies each person as native-born or foreign-born.
Marital Status	Ever Married Never Married	Gives each person's marital status.
Nurse	Nurse Not a Nurse	Identifies if the person reported working primarily as a nurse during the previous calendar year.
Age	Continuous	Gives each person's age at last birthday.
Metro	City Not a city	Indicates whether a household was located in a metropolitan area.

Dependent Variables

There are five variables used to measure economic rewards in this study (Table 3.2),

Because Income is not normally distributed, the natural log of Income was utilized to

satisfy assumptions of normality for OLS regression (Perna, 2005). Initially this study

intended to use a different variable for employer paid health plan, but there was a

substantial amount of missing data. The group health plan variable was used rather than

employer health plan, with the understanding that additional context will be needed for

interpretation of these results.

Table 3.2

Dependent Variables

Variable Name	Level of Measurement	Description
Income (natural log)	Continuous	Reports the respondent's total pre-tax wage and salary income for the previous calendar year.
Private health plan	Dichotomous	Indicates whether the respondent reported being covered by a private (i.e., employment-based or privately-purchased, not government) insurance plan during the preceding calendar year.
Group health plan	Dichotomous	Indicates whether the respondent was covered, either as a policyholder or as a dependent of another household member, by employment-based group health insurance during the previous calendar year.
Medicaid	Dichotomous	Indicates whether the respondent was covered by Medicaid during the previous calendar year.
Pension	Dichotomous	Indicates whether the respondent's union or employer for his or her longest job during the preceding calendar year had a pension or other retirement plan for any of the employees, and, if so, whether the respondent was included in that plan. The question specifically excluded retirement support from Social Security.

Data Analysis Plan

This study used descriptive and multivariate analyses of data accessed through

IPUMS from the Current Population Survey (CPS) 2019 Annual Social and Economic

Supplement (ASEC) to examine the heterogeneity of economic outcomes by race/ethnicity

and nativity or citizenship. Following cleaning of the data, sample distributions are

displayed. The data were checked for absence of outliers, absence of multicollinearity,

linearity, multivariate normality, and presence of homoscedasticity among the applicable

variables. Interaction terms between educational attainment and race/ethnicity, sex,

citizenship, or nativity will display variations in the associations across groups. Details will

be discussed in the Results chapter.

Ordinary least squares (OLS) regression examines the association between

educational attainment, race/ethnicity, sex, citizenship, and nativity and the continuous

dependent variable, income (natural log), after controlling for other variables (outlined in

the measures section above). I ran separate regressions using citizenship (Bratsberg et al.,

2002; Picot & Hou, 2011) and then nativity (Abramitzky et al., 2014; Shih, 2002; Singh &

Kposowa, 1996). The literature suggested both may have an impact on the economic

outcomes, and because there were no concerns with multicollinearity upon examine the

sample, I included both variables in the regression equation (Field, 2013):

y_i (income ln) = b_0 + b_1 (educational attainment) + b_2 (race/ethnicity) + b_3 (sex) + b_4

(citizenship) + b_5 (nativity) + b_6 (marital status) + b_7 (age) + b_8 (nurse) + b_9 (metro) + $\mathcal{E}_i$

I examined the association between educational attainment and the other four

dichotomous variables selected as measures of economic benefits (such as health insurance

coverage) using logistic regression, holding constant other variables. Based on results from

the OLS regression, I also included both citizenship and nativity in the logistic regressions.

A sample equation for these logistic regressions is as follows:

$$P(Y) = \frac{1}{1 + e^{-i(b0 + b1 \text{ (educational attainment)} + b2 \text{ (race/ethnicity)} + b3 \text{ (sex)} + b4 \text{ (citizen)} + b5 \text{ (nativity)} + b6 \text{ (marital status)} + b7 \text{ (age)} + b8 \text{ (nurse)} + b9 \text{ (metro)} + \varepsilon i)}}$$

Interaction effects were examined between the four demographic variables –

race/ethnicity, sex, citizenship and nativity. Given the theoretical lens of intersectionality

that frames this research study, both two way and three interaction effects are presented.

As a final analytical step, this study utilized a propensity score model to estimate an

individual's propensity to complete an associate's degree using race/ethnicity, sex,

citizenship and/or nativity as variables in the model. Because decisions to complete a

college degree are distinct and cannot be randomly assigned, it is difficult to assess causal

effects of degree completion on economic outcomes. Propensity score matching may be

used to estimate causal treatment effects that use observational data (Austin, 2009, 2011;

Brand & Xie, 2010; Harper-Anderson & Jin, 2014). This process of matching attempts to

create a balance between treated and untreated participants, or in this study, associate's

and SCND degree completers.

I use the *teffects psmatch* (treatment effects propensity score match) command in

Stata to execute this analysis. This command implements the propensity score match (PSM)

estimator and models the propensity score using a probit model. PSM matches on the

estimated predicted probabilities of treatment, also known as the propensity scores. All

covariate information is combined to create estimated treatment probabilities, or

propensity scores. This method was selected as it does not require bias correction when

using a model for the treatment, as is done in this study (Abadie et al., 2004; Rosenbaum &

Rubin, 1983; StataCorp, 2019). By utilizing this statistical technique, I attempt to create a

research design with a balance like that achieved through a randomized experiment. By

generating propensity scores for individuals to complete an associate's degree, I assess the

impact of associate's degree completion on economic outcomes for individuals with equal

likelihoods of participation.

Chapter 4. Results

Description of the Sample

Data for this sample were obtained by building a custom report in IPUMS (Ruggles et al., 2018) of variables of interest from the Current Population Survey (CPS) 2019 Annual Social and Economic (ASEC) Supplement. The sample was limited as previously described in the methods section. Using those limitations, the sample consisted of 13,452 individual observations. In accordance with CPS recommendations, the individual-level weight (ASECWT) was utilized. Due to the complex sampling design of the ASEC, the individual-level weight adjusts for "failure to obtain an interview; sampling within large sample units; the known distribution of the entire population according to age, sex, and race; over-sampling Hispanic persons; to give husbands and wives the same weight; and an additional step to provide consistency with labor force estimates from the basic survey" (Ruggles et al., 2018).

Stata 16 was used to conduct statistical analyses outlined in the methods section. Table 4.1 presents a description of the data utilized in this analysis. There were no missing data in this sample, as they were eliminated when selecting the sample. The range of the income variable was $2 to $1,100,399.

Table 4.1

Demographic Characteristics and Sample Descriptive Statistics (N = 13,452)

Variable	Mean	Std. Dev.
Associate's degree	0.432	0.495
Race/Ethnicity		
White	0.628	0.483
Black	0.129	0.335
American Indian	0.014	0.119
Asian	0.047	0.211
Multiracial	0.017	0.129
Hispanic	0.165	0.371
Female	0.466	0.499
Not a citizen	0.041	0.198
Non-native	0.123	0.329
Never married	0.220	0.414
Nurse	0.038	0.192
Age	43.700	11.021
Not a city	0.369	0.482
Income	55,579.930	52,796.910
Private health plan	0.861	0.346
Group health plan	0.817	0.387
Medicaid	0.061	0.240
Pension	0.427	0.495

Research Questions & Hypotheses

The objective of this research was to understand if economic benefits differ between those whose highest level of educational attainment is SCND and an associate's degree, specifically by analyzing any heterogeneity and interaction effects between sex, race/ethnicity, nativity and citizenship of these economic outcomes. This research compared economic outcomes of the population of workers whose highest level of educational attainment is SCND versus an associate's degree. To frame the discussion of these analyses, the specific research questions and hypotheses are outlined in Table 4.2.

Table 4.2

Research Questions and Hypotheses

RQ1 - Do economic rewards for completing an associate's degree differ from SCND when accounting for the intersection of diverse identities - race/ethnicity, sex, citizenship, and nativity?

H1- Workers whose highest level of degree attainment is an associate's degree will reap more economic rewards (as measured by five different economic indicators) than workers whose highest level of degree attainment is some college, no degree.

H1A - Females with an associate's degree will reap more economic rewards than males with an associate's degree, but SCND males will reap more economic rewards than SCND females.

H1B - Black and Hispanic workers at both educational levels (SCND and associate's degree) will reap fewer economic rewards than White workers.

H1C - Non-native workers at both educational levels (some college, no degree and associate's degree) will reap fewer economic rewards than native workers.

H1D - Non-citizen workers at both educational levels (some college, no degree and associate's degree) will reap fewer economic rewards than workers who are U.S. citizens.

RQ2 - Do race/ethnicity, sex, citizenship and nativity interact to differentially affect economic rewards for completion of an associate's degree?

H2 - There will be statistically significant associations among race/ethnicity, sex, nativity and citizenship.

H2A - Black men will reap fewer economic rewards than White males, White females and Black females.

H2B - Non-native Black workers will reap more economic rewards than native Black workers.

H2D - Hispanic citizens will reap more economic rewards than non-citizens.

RQ1 - Do economic rewards for completing an associate's degree differ from SCND when accounting for the intersection of diverse identities - race/ethnicity, sex, citizenship, and nativity?

Descriptive statistics. The distribution of each predictor variable – race/ethnicity, sex, citizenship, nativity – for both the SCND and associate's groups are displayed in Table 4.3. Fifty-nine percent of SCND workers are White (non-Hispanic), 55% male, 95% are U.S. citizens, and 88% are native to the United States. Examining the characteristics of associate's worker, 67% are White, 51% are male, 96% are U.S. citizens and 87% are native to the U.S. It is more likely that White (non-Hispanic) and Asian (non-Hispanic) workers will have completed an associate's degree; it is more likely that Black (non-Hispanic), American-Indian (non-Hispanic), Multiracial (non-Hispanic), and Hispanic workers will have some college, no degree. It is more likely that a female will have completed an Associate's degree than a male. The distributions between citizens and native workers are similar between SCND and associate's degrees holders.

Table 4.3

Distribution of Predictor Variables by Levels of Educational Attainment (n=13,452)

Variable	Value	SCND (%)	Assoc. (%)	Pearson X^2	p	Cohen's d	95% CI LL	95% CI UL
Race/ethnicity	White	59.93	66.67					
	Black	13.98	11.46					
	American Indian	1.53	1.29	76.57	0.00	0.12	0.09	0.16
	Asian	4.50	4.85					
	Multiracial	1.82	1.51					
	Hispanic	18.24	14.21					
Sex	Male	55.35	50.92	25.98	0.00	-0.09	-0.12	-0.06
	Female	44.65	49.08					
Citizenship	Citizen	95.68	96.18	2.08	0.15	0.03	-0.01	0.06
	Not a citizen	4.32	3.82					
Nativity	Native	88.00	87.20	1.96	0.16	-0.02	-0.06	-0.01
	Non-native	12.00	12.80					

Note. SCND = some college, no degree; Assoc.=Associate's degree; CI = confidence interval; LL = lower limit; UL = upper limit.

Outcome Variable: Income. Table 4.4 shows the mean and standard deviation for the two groups – SCND and associate's – by each income. Associate's degree workers had higher incomes when they were White (non-Hispanic), Black (non-Hispanic), Asian (non-Hispanic), Multiracial (non-Hispanic) and Hispanic. Native American (non-Hispanic) workers with SCND had higher incomes on average compared with Native American workers with associate's degree. White (non-Hispanic) workers of both groups had the highest average incomes, followed by Asian (non-Hispanic) workers. Black (non-Hispanic) workers of both groups had the lowest average incomes. Both males and females with associate's degrees had higher average incomes than males and females with SCND. The average incomes of males compared to females were notably higher, for both SCND and associate's workers. Citizens, non-citizens, native and non-native workers with associate's degrees had higher average incomes than SCND workers.

Table 4.4

Descriptive Statistics for Income by Predictor Variables

Variable	SCND			Associate's degree		
	n	Mean	SD	n	Mean	SD
Race/Ethnicity						
White	4,579	$57,058	45,881	3,874	$60,045	60,237
Black	1,068	$46,328	46,649	666	$52,559	64,643
American Indian	117	$51,567	90,824	75	$49,377	27,070
Asian	344	$53,747	34,535	282	$55,934	40,687
Multiracial	139	$50,715	33,666	88	$57,002	47,999
Hispanic	1,394	$49,145	39,340	826	$54,142	70,086
Sex						
Male	4,229	$62,271	51,166	2,959	$66,755	59,373
Female	3,412	$43,225	34,345	2,852	$48,845	61,451
Citizenship						
Citizen	7,311	$54,202	45,995	5,589	$58,318	61,874
Not a citizen	330	$44,119	29,206	222	$49,072	33,504
Nativity						
Native	6,724	$54,202	45,097	5,067	$58,243	60,625
Non-native	917	$50,568	47,808	744	$56,073	63,930

Note. SD = standard deviation

Outcome Variable: Private Health Plan. The remaining four outcome variables are all dichotomous. The first is private health plan, displayed in Table 4.5. Private health plan indicates whether the respondent is covered by a private health care plan. No is coded zero, yes is coded one. For all groups, more Associate's degree workers were covered by a private health care plan than SCND, expect for Hispanic workers in which slightly more SCND workers were covered by a private health care plan than associate's workers. Men and women were very similarly covered by private health care in both levels of educational attainment. Far more citizen and native workers were covered by private health care than non-citizen and non-native workers at both educational levels.

Table 4.5

Descriptive Statistics of Private Health Plan by Predictor Variables

Variable	SCND			Associate's degree		
	n	Mean	SD	n	Mean	SD
Race/Ethnicity						
White	4,579	0.881	0.323	3,874	0.898	0.303
Black	1,068	0.815	0.389	666	0.863	0.344
American Indian	117	0.684	0.467	75	0.733	0.445
Asian	344	0.849	0.359	282	0.883	0.322
Multiracial	139	0.813	0.391	88	0.886	0.319
Hispanic	1,394	0.792	0.406	826	0.788	0.409
Sex						
Male	4,229	0.855	0.353	2,959	0.875	0.331
Female	3,412	0.844	0.363	2,852	0.876	0.329
Citizenship						
Citizen	7,311	0.859	0.348	5,589	0.883	0.321
Not a citizen	330	0.658	0.475	222	0.676	0.469
Nativity						
Native	6,724	0.860	0.347	5,067	0.887	0.317
Non-native	917	0.775	0.418	744	0.797	0.402

Note. SD = standard deviation

Outcome Variable: Group Health Plan. Group health plan indicates whether the

respondent was covered, either as a policyholder or as a dependent of another household

member, by employment-based group health insurance. The descriptive statistics for this

outcome variable are displayed in Table 4.6. This variable was substituted for the originally

intended employer health plan variable as there was too much missing data in the

employer health plan variable. However, it is important to note that the group health plan

is an economic benefit that may be the result of the respondent's employment or one of

their family members, making interpretation of this particular variable a bit more

complicated. This will be further discussed in the next chapter. Like the private health care

plan, more Associate's degree workers in all categories were covered by a group health

care plan than SCND workers, expect for Hispanic workers in which slightly more SCND

workers were covered by a group health care plan than associate's workers. The rates at

which males and females were covered by group health care plans were quite similar. Far

fewer non-citizens were covered by a group health plan, and fewer non-native workers

than native workers were covered by a group health care plan.

Table 4.6

Descriptive Statistics of Group Health Plan by Predictor Variables

	SCND			Associate's degree		
	n	Mean	SD	n	Mean	SD
Race/Ethnicity						
White	4,579	0.837	0.369	3,874	0.858	0.349
Black	1,068	0.764	0.425	666	0.824	0.381
American Indian	117	0.667	0.473	75	0.707	0.458
Asian	344	0.802	0.399	282	0.809	0.394
Multiracial	139	0.784	0.413	88	0.852	0.357
Hispanic	1,394	0.744	0.437	826	0.736	0.441
Sex						
Male	4,229	0.809	0.393	2,959	0.837	0.370
Female	3,412	0.799	0.401	2,852	0.828	0.378
Citizenship						
Citizen	7,311	0.814	0.389	5,589	0.841	0.365
Not a citizen	330	0.597	0.491	222	0.608	0.489
Nativity						
Native	6,724	0.817	0.386	5,067	0.847	0.360
Non-native	917	0.712	0.453	744	0.735	0.442

Note. SD = standard deviation

Outcome variable: Medicaid. The Medicaid outcome variable indicates whether the

respondent was covered by Medicaid during the previous calendar year. The descriptive

statistics for this outcome variable are displayed in Table 4.7. The means for all the groups

were very low, with the highest being .155 (SCND, not a citizen). This means that most of

the people in this sample were not on Medicaid in the previous calendar year. Medicaid is

defined by ASEC as "the government assistance that pays for health care" which is provided

"to low-income families with dependent children and to aged, blind, or permanently and

totally disabled individuals with incomes insufficient to meet the costs of medical services"

(Ruggles et al., 2018). The racial and ethnic groups with the highest percentage of

individuals on Medicaid were SCND Asian, non-Hispanic workers (.081), SCND Hispanic

workers (.098), associate's American Indian, non-Hispanic workers (.107). More females in

both the SCND and associate's groups were on Medicaid than males. More non-citizen

workers were at both educational levels were on Medicaid, as were non-native workers.

Table 4.7

Descriptive Statistics of Medicaid by Predictor Variables

	SCND			Associate's degree		
	n	Mean	SD	n	Mean	SD
Race/Ethnicity						
White	4,579	0.053	0.223	3,874	0.046	0.209
Black	1,068	0.076	0.265	666	0.063	0.243
American Indian	117	0.043	0.203	75	0.107	0.311
Asian	344	0.081	0.274	282	0.078	0.269
Multiracial	139	0.079	0.271	88	0.045	0.209
Hispanic	1,394	0.098	0.297	826	0.085	0.279
Sex						
Male	4,229	0.056	0.229	2,959	0.052	0.221
Female	3,412	0.078	0.269	2,852	0.060	0.237
Citizenship						
Citizen	7,311	0.062	0.241	5,589	0.054	0.227
Not a citizen	330	0.155	0.362	222	0.090	0.287
Nativity						
Native	6,724	0.061	0.239	5,067	0.052	0.222
Non-native	917	0.103	0.303	744	0.082	0.275

Note. SD = standard deviation.

Outcome Variable: Pension. The Pension outcome variable indicates whether the

respondent's union or employer for his or her longest job during the preceding calendar

year had a pension or other retirement plan for any of the employees, and, if so, whether

the respondent was included in that plan. The question specifically excluded retirement

support from Social Security. The descriptive statistics for this variable are displayed on

Table 4.8. More White, non-Hispanic and Asian, non-Hispanic workers at both educational

levels had a pension plan. More males had pension plans than females at both educational

levels. More citizen workers than non-citizen workers had a pension at both educational

levels, as did native workers compared to non-native workers. Except for the non-citizen

group, all associate's worker groups had more pension plans than SCND groups.

Table 4.8

Descriptive Statistics of Pension by Predictor Variables

	SCND			Associate's degree		
	n	Mean	SD	n	Mean	SD
Race/Ethnicity						
White	4,579	0.434	0.496	3,874	0.458	0.498
Black	1,068	0.399	0.490	666	0.413	0.493
American Indian	117	0.393	0.491	75	0.440	0.500
Asian	344	0.439	0.497	282	0.468	0.500
Multiracial	139	0.403	0.492	88	0.432	0.498
Hispanic	1,394	0.360	0.480	826	0.392	0.489
Sex						
Male	4,229	0.437	0.496	2,959	0.464	0.499
Female	3,412	0.387	0.487	2,852	0.422	0.494
Citizenship						
Citizen	7,311	0.419	0.493	5,589	0.451	0.498
Not a citizen	330	0.318	0.466	222	0.266	0.443
Nativity						
Native	6,724	0.423	0.494	5,067	0.454	0.498
Non-native	917	0.358	0.480	744	0.370	0.483

Note. SD = standard deviation.

Regressions: OLS and Logistic. To address the research question, this study

employed both ordinary least squares (OLS) and logistic regression to examine the

association among variables. OLS regression examined the association among educational

attainment, sex, race/ethnicity, citizenship, and nativity and the continuous dependent

variable, income. Logistic regression was used to examine the association among

educational attainment and the other four dichotomous outcome variables – private health

care plan, group health care plan, Medicaid, and pension.

   Normality, Multicollinearity and Homoscedasticity. The data were checked for

assumptions of normality, multicollinearity and homoscedasticity. The continuous variable

in the OLS regression is the natural log of income. A histogram and pp plot of the income

variable show that it violates assumptions of normality, which is why the natural log is

used. The histogram (Figure 4.1) and probability plot (Figure 4.2) of the natural log of the

income variable demonstrate adherence to assumptions of normality. The skewness

statistic for this variable is -1.343, indicating a left skew. The kurtosis statistic is 20.756,

indicating a heavy tail distribution (Tabachnick & Fidell, 2013).

Figure 4.1

Histogram of Natural Log of Income
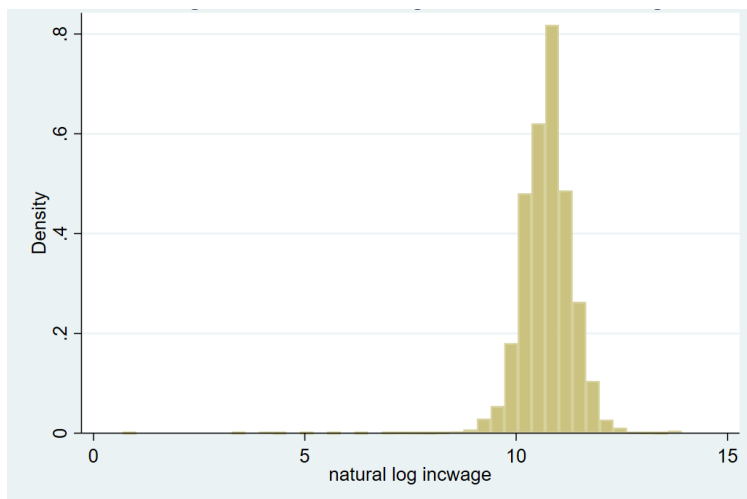
Figure 4.2

Probability Plot of Natural Log of Income
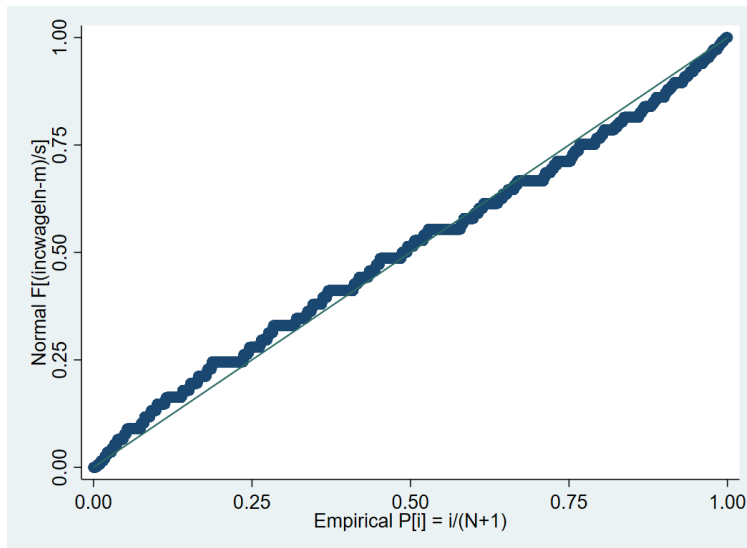
A check for multicollinearity, whether predictor variables were highly correlated, was

performed. The results indicate the predictor variables in this analysis do not exhibit high

levels of collinearity. Table 4.9 shows the Variance Inflation Factor (VIF) is under 2.0 for all

the variables, and the tolerance statistics are all within acceptable ranges (Field, 2013).

Another assumption of OLS regression is the homogeneity of variance of the

residuals. Using a graphical method, the residuals appear to conform to these assumptions

(Figure 4.3). Using the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity,

$p=0.0099$. These checks satisfy the assumptions of OLS regression.

Table 4.9

Collinearity Values

Variable	VIF	1/VIF
Education	1.03	0.967
Race/Ethnicity#		
Black, non-Hispanic	1.12	0.890
American Indian, non-Hispanic	1.01	0.993
Asian, non-Hispanic	1.24	0.805
Multiracial, non-Hispanic	1.01	0.990
Hispanic	1.28	0.778
Sex	1.04	0.960
Citizenship	1.44	0.696
Nativity	1.77	0.564
Marital Status	1.24	0.807
Nurse	1.06	0.947
Age	1.21	0.825
Metro	1.06	0.941
Mean VIF	1.19	

#Reference category is White, non-Hispanic

Figure 4.3

Homoscedasticity of Residuals for Natural Log of Income
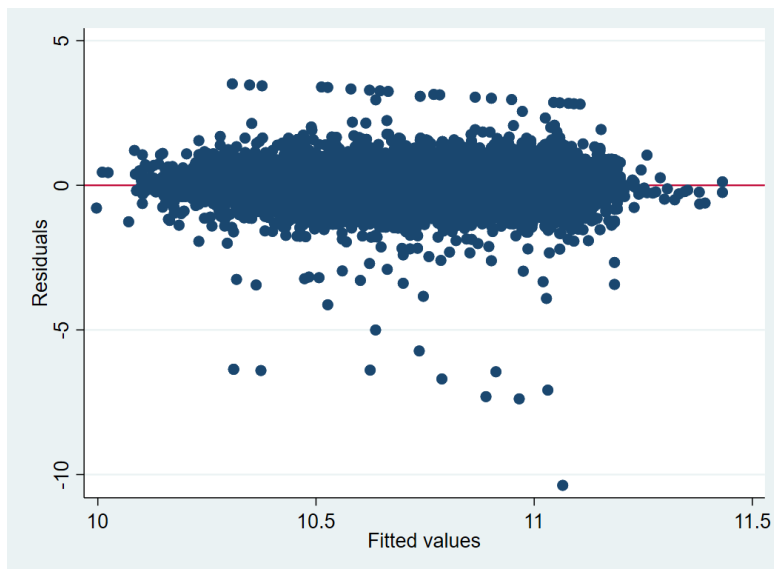
OLS Regression: Income Outcomes. The first model is a simultaneous OLS

regression model examining the effect of the predictor variables on the dependent variable

Income (natural log). The model was statistically significant (F(13) = 129.250, p < .000), with an R2 of .142, meaning the predictor variables in this model explain 14.2% of the variability in the dependent variable, natural log of Income. Workers with an associate's degree (M=$57,964) earned higher incomes than those with SCND (M=$53,766), B = .056, p < .001, 95 % CI[B] (.034, .079). Black workers at both SCND (M=$46,328) and associate's (M=$52,559) levels earn less income than White workers at the SCND (M=$57,058) and associate's ($60,045) levels, B = -.123, p < .001, 95% CI[B] (-.158, -.087). Hispanic workers at both SCND (M=$49,145) and associate's (M=$54,142) levels also earn less than White workers at the SCND (M=$57,058) and associate's ($60,045) levels, B = -.077, p < .001, 95% CI[B] (-0.109, -0.044). Female workers at both SCND (M=$43,225) and associate's (M=$48,845) levels earn less than male workers at the SCND (M=$62,271) and associate's ($66,755) levels, B = -.338, p < .001, 95% CI[B] (-0.360, -0.316). Non-citizen workers at both SCND (M=$44,119) and associate's (M=$49,072) levels earn less income than citizen workers at the SCND (M=$54,202) and associate's (M=$58,318) levels, B=-.130, p < .001, 95% CI[B] (-0.196, -0.064). Non-native workers at both SCND (M=$50,568) and associate's (M=$56,073) levels earn less income than native workers at the SCND (M=$54,202) and associate's (M=$58,243) levels, B = -.056, p < .05, 95% CI[B] (-0.102, -0.009).

Table 4.10

Income (ln): OLS Regression Results

Income/Wage (ln)	Coef.	RSE	t	P>t	95% CI LL	UL
Education	0.056	0.012	4.860	0.000***	0.034	0.079
Race/Ethnicity#						
Black	-0.123	0.018	-6.820	0.000***	-0.158	-0.087
American Indian	-0.129	0.041	-3.130	0.002**	-0.210	-0.048
Asian	0.000	0.031	0.010	0.993	-0.060	0.061
Multiracial	-0.064	0.038	-1.710	0.088	-0.138	0.009
Hispanic	-0.077	0.017	-4.620	0.000***	-0.109	-0.044
Sex	-0.338	0.011	-29.650	0.000***	-0.360	-0.316
Citizenship	-0.130	0.034	-3.850	0.000***	-0.196	-0.064
Nativity	-0.056	0.024	-2.340	0.019*	-0.102	-0.009
Marital Status	-0.181	0.015	-11.800	0.000***	-0.211	-0.151
Nurse	0.261	0.025	10.270	0.000***	0.211	0.311
Age	0.007	0.001	12.980	0.000***	0.006	0.008
Metro	-0.137	0.012	-10.980	0.000***	-0.161	-0.112
(Constant)	10.682	0.028	377.070	0.000***	10.627	10.738

Note. RSE = Robust Standard Error; CI = Confidence interval; LL = Lower Limit; UL = Upper Limit; (Constant) estimates baseline odds; n=13,452; weighted variable results reported.

Reference category is White, non-Hispanic. *$p < .05$, **$p < .01$, ***$p < .001$

Logistic Regression: Health Care, Medicaid, and Pension Outcomes. The other

four outcome variables were analyzed by logistic regression – private insurance, group

insurance, Medicaid, and pension. The model summaries of these four logistic regressions

are displayed in Table 4.11. All four models were found to be statistically significant

($p<.001$). The models for private insurance and Medicaid had more explanatory power, and

the model for pension had the least.

Table 4.11

Model Summaries - Logistic Regressions

Variable	n	Wald	P	Pseudo R^2
Private insurance	13,452	378.500	0.000***	0.048
Group insurance	13,452	366.340	0.000***	0.039
Medicaid	13,452	215.750	0.000***	0.045
Pension	13,452	167.500	0.000***	0.013

Note: weighted variable results reported

***$p < .001$

The details of the logistic regression model for private healthcare are displayed in Table 4.12. Black workers are 31% less likely to have private insurance; American Indian workers are 65% less likely to have private insurance; and Hispanic workers are 42% less likely to have private insurance, holding all other variables constant ($p < 0.001$). Non-citizen workers are 60% less likely to have private insurance, holding all other variables constant ($p < 0.001$).

The results of the logistic regression model for group healthcare are displayed in Table 4.13. The odds of having group insurance decreases for Black workers are 28% less likely to have group insurance, American Indian workers are 55% less likely to have group insurance, and Hispanic workers are 39% less likely to have group insurance, compared to the reference group of White workers and holding all other variables constant ($p < 0.001$). Non-citizen workers are 56% less likely than citizen workers to have group insurance and non-native workers are 23% less likely to have group insurance than native workers, holding all other variables constant ($p < 0.001$). It is important to note the significance of marital status in this analysis - never married workers were 39% less likely to have group insurance compared to ever married workers, holding all other variables constant ($p < 0.001$). The differences in rates of marriage potentially conflates the interpretation of this outcome variable.

Table 4.12

Logistic Regression - Private Healthcare

Private Insurance	OR	RSE	z	*P*>z	95% CI	
					LL	UL
Education	1.127	0.071	1.920	0.055	0.997	1.274
Race/Ethnicity [a]						
Black	0.681	0.062	-4.240	0.000***	0.570	0.813
American Indian	0.346	0.082	-4.470	0.000***	0.218	0.551
Asian	0.989	0.158	-0.070	0.944	0.724	1.351
Multiracial	0.746	0.165	-1.320	0.187	0.483	1.152
Hispanic	0.582	0.048	-6.520	0.000***	0.495	0.685
Sex	0.969	0.059	-0.510	0.613	0.860	1.093
Citizenship	0.395	0.056	-6.540	0.000***	0.299	0.522
Nativity	0.804	0.092	-1.910	0.056	0.643	1.006
Marital Status	0.591	0.043	-7.280	0.000***	0.512	0.680
Nurse	1.175	0.216	0.880	0.380	0.820	1.685
Age	1.016	0.003	5.220	0.000***	1.010	1.022
Metro	0.817	0.055	-3.010	0.003**	0.717	0.932
(Constant)	5.053	0.757	10.810	0.000***	3.766	6.779

Note. OR = Odds Ratio; RSE = Robust Standard Error; CI = Confidence interval; LL = Lower Limit; UL = Upper Limit; (Constant) estimates baseline odds; n=13,452; weighted variable results reported.
[a] Reference category is White, non-Hispanic.
p < .05, **p* < .01, ***p* < .001

Table 4.13

Logistic Regression - Group Healthcare

Group Insurance	OR	RSE	z	*P*>z	95% CI	
					LL	UL
Education	1.100	0.061	1.710	0.087	0.986	1.226
Race/Ethnicity [a]						
Black	0.724	0.058	-4.010	0.000***	0.618	0.848
American Indian	0.454	0.103	-3.490	0.000***	0.291	0.707
Asian	0.896	0.123	-0.800	0.423	0.684	1.173
Multiracial	0.837	0.170	-0.870	0.383	0.562	1.247
Hispanic	0.615	0.046	-6.450	0.000***	0.531	0.713
Sex	0.941	0.051	-1.110	0.266	0.846	1.047
Citizenship	0.439	0.057	-6.370	0.000***	0.340	0.565
Nativity	0.772	0.077	-2.590	0.009**	0.635	0.939
Marital Status	0.609	0.039	-7.680	0.000***	0.537	0.691
Nurse	1.255	0.202	1.410	0.157	0.916	1.720
Age	1.011	0.003	4.250	0.000***	1.006	1.017
Metro	0.876	0.052	-2.220	0.027*	0.779	0.985
(Constant)	4.093	0.548	10.530	0.000***	3.149	5.320

Note. OR = Odds Ratio; RSE = Robust Standard Error; CI = Confidence interval; LL = Lower Limit; UL = Upper Limit; (Constant) estimates baseline odds; n=13,452; weighted variable results reported.
[a] Reference category is White, non-Hispanic.
p < .05, **p* < .01, ***p* < .001

The details of the logistic regression model for Medicaid are displayed in Table 4.14. Black workers were 41% more likely to be enrolled in Medicaid and Hispanic workers were 70% more likely to be enrolled in Medicaid, as compared to White workers and holding all other variables constant (*p* < 0.01). Female workers were 34% more likely to be enrolled in Medicaid than workers who were male, holding all other variables constant (*p* < 0.001). The details of the logistic regression model for pension are displayed in Table 4.15. If a worker was female, she is 19% less likely to have a pension than workers who are male, holding all other variables constant (*p* < 0.001). Non-citizen workers were 35% less likely to have pension compared to citizen workers, holding all other variables constant (*p* < 0.001).

Table 4.14

Logistic Regression - Medicaid

Medicaid	OR	RSE	z	*P*>z	95% CI	
					LL	UL
Education	0.914	0.083	-0.990	0.324	0.765	1.092
Race/Ethnicity [a]						
Black	1.411	0.185	2.620	0.009**	1.091	1.825
American Indian	1.177	0.430	0.450	0.655	0.575	2.408
Asian	1.655	0.339	2.460	0.014*	1.108	2.471
Multiracial	1.055	0.343	0.170	0.869	0.558	1.994
Hispanic	1.701	0.202	4.460	0.000***	1.347	2.148
Sex	1.355	0.117	3.500	0.000***	1.143	1.606
Citizenship	1.580	0.310	2.330	0.020*	1.075	2.321
Nativity	1.274	0.198	1.560	0.119	0.939	1.726
Marital Status	1.117	0.120	1.030	0.302	0.905	1.378
Nurse	0.882	0.209	-0.530	0.595	0.554	1.403
Age	0.962	0.004	-8.770	0.000***	0.953	0.970
Metro	1.217	0.114	2.110	0.035*	1.014	1.462
(Constant)	0.190	0.041	-7.700	0.000***	0.125	0.290

Note. OR = Odds Ratio; RSE = Robust Standard Error; CI = Confidence interval; LL = Lower Limit; UL = Upper Limit; (Constant) estimates baseline odds; n=13,452; weighted variable results reported.
[a] Reference category is White, non-Hispanic.
p < .05, **p* < .01, ***p* < .001

Table 4.15

Logistic Regression - Pension

Pension	OR	RSE	z	*P*>z	95% CI	
					LL	UL
Education	1.082	0.046	1.860	0.063	0.996	1.176
Race/Ethnicity [a]						
Black	0.933	0.059	-1.080	0.279	0.824	1.058
American Indian	0.947	0.189	-0.270	0.786	0.640	1.401
Asian	1.150	0.127	1.260	0.206	0.926	1.427
Multiracial	0.900	0.147	-0.640	0.521	0.653	1.241
Hispanic	0.882	0.056	-2.000	0.045	0.779	0.997
Sex	0.815	0.034	-4.840	0.000***	0.750	0.885
Citizenship	0.646	0.083	-3.400	0.001**	0.502	0.831
Nativity	0.822	0.068	-2.370	0.018*	0.699	0.966
Marital Status	0.894	0.049	-2.040	0.042	0.803	0.996
Nurse	1.170	0.128	1.440	0.150	0.945	1.450
Age	1.015	0.002	7.340	0.000***	1.011	1.019
Metro	1.062	0.049	1.310	0.191	0.971	1.161
(Constant)	0.430	0.044	-8.250	0.000***	0.352	0.526

Note. OR = Odds Ratio; RSE = Robust Standard Error; CI = Confidence interval; LL = Lower Limit; UL = Upper Limit; (Constant) estimates baseline odds; n=13,452; weighted variable results reported.
[a] Reference category is White, non-Hispanic.
p < .05, **p* < .01, ***p* < .001

The models for private health care (Psuedo R^2 = .048) and Medicaid (Psuedo R^2 = .045) had more explanatory power, and pension had the least (Psuedo R^2 = .013). While these Psuedo R^2 values are low, there are factors that influence whether workers have health insurance, Medicaid and pensions that are not included in this model. Because the emphasis of this study is on understanding economic rewards for associate's degrees as compared to SCND, it is understandable that not all relevant variables that influence these economic outcomes are accounted for in this model. This helps explain the low Psuedo R^2. However, that the models for private insurance and Medicaid explain close to 5% of the differences using only the variables in this study. Additionally, group health insurance likely has confounding factors like whether someone else in the home is working and

qualifies for health care, which is not accounted for in this study. For example, never

married workers were 39% less likely to have group insurance compared to ever married

workers, holding all other variables constant ($p < 0.001$). The differences in rates of

marriage potentially conflates the interpretation of this outcome variable. Finally, the

pension model had very little explanatory power, suggesting that pensions are not a

predictable economic reward for those who complete an associate's degree. Pension plans

have decreased over the years and retirement age has gone up, which may account for the

lack of explanatory power of this particular model (Bielecki et al., 2016).

Propensity Score Analysis. The final analytical step undertaken to examine this

research question is a propensity score analysis, examining the treatment effects of this

observational data using treatment-effect estimators. Propensity scores may also be

referred to as treatment probabilities, as they are calculated by combining all the covariate

information into this single score. No bias correction is required for this method because it

uses a model to estimate treatment. This method assumes the treatment status of each

individual is not related to the outcome or treatment status of other individuals. It also

assumes potential outcomes are independent of treatment assignments (Abadie et al.,

2004; Abadie & Imbens, 2012; StataCorp, 2019). These assumptions are met in this study.

For this analysis, completion of an associate's degree is considered the treatment,

and is compared to those individuals whose highest level of degree attainment is some

college, no degree (SCND). I used the *teffects psmatch* command in Stata which estimates

average treatment effects using a probit model and the one-to-one nearest neighbor

matching technique, a type of "greedy matching" (Guo & Fraser, 2010). I used a caliper of .2

to limit the distance between matched observations to no more than a .2 propensity score

difference between matches (Guo & Fraser, 2010; Rosenbaum & Rubin, 1983).

Examining the balance of the covariates before and after matching is the first

diagnostic step for propensity score analysis. In experimental data, covariates are balanced

by study designs that separate treatment assignment. In observational data, this is not

possible. Therefore, one way of knowing if the matching was effective is to compare how

many covariates were balanced before and after the matching. There were 13,452 raw

observations, and 26,904 matches. There were 7,641 raw control observations (SCND),

with 13,452 matched, and 5,811 raw treated observations (associate's) with 13,452

matched. The covariate balance of income is displayed in Table 4.16. Before the propensity

score matching, six of the covariates were balanced at the $p < .05$ level, and none at the $p <$

.01 level. After the matching, all of the covariates were balanced at the $p < .05$ level, and ten

were balanced at the $p < .01$ level.

With this check of covariate balance complete, the average treatment effects were

calculated by taking the average difference between the observed and potential outcomes

for each subject. Results of this analysis for all five outcome variables are displayed in

Table 4.17. Income, private health plan, group health plan and pension are all statistically

significant with positive coefficients, indicating that, in equal comparison groups when

much of the imbalance of observational data has been removed, individuals who complete

an associate's degree have higher incomes (coefficient [ATE] = .062 and $P>z$ = <.001), and

are more likely to have private health plans (coefficient [ATE] = .019 and $P>z$ = .003), group

health plans (coefficient [ATE] = .022 and $P>z$ = .003), and pensions (coefficient [ATE] =

.024 and *P>z* = .012) than SCND individuals. The one outcome variable that is not

statistically significant is Medicaid, though the coefficient is negative (coefficient [ATE] = -

.007 and *P>z* = .108). This indicates that when matching SCND and Associate's individuals

and estimating their propensity to be on Medicaid, the variables used in this model do not

predict who is and is not on Medicaid. Considering that the sample was limited to those

who report working 35 hours or more the previous week, this is not surprising.

Table 4.16

Covariate Balance Summary (Income)

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Race/Ethnicity				
Black, non-Hispanic	-0.076	0.003**	0.844	1.006
American Indian, non-Hispanic	-0.020*	-0.010**	0.845	0.914
Asian, non-Hispanic	0.017*	-0.001***	1.074	0.997
Multiracial, non-Hispanic	-0.024*	-0.001***	0.835	0.995
Hispanic	-0.109	-0.010**	0.818	0.981
Sex	0.089	-0.010**	1.011	0.999
Citizenship	-0.025*	-0.004**	0.889	0.978
Nativity	0.024*	-0.006**	1.057	0.986
Marital Status	-0.103	-0.011*	0.867	0.985
Nurse	0.311	0.000***	5.927	1.000
Age	0.026*	0.008**	0.925	0.983
Metro	0.103	-0.017*	1.056	0.991

*p < .05, **p < .01, ***p < .001

Table 4.17

Average Treatment Effect (Associate's v. SCND)

	Coef.	RSE	*z*	*P>z*	95% CI	
					LL	UL
Income/wage	0.062	0.011	5.900	0.000***	0.042	0.084
Private health plan	0.015	0.006	2.410	0.016*	0.003	0.028
Group health plan	0.017	0.007	2.350	0.019*	0.003	0.032
Medicaid	-0.006	0.005	-1.280	0.201	-0.015	0.003
Pension	0.024	0.009	2.520	0.012*	0.005	0.042

Note. RSE = robust standard error, CI = Confidence interval; LL = Lower Limit; UL = Upper Limit
n=13,452; *$p < .05$, **$p < .01$, ***$p < .001$

RQ2 - Do race/ethnicity, sex, citizenship and nativity interact to differentially affect economic rewards for completion of an associate's degree?

Due to issues of collinearity when including citizenship and nativity in the same model, two regressions were computed to examine interaction effects. Table 4.18 shows the interaction effects for race/ethnicity, sex and citizenship. There were several significant interactions between race/ethnicity and gender. Black non-Hispanic females earned less than Black non-Hispanic males ($F(26, 13425) = 69.83$, $p = .014$). American Indian non-Hispanic females earned less than American Indian non-Hispanic males ($F(26, 13425) = 69.83$, $p = .034$). Asian non-Hispanic females earned less than Asian non-Hispanic males ($F(26, 13425) = 69.83$, $p = .001$). Hispanic females earned less than Hispanic males ($F(26, 13425) = 69.83$, $p = .000$). There were significant interactions between race/ethnicity and citizenship as well. Multiracial non-Hispanic non-citizen workers earned less than Multiracial non-Hispanic citizen workers ($F(26, 13425) = 69.83$, $p = .000$). Hispanic non-citizen workers earned less than Hispanic citizen workers ($F(26, 13425) = 69.83$, $p = .025$).

Table 4.18

Interaction Effects: Race/Ethnicity, Sex and Citizenship

Income (ln)	Coef.	RSE	t	P>t	95% CI	
					LL	UL
Education	0.057	0.012	4.890	0.000***	0.034	0.079
Race/Ethnicity [a]						
Black	-0.166	0.026	-6.350	0.000***	-0.217	-0.114
American Indian	-0.208	0.058	-3.620	0.000***	-0.321	-0.096
Asian	-0.082	0.052	-1.570	0.117	-0.184	0.020
Multiracial	0.012	0.050	0.230	0.815	-0.087	0.110
Hispanic	-0.120	0.024	-5.090	0.000***	-0.167	-0.074
Sex						
Female	-0.374	0.014	-25.900	0.000***	-0.403	-0.346
Race/Ethnicity*Sex						
Black*Female	0.088	0.036	2.470	0.014*	0.018	0.158
American Indian*Female	0.169	0.080	2.120	0.034*	0.013	0.326
Asian*Female	0.210	0.065	3.210	0.001**	0.082	0.338
Multiracial*Female	-0.126	0.074	-1.700	0.089	-0.270	0.019
Hispanic*Female	0.122	0.031	3.980	0.000***	0.062	0.183
Citizenship						
Not a citizen	0.165	0.127	1.300	0.194	-0.084	0.414
Race/Ethnicity*Citizenship						
Black*Not a citizen	-0.243	0.154	-1.580	0.113	-0.544	0.058
Asian *Not a citizen	-0.270	0.149	-1.810	0.071	-0.562	0.023
Multiracial*Not a citizen	-0.695	0.138	-5.040	0.000***	-0.965	-0.425
Hispanic*Not a citizen	-0.306	0.137	-2.240	0.025*	-0.574	-0.038
Sex*Citizenship						
Female*Not a citizen	-0.121	0.148	-0.820	0.414	-0.411	0.169
Race/Ethnicity*Sex*Citizenship						
Black*Female*Not a citizen	0.131	0.215	0.610	0.541	-0.290	0.552
Asian*Female*Not a citizen	-0.004	0.183	-0.020	0.984	-0.362	0.355
Hispanic*Female*Not a citizen	0.008	0.168	0.050	0.961	-0.322	0.338
Nativity						
Non-native	-0.061	0.024	-2.540	0.011*	-0.107	-0.014
Marital Status	-0.179	0.015	-11.720	0.000***	-0.209	-0.149
Nurse	0.261	0.025	10.250	0.000***	0.211	0.311
Age	0.007	0.001	13.180	0.000***	0.006	0.008
Metro	-0.135	0.012	-10.830	0.000***	-0.159	-0.110
(Constant)	10.692	0.029	374.790	0.000***	10.636	10.747

Note. RSE = Robust Standard Error; CI = Confidence interval; LL = Lower Limit; UL = Upper Limit; n=13,452; weighted variables results reported. Multiracial, non-Hispanic*Female*Not a citizen omitted for multicollinearity; all others omitted were empty. [a] Reference category is White, non-Hispanic.
*p < .05, **p < .01, ***p < .001

Table 4.19 shows the interaction effects for race/ethnicity, sex and nativity. There were significant interaction effects between race/ethnicity and gender. Black non-Hispanic females earned less than Black non-Hispanic males ($F(27, 13424) = 64.83$, $p = .018$). American Indian non-Hispanic females earned less than American Indian non-Hispanic males ($F(27, 13424) = 64.83$, $p = .033$). Hispanic females earned less than Hispanic males ($F(27, 13424) = 64.83$, $p = .000$). There were significant interactions between race/ethnicity and nativity as well. Black non-Hispanic non-native workers earned less than Black non-Hispanic native workers ($F(27, 13424) = 64.83$, $p = .050$). Asian non-Hispanic non-native workers earned less than Asian non-Hispanic native workers ($F(27, 13424) = 64.83$, $p = .024$).

Table 4.19

Interaction Effects: Race/Ethnicity, Sex and Nativity

Income (ln)	Coef.	RSE	t	*P*>t	95% CI	
					LL	UL
Education	0.057	0.012	4.910	0.000***	0.034	0.080
Race/Ethnicity [a]						
Black	-0.154	0.027	-5.650	0.000***	-0.208	-0.101
American Indian	-0.206	0.058	-3.580	0.000***	-0.318	-0.093
Asian	0.000	0.059	0.000	0.999	-0.116	0.116
Multiracial	-0.001	0.050	-0.020	0.980	-0.099	0.096
Hispanic	-0.115	0.026	-4.370	0.000***	-0.166	-0.063
Sex						
Female	-0.375	0.015	-25.660	0.000***	-0.404	-0.346
Race/Ethnicity*Sex						
Black*Female	0.087	0.037	2.370	0.018*	0.015	0.159
American Indian*Female	0.170	0.080	2.130	0.033*	0.013	0.326
Asian*Female	0.076	0.082	0.930	0.353	-0.084	0.236
Multiracial*Female	-0.111	0.074	-1.500	0.133*	-0.256	0.034
Hispanic*Female	0.129	0.034	3.760	0.000***	0.062	0.197
Nativity						
Non-native	0.056	0.060	0.950	0.343	-0.060	0.173
Race/Ethnicity*Nativity						
Black*Non-native	-0.165	0.084	-1.960	0.050	-0.331	0.000
Asian*Non-native	-0.225	0.099	-2.260	0.024*	-0.420	-0.030
Multiracial*Non-native	0.260	0.309	0.840	0.401	-0.347	0.866
Hispanic*Non-native	-0.136	0.070	-1.930	0.053	-0.274	0.002
Sex*Nativity						
Female*Non-native	0.012	0.080	0.150	0.883	-0.144	0.168
Race/Ethnicity*Sex*Nativity						
Black*Female*Non-native	-0.022	0.135	-0.170	0.868	-0.286	0.242
Asian*Female*Non-native	0.144	0.132	1.090	0.276	-0.115	0.404
Multiracial*Female*Non-native	-0.719	0.365	-1.970	0.049*	-1.434	-0.004
Hispanic*Female*Non-native	-0.069	0.097	-0.710	0.475	-0.258	0.120
Citizenship						
Not a citizen	-0.113	0.033	-3.410	0.001**	-0.178	-0.048
Marital Status	-0.181	0.015	-11.840	0.000***	-0.211	-0.151
Nurse	0.263	0.026	10.240	0.000***	0.213	0.314
Age	0.007	0.001	13.170	0.000***	0.006	0.008
Metro	-0.134	0.012	-10.760	0.000***	-0.158	-0.110
(Constant)	10.688	0.029	372.840	0.000***	10.632	10.744

Note. RSE = Robust Standard Error; CI = Confidence interval; LL = Lower Limit; UL = Upper Limit; n=13,452; weighted variables results reported. [a] Reference category is White, non-Hispanic. *p < .05, **p < .01, ***p < .001

Chapter 5 – Discussion

Research Problem and Major Findings

Past studies have pointed to increased economic rewards for those who complete associate's degrees compared to workers with SCND, but there are inconsistences in the literature as to how these economic rewards are distributed among people of different races, ethnicities, sexes, citizenships and nativities. Given that the different aspects of each person's identity are intersecting and experienced in concert, this study examined the intersection of race/ethnicity, sex, citizenship, and nativity on the economic benefits reaped by those who complete an associate's degree compared to those who have SCND. Table 5.1 summarizes the research questions, hypotheses and associated findings.

Table 5.1

Research Questions, Hypotheses, and Findings

Research Hypothesis (H_1)	Findings
RQ1 - Do economic rewards for completing an associate's degree differ SCND when accounting for the intersection of diverse identities - race/ethnicity, sex, citizenship, and nativity?	
$H_1$1- Workers whose highest level of degree attainment is an associate's degree will reap more economic rewards (as measured by five different economic indicators) than workers whose highest level of degree attainment is some college, no degree.	*Supported*
$\quad$ $H_1$1A - Black and Hispanic workers at both educational levels (SCND and associate's degree) will reap fewer economic rewards than White workers.	*Supported*
$\quad$ $H_1$1B - Females with an associate's degree will reap more economic rewards than males with an associate's degree, but SCND males will reap more economic rewards than SCND females.	*Partially supported*
$\quad$ $H_1$1C - Non-native workers at both educational levels (SCND and associate's degree) will reap fewer economic rewards than native workers.	*Supported*
$\quad$ $H_1$1D - Non-citizen workers at both educational levels (SCND and associate's degree) will reap fewer economic rewards than workers who are US citizens.	*Supported*
RQ2 - Do race/ethnicity, sex, citizenship and nativity interact to differentially affect economic rewards for completion of an associate's degree?	
$H_1$2 - There will be statistically significant associations among race/ethnicity, sex, citizenship and nativity.	*Supported*
$\quad$ $H_1$2A - Black men will reap less economic rewards than White males, White females and Black females.	*Partially supported*
$\quad$ $H_1$2B - Non-native Black workers will reap more economic rewards than native Black workers.	*Not supported*
$\quad$ $H_1$2C - Hispanic citizens will reap more economic rewards than non-citizens.	*Supported*

Differing Economic Rewards by Degree Attainment (RQ1)

The first research question tested was "Do economic rewards for completing an

associate's degree differ SCND when accounting for the intersection of diverse identities -

race/ethnicity, sex, citizenship, and nativity?" Support was found for the main hypothesis

(*$H_1$1*): *Workers whose highest level of degree attainment is an associate's degree will reap more economic rewards (as measured by five different economic indicators) than workers whose highest level of degree attainment is some college, no degree.* Of the four secondary hypotheses tested, three were supported and one was partially support.

In this study, workers with an associate's degree earned on average 8% higher incomes than those with SCND. These earnings advantages were lower than those reported by Carnevale (2011), who reported that lifetime earnings of associate's degree holders are 12% higher than SCND. However, Carnevale reports on lifetime earnings and this study is cross-sectional, only capturing a moment in time. It is possible that associate's degree holders accumulate economic rewards over their lifetimes at a greater rate than this cross-sectional analysis captures. In a more recent report, Carnevale and his colleagues dove further into the labor market outcomes for associate's degree holders and underscore that the average earnings mutes the reality that economic returns vary widely by field of study and employment (Carnevale et al., 2020). Nevertheless, the consistent finding that workers with an associate's degree earn higher incomes than those with SCND suggests support of the Human Capital Theory Sheepskin effect at the aggregate level. The "sheepskin effect" refers to the theory that equal amount of schooling that yields a completed degree yielding higher economic returns than those same years of education with no degree yields higher economic returns. This study's finding supports previous studies that report degree completion yields high returns than equal years in school without a credential (Belman & Heywood, 1991; Jaeger & Page, 1996).

It is important to consider that SCND has largely been approached as an undifferentiated population in many analyses. This is in fact a complex group. One third of

the entire SCND population was enrolled in college for a single semester (Carnevale et al., 2020). Of those who enrolled for more than a semester, about 1/3 have less than one year of college education. A worker who completed an associate's degree typically has at least two years of schooling, making these segments of the SCND population an unequal comparison group. Of the students who enrolled for more than one term but have no credential, seven out of 10 attended a community college at some point on their journey. This suggests that the majority of the students in the SCND population and those who completed an associate's degree are pursuing their degrees at similar institutions (community colleges). These mixed findings suggest that economic returns for the workers in this sample are not based on increases of human capital gained through formal training alone. The subsequent hypotheses examine the differences in economic rewards based on social identities of race/ethnicity, sex, citizenship, and nativity.

$H_1$1A - Black and Hispanic workers at both educational levels (SCND and associate's degree) will reap fewer economic rewards than White workers.

Not only do Black workers at both SCND and associate's levels earn less income than White workers at the SCND and associate's levels, but Black workers with an associate's degree earn 92% of what White workers with SCND earn on average. Hispanic workers at both SCND and associate's levels earn less than White workers at the SCND and associate's levels respectively. Hispanic workers with an associate's degree earn on average 95% of what White workers with SCND earn on average. Black, American Indian, and Hispanic workers are less likely to have private insurance than White workers. Black and Hispanic workers are more likely to be enrolled in Medicaid than White workers.

These findings support the hypothesis in this study, as well as the existing literature, that has demonstrated wage gaps for Black and Hispanic workers (J. Kim, 2002; McCall, 2001; O'Gorman, 2010). However, these studies attributed these wage gaps to differences in human capital accumulation. This study demonstrates that wage gaps for Black and Hispanic workers still exist when accounting for differences in degree completion. This finding supports the conclusion of Stoll (2010) who observed that racial inequalities for racial/ethnic minority men widened as education increased. This growing divide was driven by the advances made by White men compared to Black men. In other words, even with the same level of educational attainment – in his study, a college degree – White men made increasingly more as compared to Black men over the first 16 years of working. While multiple levels of degrees are not examined in this study, the finding does apply to both men and women, and across a variety of racial/ethnic groups.

$H_1$1B - Females with an associate's degree will reap more economic rewards than males with an associate's degree, but SCND males will reap more economic rewards than SCND females.

Female workers at both SCND and associate's levels earned less than male workers at the SCND and associate's levels. Female workers with SCND earned 88% of what female workers with an associate's earned. Male workers with SCND earned 93% of what male workers with an associate's earned. Female workers with an associate's degree earned 78% of what male workers with SCND earned. If a worker was female, she was more likely to be enrolled in Medicaid. Sex was one of two independent variables that predicted enrollment in Medicaid. If a worker was female, she was less likely to have a pension than a male worker. Sex was the strongest predictor of whether a worker had a pension.

These findings partially support the hypothesis that females with an associate's degree will reap more economic rewards than males with an associate's degree. The finding did confirm that SCND males reap more economic rewards than SCND females. While female workers with an associate's degree do not earn more than male workers with an associate's degree, female workers do realize greater gains from completing an associate's degree as compared to male workers. Female workers who completed an associate's degree earned 13% more than female workers with SCND. Males workers who completed an associate's degree earned 7% more than male workers with SCND.

This hypothesis was based on previous findings in the literature that women reaped greater benefits from completing an associate's degree than men (Dougherty, 2005; Jepsen et al., 2014; C. Kim & Tamborini, 2019; V. Liu et al., 2015). These studies found women reaped greater reward relative to the earnings of other women. In this study, sex accounted for the largest difference in income amongst the independent variables, further illuminating the wage differential between female and male workers at both educational levels. Consistent with this study, Dougherty (2005) and Jepsen et al (2014) found that women consistently earned less than men, despite degree completion. This study's findings concur that female workers reap greater gains from completing an associate's degree than male workers. Dougherty used the 1979 NELS for his study. There have been significant changes to the labor market returns for men and women in the nearly four decades between these two studies, and yet female workers still earn far less than male workers. Jepsen et al (2014) used more recent data (2000-2008), and their data were specific to the state of Kentucky. Even using a specific state, this labor market trend remains compared to the national dataset employed in this study. Kim and Tamborini (2019) used a 20-year

longitudinal approach, which is methodologically quite different from this cross-sectional approach, and have the same finding.

Even when using a variety of methodological approaches, including controlling for observed differences between workers and productivity levels, studies suggest that job characteristics contribute more to wage discrimination between male and female workers than unobserved worker characteristics (Becker, 1971; Garcia et al., 2001; R. Oaxaca, 1973; R. L. Oaxaca & Ransom, 1994; Sicilian & Grossberg, 2001). Carnevale and his colleagues (2020) document the rapid changes to the middle-skills pathway, much of which is concentrated in advanced manufacturing, IT and healthcare. The jobs that have the greatest economic rewards with a middle-skill credential are in STEM and managerial/professional office occupations (Carnevale et al., 2020), but females are less likely to hold management and supervisory jobs than males, even when controlling for human capital variables (Rosenfeld et al., 1998; Wood et al., 1993). The pattern of unequal wage gaps for female workers increases as the pay scale increases – in other words, females in more highly compensated jobs experience greater wage discrimination than those in lesser paid jobs (Garcia et al., 2001). Additionally, there have been greater increases in occupational integration by gender within white collar, service and sales roles, than within blue collar roles that are still primarily male dominated (Busch, 2020). Given that this study focuses on SCND and associate's level workers, they are more densely populated in these more highly gendered segregated blue collar fields. The present study does not disaggregate by occupation, which is noted as an area for further research. However, the findings are consistent with a long pattern of wage differences between women and men, despite holding human capital variables constant.

H₁1C - Non-native workers at both educational levels (SCND and associate's degree)

will reap fewer economic rewards than native workers.

Non-native workers with an associate's degree earn 103% of what native workers at

the SCND levels do on average. It is important to note that non-native workers with an

associate's degree are the only disadvantaged group in this study who earn more than their

advantaged counterparts, native workers, with SCND. These findings support the

hypotheses that non-native workers will reap fewer economic rewards than native

workers. Additionally, this finding supports research that has shown there have been

consistent earnings differences between immigrant and native workers for decades

(Chiswick, 1978; Lubotsky, 2007). Some scholars have suggested that wage differentials

between countries are a significant driver of migration (Korzeniewicz & Albrecht, 2015). In

other words, people move to another country because they hope to earn more money. As

Korzeniewicz & Albrecht (2015) observe:

> "Nationality joins other relevant ascriptive criteria (e.g., gender, race, age, ethnicity)
>
> in shaping hierarchies and inequalities, inclusion and exclusion, on a global scale;
>
> and migration can be understood as a key strategy used by populations that seek to
>
> overcome such ascriptive barriers of exclusion…indeed, the income gains derived
>
> from moving from a poor country into a wealthier one are often vastly superior to
>
> any effort to gain upward mobility within a given poor country (p. 260)."

The findings in my study suggest that while workers who were born outside of the

United States do make less than workers who were born in the United States within levels

of educational attainment, the completion of the degree outweighs their minority status as

it impacts economic rewards. If it is true that a key driver of migration is the pursuit of

higher wages, these results suggest that associate's degree completion can be a particularly

effective strategy for non-native workers to gain an economic advantage. It is possible this

group of workers, immigrants who move to the United States and proceed to work, have

more similar motivations in regards to economic outcomes than other identity groups in

this study. For instance, women or Hispanic workers likely have a much broader array of

motivators regarding occupational choice and workforce involvement. I theorize that this

difference accounts for the greater educational and economic advantage reaped by non-

native workers associate's degree workers compared to native SCND workers.

H$_1$1D - Non-citizen workers at both educational levels (SCND and associate's degree) will reap fewer economic rewards than workers who are US citizens.

Non-citizen workers at both SCND and associate's levels earn less income than

citizen workers at the SCND and associate's levels. Non-citizen workers with an associate's

degree earn 90% of what citizen workers with SCND earn on average. Non-citizen workers

were less likely to have private insurance, group insurance or a pension. These findings

support the hypotheses that non-citizen workers will reap fewer economic rewards than

citizen workers. This finding supports the existing literature that shows great advantages

to wage growth and available occupations are gained by becoming a citizen (Borjas &

Tienda, 1993; Bratsberg et al., 2002; Chi & Coon, 2020; Peters et al., 2020; Picot & Hou,

2011). However, studies have also demonstrated that differences in earnings for those who

are naturalized vary widely based on country of origin; specifically, those immigrating from

China, Mexico, and the Philippines realize a substantially larger wage advantage than those

immigrating for other countries (Chi & Coon, 2020). Though my study does not

disaggregate based on country of origin, these findings underscore that non-citizen

workers are a diverse group with many other elements to their identity that likely impact

economic outcomes.

As an example, information technology is a large segment of the middle skills

pathway, and a portion of the jobs in IT require citizenship due to security needs. These

roles tend to be very well compensated as compared to other middle skills pathways. For

instance, an IT cybersecurity specialist for the federal government requires workers to be a

U.S. citizen or U.S. national. The role does not require a postsecondary degree, but allows

for previous experience to qualify a candidate. This position pays between $59,908 to

$85,535 per year. In my study, the average non-citizen worker with an associate's degree

earned $49,072 per year. There are 131,000 Information Security Analysts; they earn on

average $103,590 per year, and this field is growing much faster than average at 31%

(*Occupational Outlook Handbook, Information Security Analysts*, 2021). This is one example

of the types of opportunities that are available to citizens, but not to non-citizens.

Previous studies observe that immigrants invest more in host-country specific

training to boost skills (Gathmann & Keller, 2018) – this finding suggests these educational

investments in the United States as a host country are successful in producing greater

economic rewards. Scholars point out that faster access to citizenship is a powerful policy

instrument to boost not only the assimilation of immigrants, but also their economic well-

being (Gathmann & Keller, 2018). For the most part, non-citizens are not eligible for federal

financial aid, making the pursuit of higher education a costlier and therefore more

prohibitive endeavor. While this study demonstrates citizens reap great economic rewards,

it is important to note they likely also have more financial support available to complete postsecondary degrees. This only amplifies their return on investment in higher education. The present study makes a unique contribution to the literature, as there is currently no literature confirming that associate's degree completion does yield economic rewards for both non-citizen and non-native workers.

Differing Economic Rewards by Intersecting Identities (RQ2)

The second research question tested was "Do race/ethnicity, sex, citizenship, and nativity interact to differentially affect economic rewards for completion of an associate's degree?" Support was found for the main hypothesis: *$H_1$2 - There will be statistically significant associations among race/ethnicity, sex, citizenship and nativity.* This is consistent with literature demonstrating wage gaps for intersecting identities across a variety of contexts (Browne & Misra, 2003; Cheng, 2016; Folbre, 2012; Hodges, 2020; M. Kim, 2009; Mitra, 2003; Nawyn & Gjokaj, 2014; Tao, 2018; Torres Stone et al., 2006; Wooten & Branch, 2012). Of the three secondary hypotheses tested, two were supported and one was partially supported. The specific secondary hypotheses will be discussed first, followed by a broader discussion of the implications of these findings.

$H_1$2A - Black men will reap less economic rewards than White men, White women and Black women.

This hypothesis was partially supported. Females earned less than males in all race/ethnicity groups. Black male workers earned less than White male workers. This is consistent with previous literature demonstrating the wage gap between White and Black male workers (Darity et al., 1996; Stoll, 2010). A longitudinal study of race and economic

opportunity found that differences in wages and employment between Black and White

men is the key driver of the Black-White income gap (Chetty et al., 2020). Even when

controlling for parental income levels, Black boys have lower incomes than White boys

when they reach adulthood in 99% of Census tracts. Additionally, Chetty and his colleagues

found that Black Americans have much lower rates of upward mobility and higher rates of

downward mobility as compared to White Americans.

Black women have been observed to reap higher returns in educational categories

compared to White men and White women, though the comparison to Black men does not

yield a clear pattern (Averett & Dalessandro, 2001). Nonetheless, Black men still earn more

overall than Black women, as my study confirmed. These findings are consistent with the

findings of Mitra (2003), who observed that Black women are segregated into primary

"female" jobs, such as care occupations and non-management roles, and therefore have a

lesser wage differential. Females and workers of color are overrepresented in care

occupations, which have lower entry barriers, benefits and pay (Hodges, 2020). Paid care

work is a large proportion of the labor market for workers with less than a bachelor's

degree, and has been identified as a primary nexus of labor market disadvantages for both

race and gender (Duffy, 2005, 2007; Hodges, 2020; Yavorsky et al., 2016). When examining

occupational hierarchies, white men dominate the upper levels (verticals), and women and

non-White workers are horizontally distributed across service and non-manual

occupations (Hodges, 2020). Additionally, empirical research has found that men with

disadvantaged identities are disproportionality more likely than other men to work in

female-dominated, low-status work (Woodhams et al., 2015a). While the present study did

not include occupation as an independent variable, beyond isolating nurses, existing

literature points to occupational differences consistently contributing to differences in economic rewards for non-White and female workers.

The literature points to a variety of barriers that may discourage female and non-white workers from selecting more economically rewarding occupations. First, gender ideologies about what types of work men and women are expected to perform are held strongly among the class of workers without bachelor's degrees (Hodges, 2020), so some workers have not even conceived of occupational choices available to them due to their understanding of what occupations a worker "like them" should pursue. Second, concepts of "appropriate labor," which workers are best suited for certain types of work, stereotype female and non-White workers into lower paid occupations such as domestic work, food service, and care work (Wooten & Branch, 2012). Third, non-White workers are often at a disadvantage when it comes to cultural capital.

Cultural capital is the mechanism which "allows culture to be used as a resource that provides access to scarce rewards, is subject to monopolization, and, under certain conditions, may be transmitted from one generation to the next" (Lareau, Weininger, & Lareau, 2003, p. 587). Culture is a value system expressed as preferences (King, 2012), and has the ability to exert power by creating belonging or lack thereof. Some readily observable components include food, clothing, music, entertainment, art, literature, languages and celebrations. Many of the values that comprise culture operate below the surface, including patterns of superior/subordinate relations, concepts of justice, incentives to work, notions of leadership, tempo of work, patterns of decision-making, approaches to problem solving, concepts of social mobility, conversational patterns,

ordering of time, and concepts of self. Groups and settings create distinctive cultural norms around these concepts, and it becomes readily apparent when someone is functioning outside of these norms, creating an "in" and "out" group.

Just as economic capital provides advantages and opportunities, and excludes those without access to it, so too can access to the culture in power differentiate who has access to certain resources and opportunities. Erikson (1996) highlights impact of cultural capital in workplace settings, pointing out that "personal networks are a major source of cultural resources" (p. 217). Relationships with those who are in power, and therefore an increased understanding of the culture of the dominant culture, impact the opportunities of individuals. She observes that the value of an individual's cultural capital "varies with the prestige level of one's culture: cultural capital is smallest in volume for the culture typical at the bottom of the class structure and greatest in volume for the culture typical of elites" (p. 218). Difference in cultural capital may also account for a component of the labor market discrimination revealed in this study.

H$_1$2B - Non-native Black workers will reap more economic rewards than native Black workers.

The third hypothesis was not supported. The interaction effect between Black and non-native was significant, but in the opposite direction – non-native Black workers earned less than native Black workers. This hypothesis had been based on Shih (2000), who observed that employers were more likely to hire African American and immigrant Latino workers because they perceived them to be easier to manage. In fact, Black, Hispanic and Asian non-native workers all earned less than their native counterparts. This is consistent

with previous findings that demonstrate earnings gaps for non-native workers compared

to native workers across a variety of racial/ethnic groups (Borjas & Tienda, 1993; Bucci &

Tenorio, 1997; Lubotsky, 2007; Singh & Kposowa, 1996). Bucci & Tenorio (1997) attribute

the gap to both differences in individual and job characteristics, as well as an overvaluation

of native characteristics and undervaluation of immigrant characteristics. In other words,

employers showed a preference for hiring native workers over non-native workers.

Non-native workers were the only disadvantaged identity in this study in which

associate's degree workers earned more than the advantaged SCND counterparts (native

workers). In other words, the advantage of increased educational attainment outweighed

the disadvantaged social standing for non-native workers. When a disadvantaged

racial/ethnic identity is added to the equation, this educational and economic advantaged

is lost. This is consistent with the intersectionality literature that says multiple

disadvantaged social identities have a magnifying effect on each other (Nawyn & Gjokaj,

2014; Woodhams et al., 2015a). Workers who belong to multiple disadvantaged groups

experience decreasing benefits compared to the privileged groups. Bucci & Tenorio (1997)

observed that Black immigrant workers experienced additional wage discrimination as

compared to non-Black immigrant workers. The results of this study confirm that indeed,

at the intersection of these disadvantaged identities, workers reap fewer economic

rewards. Again, Human Capital Theory is not supported at the intersection of

disadvantaged social identities. The disaggregated data point to systemic labor market

discrimination and disadvantages for non-White and non-native workers.

H_12C - Hispanic citizens will reap more economic rewards than non-citizens.

The fourth hypothesis was supported. There was a significant interaction effect for earnings of Hispanic non-citizen workers. The only other racial/ethnic category that had a significant interaction effect in this regard was Multiracial workers. This is supported by previous literature that has found wage growth accelerates upon gaining citizenship (Bratsberg et al., 2002) However, Bratsburg et al (2002) found this to be true for immigrant males across a range of racial/ethnic groups; immigrants from less-developed countries realized greater economic gains even when controlled or unobserved measures of productivity. This further reinforces the observation that wage differentials are a driver for migration (Korzeniewicz & Albrecht, 2015).

It is notable that the present study found the differences between earnings and citizenship to be significant only for Hispanic and Multiracial workers, and not for Black and Asian workers. In contrast, the differences between earnings and nativity were significant for Black, Hispanic and Asian workers. Only Hispanic workers saw reduced economic rewards for both non-nativity and non-citizenship. This is consistent with the finding that the earnings gap between Hispanic and non-Hispanic White workers is so large that evening the compensation differences is as important as improving educational attainment (J. Kim, 2002). The present study makes a unique contribution to the literature in showing non-citizen and non-native identities negatively impact racially/ethnically diverse workers' economic outcomes. Consistent with the theory of intersectionality, these differences vary across social identities, such as racial/ethnic groups.

Two theories were used to frame this study's research questions about differences

to economic rewards – Human Capital Theory (HCT) and Intersectionality. HCT has long

been used to support the need for increased formal training for workers, as it claims

increased training yields increased productivity which yields increased economic growth,

both for individuals and societies. HCT held true when examining this data in aggregate –

on average, associate's workers reaped more economic rewards than SCND. However, HCT

alone could not explain the findings of this study once the data were disaggregated along

the lines of socially advantaged and disadvantaged groups. The training differential held

true within groups; for instance, a Black worker with an associate's degree earned more

than a Black worker with SCND. However, in almost every category, the advantage of

additional training (completion of the associate's degree) was lost when the worker held at

least one socially disadvantaged identity. The economic disadvantage was multiplied for

some workers who had more than one disadvantaged identity. Intersectionality helps

explain this phenomenon: discrimination in society and in institutions is multi-layered, and

often occurs at the intersection of race/ethnicity, sex, and nation. The findings of this study

not only support HCT and the economic value of completing an associate's degree, but also

reveal the discrimination embedded in the labor market when examining economic returns

for workers of diverse races/ethnicities, sexes and nationalities.

Policy Implications

Disaggregating Data

These findings contribute to existing literature that examine the interaction effects

of multiple dimensions of identity on economic outcomes. While Human Capital Theory

seems to explain the differences in economic rewards at the aggregate level for educational

attainment, it does not account for the differences revealed when examining race/ethnicity,

sex, citizenship, and nativity. This study shows that the completion of associate's degrees

propels upward each population studied here, but it also brings to light how different the

starting places are for each population. While women and non-White workers realize

greater gains from completing associate's degrees than their majority counterparts, the

labor market continues to reward White men with much greater economic returns than

any other population. Analyses that stop at the aggregate level obscure the differential

experiences of the diverse workforce. Intersectionality helps frame these differential

experiences, and underscores the importance of disaggregated data (Browne & Misra,

2003; M. Kim, 2009; X. Liu et al., 2019; Nawyn & Gjokaj, 2014; Tao, 2018; Torres Stone et

al., 2006). As policy makers advocate for associate's degree completion as the quickest

ticket to the middle class, it is important that to examine which groups have the most, and

least, to gain from such proposals.

　　Based on the findings of this study, minorities of all these types – women, Black,

American-Indian, Asian, Multiracial, Hispanic, non-citizen, and non-native workers – have

more to gain from degree completion because of the existing wage gap for each of these

groups that have been systematically under compensated. However, this also raises the

question of the return on investment for them given the wage gap. The degree costs the

same for everyone, but they won't earn as much as their privileged counterparts. It will

take them longer to see the return on their investment, but they have more to gain from

degree completion (Brand & Xie, 2010). When the data are disaggregated, HCT no longer

justifies differences in economic rewards due to differences in training. These data suggest

systemic discrimination of economic rewards in the workforce for workers of disadvantaged social identities. Without disaggregating the data to understand these differential rewards, researchers and policy makers will be at risk for making decisions that continue to create and sustain systemic inequalities. In short, we need to see a problem before we can solve it.

The Costs of Educational and Economic Inequalities

College degree completion is one of the greatest avenues for social mobility and economic growth. The disproportionate share of poor, Black and Hispanic students who leave college without earning a degree has long term implications for their own social mobility, as well as for their children and their communities. Workers with SCND have unemployment and earnings closer to high school graduates than college graduates. Individuals from the bottom of the income distribution who gain a college degree have greater social mobility, and parents pass on their educational advantages to the next generation, impacting intergenerational social mobility (Chetty, Katz, et al., 2017; Venator & Reeves, 2015). The rate at which children of parents in the top quartile attained college degrees doubled from 40 to 80 percent, while children whose parents are in the bottom two quartiles rose from 10 to 20 percent (Venator & Reeves, 2015). For all of these reasons, degree completion is a policy priority for disadvantaged populations.

Approximately two out of three college students take loans to pay for college, and the average student loan debt is more than $26,000 (Hillman, 2014). In an examination of national student loan defaults, Hillman (2014) found that it is not how much debt a student takes on that is the best predictor of whether the student defaults on those loans. Rather, it

is whether they earn a degree or gain employment after leaving college and in what sector

(for-profit, not-for-profit) of higher education institution the student enrolls, that best

predicts how likely they are to default on their student loans. Of students who did not earn

a degree before leaving college, 65% were in default of their student loans (Hillman, 2014).

Even after adjusting for student and family background characteristics, type of college

attended and post-college employment, there is an 11%-point disparity between Black and

White student loan defaults (Scott-Clayton, 2019). In the cohort of students who started

college in 2003-2004, 38% of Black students defaulted within 12 years, compared to 12%

of White students (Looney et al., 2020). The present study demonstrated that Black

workers are making less than their White colleagues, thereby having less economic power

to repay these loans.

Taking out loans to attend college, but not completing a degree is not only costly to

the individual in terms of economic and social mobility, but also has larger policy

implications. Certainly, the individual student has economic consequences, but there are

collective impacts as well. Student loans cannot be cleared through bankruptcy court, and

those in default of their student loans can have their wages, tax refunds, and Social Security

benefits garnished to repay the outstanding debts. Not only do these individuals suffer

financially, but taxpayers support a large portion of student loans. Estimates of the costs to

taxpayers for defaulted student loans range from $31 billion to $307 billion (Looney et al.,

2020). The Federal Reserve estimates that 20% of the decline in rates of home ownership

can be attributed to the increases in student loan debt (Mezza et al., 2019).

Varying levels of inequality impact a wide variety of social outcomes, including educational outcomes. Both state and international educational outcomes are closely correlated with levels of educational attainment (Wilkinson & Pickett, 2009). Math and literacy scores of eighth graders are lower in states that have more income inequality. The higher the income inequality in a state, the more students drop out of high school. These findings suggest that inequality has an adverse effect on educational outcomes. My study demonstrated that women earn far less than men regardless of whether they have SCND or an associate's degree, and Black and Hispanic workers earn far less than White workers. Women who have earned an associate's degree still earn less than men who have SCND, and all races other than White who have completed an associate's degree earn less than a White worker with SCND. A study by the Georgetown Center on Education and the Workforce (CEW) identified a range of benefits if postsecondary degree attainment were equalized for racial/ethnic groups. If degree attainment amongst Black and Hispanic adults rose to meet degree attainment amongst White adults, over half of the population would have an associate's degree or higher. These gains in postsecondary degree completion and the associated upskilling of the labor force would lead to $956 billion in annual societal gains, including boosts to the GDP and reductions in criminal justice and public health expenditures (Carnevale et al., 2021).

Goldin & Katz (2008) suggest that educational attainment is a proxy for the supply of skilled workers and the skill-based technology used by businesses represents the demand for skilled workers. These two forces are constantly pushing and pulling on each other in a race between education and technology. Since the 1980s, the demand for college related skills has exceeded the available supply (Oreopoulos & Petronijevic, 2013). If the

United States does not increase the educational attainment of its workforce, particularly of

the increasingly diverse population, it will likely see economic declines which will lead to

decreases in American's standards of living (Baldwin, 2017).

Degree Reclamation Strategies

The Institute for Higher Education Policy estimates that in 2015, there were 35

million Americans ages 25 or older who had attended some college but had no

postsecondary credential; this equates to almost one in five adults. As many as 1.2 million

students have left college after having completed two years of full-time attendance, the

equivalent of an associate's degree (McCambly & Bragg, 2016). There has been a debate in

policy circles about whether an associate's degree adds value in the workplace. Between

1991 and 2016, "good jobs" for associate's degree holders grew 83%. This rate of growth

has far exceeded that of other middle skills jobs by a rate of 10 to 1 (Carnevale et al., 2018).

Since 2000, contributions to national economic growth from demand for associate's degree

workers has exceeded that of bachelor's degree workers (Gittell et al., 2017). Advocates

propose that associate's degree completion is the most efficient option for "upskilling". This

study supports existing literature in demonstrating workers who have earned an

associate's degree earn higher incomes than workers with SCND, regardless of

race/ethnicity, sex, citizenship, or nativity.

With more than 35 million Americans having been to college but holding no degree,

degree reclamation strategies are an important policy initiative. Degree reclamation

strategies combine evidence-based and equity-focused strategies to provide targeted

supports to those with SCND in order to complete a postsecondary degree, thereby

realizing the superior earning power of the completed degree and providing a more skilled

labor pool. Reverse Credit Transfer (RCT) targets those who have been within striking distance of an associate's degree (often earning 45 credits or more), but transferred to a four-year institution before claiming the degree. The work they have subsequently completed at the four-year institution can be transferred back to the community college to satisfy the final requirements and award the associate's degree even while they remain enrolled in the four-year institution. Authority is granted to the two-year institution to award the degree to students who are no longer enrolled in their institution.

Ideally, these students who have transferred to a baccalaureate granting institution remain enrolled in pursuit of a bachelor's degree. However, only 38% of first time community college students obtained a degree or certificate from a two or four year college in six years (Shapiro et al., 2015). Reverse Credit Transfer provides somewhat of an insurance policy for students who have completed 60 credits of degree-worthy work. They receive an official degree to recognize this successful milestone. In the event that they do not complete the bachelor's degree, they have an associate's degree rather than SCND, thereby situating them to have more earning power in the labor market than they would otherwise.

Beyond Reverse Credit Transfer, policy makers should consider ways to incentivize colleges to become more welcoming to returning adult learners and more supportive in helping them to complete their degrees. Higher education is struggling with the beginning of a "demographic cliff" in which fewer students are graduating from high school, thereby leaving fewer students to continue on to higher education. These market forces may encourage higher education institutions to make their own internal adjustments to recruit and retain returning adult learners without needing additional policy incentives. However,

for policy makers who see the value in quickly upskilling their workforce, incentives to help

workers with SCND complete post-secondary degrees of all sorts will be a powerful tool in

building a strong labor force and competing economically. These incentives might include

funding to institutions for adult-learners who complete degrees, or funds given directly to

students who complete their degrees. Some regions might want to incentivize certain types

of degrees based on the needs of the workforce in their region. This funding could

potentially come from economic development sources, because an increased talent pool

could increase companies attracted to and hiring in the geographic area.

Strategic Funding for Equity and Social Mobility

There is a long-standing debate in education policy about whether education ought

to strive for equality or equity. Equality is understood to mean "same" and equity is

understood to be "just" (Espinoza, 2008; Rawls, 1971). Often, the two do not coexist, for "to

achieve equity – justice – may require structured inequalities, at least temporarily.

Achieving equal access, itself a very difficult challenge, is a first step toward achieving

equity" (Samoff, 1996, pp. 266-267). Consider the picture in Figure 5.1. The outside lanes

are longer on an oval track than the inside lanes. For this reason, a traditional track race

has runners start at graduated starting lines – this gives each runner an equitable chance in

the race. If each runner where to start in exactly the same place, it would not account for

the differences in the lanes they are running.

Figure 5.1

Equality v. Equity
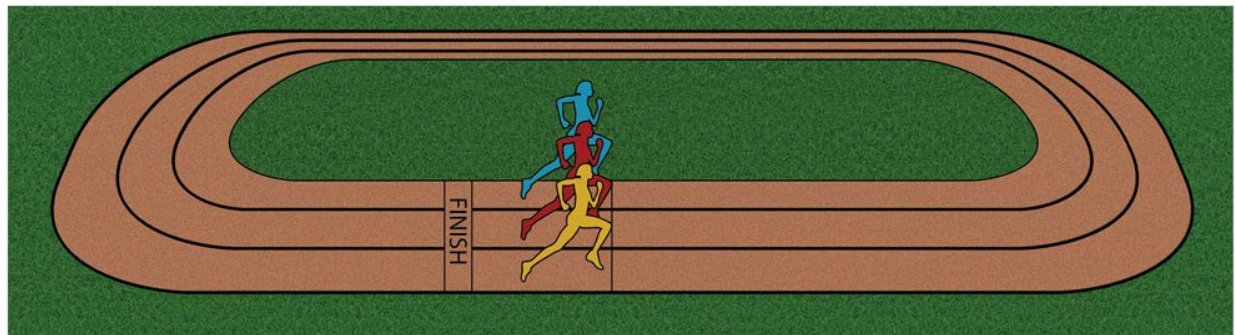
EQUALITY
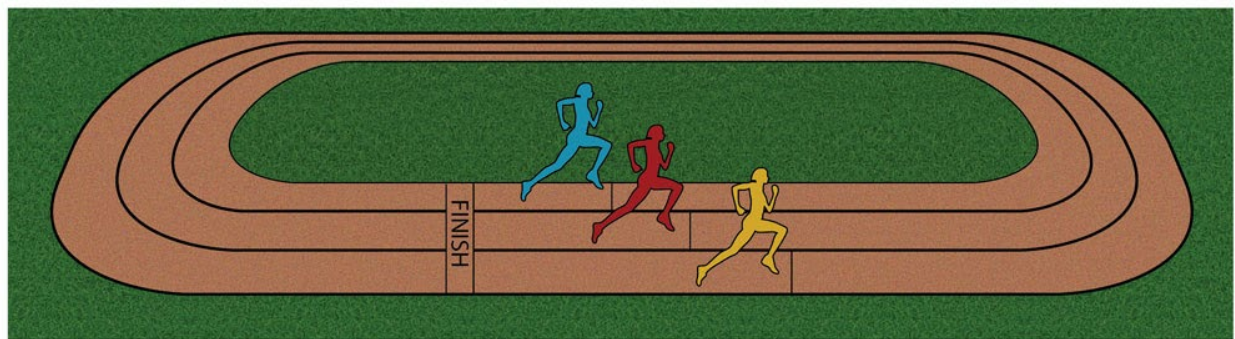
EQUITY

Cultural Organizing

       The results of the present study show that the economic returns for associate's

degree completion to workers of different identities are not equal. Increased education and

training are needed to increase human capital and fuel economic growth in the twenty first

century (Piketty, 2014). Investment in higher education yields increased in GDP (D.

Tyndorf & Martin, 2018b). The workforce is increasingly diverse – by 2050, Hispanics will

account for over half the nation's workforce (Erickson, 2014). As economic inequality

continues to grow in the United States, the greatest force for convergence, the narrowing of

economic inequality, is the distribution of knowledge and skills – education (Piketty, 2014).

To realize this convergence, increased funding should be allocated to support women and

non-White workers in pursuing associate's degrees, particularly in high demand, high wage fields such as nursing, IT, and management. This study has shown that women and non-White workers have been undercompensated for many decades – they are running on a longer track compared to White men. By seeking ways to increase funding for women and non-White workers, institutions can begin to lessen the long-standing differences in economic returns for workers of disadvantaged social standings. Funding should be made available not only for tuition and fees, but also for other expenses that are often a barrier to degree completion, such as child care, transportation, books and computers. Systemic investments like day cares on campus, accommodations for student-parents to bring children to advising appointments, flexible course modalities, and one-stop advising centers that connect eligible students with existing social services can all eliminate barriers that prevent adult learners from degree completion. While Federal funds may not be available to be used disproportionately for distinct populations, private funds can be raised from individual donors, foundations and even companies that are invested in helping women and non-White workers improve their economic well-being and mobility.

Since occupational choice is a large driver in wage differentials, policy makers, businesses and educators can start to level the playing field by exposing disadvantaged and underrepresented populations to a wide variety of occupational choices early and often. As an example, ChamberRVA sponsors an event called Mission Tomorrow in partnership with Junior Achievement. This event brings together 12,000 eighth graders and professionals from 170 businesses to learn about career options in the Richmond, VA region (ChamberRVA, 2020). Another example is the partnership between VCU College of Engineering, Bank of America and Richmond City Schools (Kolenich, 2021). Funded by a $1

million grant from the Bank of America Foundation, experts from the College of

Engineering are training career coaches to work with middle schoolers in disadvantaged

city schools to expose them to STEM careers and teach them introductory coding skills.

Hiring diverse instructors and highlighting diverse alumni of programs who are not the

majority in the field can also increase participation of those who never imagined

themselves in such an occupation until they saw someone else who looked like them paving

the way.

Equality and equity are not the same. The labor market in the United States today is

not equal. This inequality is a threat to America's economic prosperity. Currently,

advantaged workers are like the runner on the inside lane – they have less distance to

cover to win their race. To grow the economy, policy makers must adjust the starting lanes

so women and non-White workers are running a more equitable race. Policies that are

equitable in this way have the potential to drive increases in educational attainment,

diverse occupational choice, and eventually, decreases in wage discrimination to allow for

all the runners to succeed in their races.

Limitations of the Study

This research design is not experimental. Therefore findings must be interpreted as

an examination of the associations among the variables, and should not be interpreted as

causal (Shadish et al., 2001). Efforts have been made to include relevant controls to account

for the heterogeneity between individuals, and therefore the threats to internal validity.

The proposed models include most of those covariates suggested by the literature as

factors contributing to differences in economic benefits to degree completion, with one

notable exception. This data set does not include a measure to indicate academic ability,

which has been noted to account for differences in lifetime earnings when controlling for

other variables such as those in this study (Bound et al., 2010; Hendricks & Leukhina, 2018;

V. Liu et al., 2015). However, standardized tests have also shown to exhibit racial and class

bias, making them imperfect measures even when available (Orr, 2003). Additionally, this

study does not include measures of workplace performance, which also contributes to

differences in economic rewards. This is a large sample, and has been collected in a manner

designed to be nationally representative. Propensity score matching has also been utilized

to address potential selection bias between individuals with SCND and associate's degree

completers.

Economic benefits are being defined in this study as a confluence of variables,

including the natural log of income, and whether an individual has group health care,

private health care, and pensions. Certainly, economic benefits are broader than these

variables, which may pose a threat to construct validity. However, these variables have

been used in the literature previously to examine similar questions (Perna, 2005), and by

defining economic benefits in this way, the results of this study may be compared to the

results of other similar studies, thereby increasing understanding of this topic.

Measuring intersectionality has limitations in and of itself. This data set uses self-

reported data, which could be a limitation. Additionally, intersectionality teaches us that

identities are deeply complex. The four variables used to measure identity in this study do

not capture the nuances of cultural identity and more. As McCall (2001) noted, any analysis

attempting to study intersectionality is intentional and necessarily complex, and therefore

may be difficult to replicate. Additionally, some of the intersectionality literature pointed to

wage differentials for disadvantaged workers due to differences in part-time and full-time work. This study only examined those who were working full-time, potentially further muting additional disadvantages in labor market outcomes.

Suggestions for Future Research

There are a number of directions for future research based on the findings of this study. This study only used data from 2019 in a cross-sectional analysis. By applying the same analyses across different years, a more longitudinal lens could shed additional light on trends that remain consistent across multiple years, and even after the COVID-19 pandemic's disruption of the workforce. Additionally, it could be interesting to examine the age groups of the workers as an independent variable in and of itself, rather than as a control. Are the disparate economic returns more amplified for younger or older workers?

Additional understanding could be gained by adding a measure of academic ability and quality of work. Both of these factors may influence not only degree completion, but also success in the workplace, yielding increased economic rewards. Also, it would be insightful to parse out the SCND population in more detail, understanding which SCND workers had been pursuing an associate's degree versus a bachelor's degree, and how many credits they had earned before they left college. Having a better understanding of when students are dropping out, from which institutions, types of degrees, and fields of study, will help paint a clearer picture of the "leaks" in the educational pipeline. Having a more detailed understanding of these "leaks" could also guide institutions toward more effective solutions to help more students complete degrees in a timely manner.

There is a lot more work to be done understanding how occupation impacts these findings. In what ways does occupation explain the large differences between sex and race/ethnicity earnings, or are these still pronounced when controlling more specifically for differences in occupation? When do the differences in occupational paths between men and women, Blacks, Hispanics and Whites begin? Further study is also needed to understand how country of origin contributes to differences in earnings as well as occupational choice for non-native workers. These are all additional areas for further study that have the potential to shed more light on the inequalities in economic rewards for associate's degree completion.

Conclusions

This study aimed to explore whether the economic benefits of associate's degree completion propel disadvantaged students – Black, Hispanic, female, non-citizen, non-native – to economic well-being as effectively as they do students who are white, male, United States citizens and native. Using descriptive statistics, OLS and logistic regressions, and propensity score matching, this study analyzed the heterogeneity of these economic outcomes at the intersection of race/ethnicity, sex, citizenship and nativity. This study observed differences in income, health insurance, Medicaid and pensions between levels of education, race/ethnicity, gender, citizenship and nativity. The findings from this study support existing literature that demonstrates workers with associate's degrees earn more than those with SCND, supporting the claims of Human Capital Theory that additional training, especially in the form of degrees, yields greater economic rewards. Workers with

more advantaged identities (White workers, males, citizens, and native workers) earn more than those with less advantaged identities, supporting the claims of Intersectionality.

These inequities have economic costs for individuals, families, communities, and society at large. As the population of the United States becomes increasingly diverse, economic inequities grow between wealthy and poor, and the workforce continues to demand skilled workers, policymakers must grapple with potential negative economic and social outcomes ahead. Implementing policies to equalize postsecondary degree completion and earnings for diverse workers – ensuring these tickets to the middle class really are accessible regardless of race/ethnicity, sex, citizenship, or nativity – has the potential to set the United States on a course for a more equitable social and economic well-being of our increasingly diverse workforce.

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Appendix A: Description of Variables

Table A1: **Variables Used to Limit Sample**

Variable Name	IPUMS Name	IPUMS Coding		Included in Sample
Highest level of education attainment	EDUC	1	NIU or blank	Participants who responded 81, 91, and 92.
		2	None, preschool, or kindergarten	
		10	Grades 1, 2, 3, or 4	
		20	Grades 5 or 6	
		30	Grades 7 or 8	
		40	Grade 9	
		50	Grade 10	
		60	Grade 11	
		71	12th grade, no diploma	
		73	High school diploma or equivalent	
		81	Some college but no degree	
		91	Associate's degree, occupational/vocational	
		92	Associate's degree, academic	
		111	Bachelor's degree	
		123	Master's degree	
		124	Professional school degree	
		125	Doctorate degree	
Age	AGE	The ages of persons between 0 and 79 are recorded as a continuous variable.		Participants between the ages of 25-65.
Labor force	LABFORCE	A dichotomous variable that indicates whether the respondent participated in the labor force in the previous week. 1 – No 2 – Yes, includes those who were at work, on vacation or ill from a job, were seeking work, or were temporarily laid off.		Participants who responded 2.

Variable Name	IPUMS Name	IPUMS Coding	Included in Sample
Enrolled in school	SCHLCOLL	Indicates when enrolled in high school or college during the previous week: 0 – NIU 1 – High school full time 2 – High school part time 3 – College or university full time 4 – College or university part time 5 – Does not attend school, college or university	Participants who responded 5.
Class of worker	CLASSWLY	Indicates the class of work the person did for the longest amount of time in the previous year. Class of work includes working for wages from public and private employers, self-employed, and unpaid family workers. 0 – NIU 10 – Self-employed 13 – Self-employed, not incorporated 14 – Self-employed, incorporated 20 – Works for wages or salary 21 – Wage/salary, private 22 – Private, for profit 23 – Private, nonprofit 24 – Wage/salary, government 25 – Federal government employee 26 – Armed forces 27 – State government employee 28 – Local government employee 29 – Unpaid family worker 99 – Missing/Unknown	Participants who worked for wages: 20, 21, 22, 23, 24, 25, 26, 27, 28.
Full or part time	FULLPART	Working full time is defined as 35 hours or more of work in a week, and is recorded for the previous year. 1 – Full time 2 – Part time	Participants who responded 1.
Weeks worked	WKSWORK1	The number of weeks worked in the previous calendar year recoded as a continuous variable.	Participants who responded 39 or greater.

Table A2: **Variables Used in Analysis**

Type of Variable	Variable Name (IPUMS Code)	IPUMS Codes		Recoding for this Analysis
Independent	Highest level of education attainment (EDUC)	81 91 92	Some college but no degree Associate's degree, occupational/vocational Associate's degree, academic	0 – Some college but no degree (81) 1 – Associate's degree (91, 92)
Independent	Race (RACE)/Ethnicity (HISPAN)	*Race Codes* 100 200 300 651 652 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 830 *Hispanic Origin Codes* 100 200	White Black/Negro American Indian/Aleut/Eskimo Asian only Hawaiian/Pacific Islander only White-Black White-American Indian White-Asian White-Hawaiian/Pacific Islander Black-American Indian Black-Asian Black-Hawaiian/Pacific Islander American Indian-Asian Asian-Hawaiian/Pacific Islander White-Black-American Indian White-Black-Asian White-American Indian-Asian White-Asian-Hawaiian/Pacific Islander White-Black-American Indian-Asian American Indian-Hawaiian/Pacific Islander White-Black--Hawaiian/Pacific Islander White-American Indian-Hawaiian/Pacific Islander Black-American Indian-Asian White-American Indian-Asian-Hawaiian/ Pacific Islander Two or three races, unspecified Four or five races, unspecified Mexican Puerto Rican	0 – White (100), non-Hispanic 1 – Black (200), non-Hispanic 2 – American Indian (300) 3 – Asian (651, 652) 4 – Multiracial (801-820, 830), non-Hispanic 5 – Hispanic (*Hispanic Origin* 100, 200, 300, 400, 500, 600, 611, 612)

		300	Cuban	
		400	Dominican	
		500	Salvadoran	
		600	Other Hispanic	
		611	Central American (excluding Salvadoran)	
		612	South American	
Independent	Sex (SEX)	1	Male	0 – Male (1)
		2	Female	1 – Female (2)
Independent	Citizenship status (CITIZEN)	1	Born in U.S	0 – Citizen (1-4)
		2	Born in U.S. outlying	1 – Not a citizen (5)
		3	Born abroad of American parents	
		4	Naturalized citizen	
		5	Not a citizen	
Independent	Nativity (NATIVITY)	0	Unknown	0 – Native (1-4)
		1	Both parents native-born	1 – Non-native (5)
		2	Father foreign, mother native	
		3	Mother foreign, father native	
		4	Both parents foreign	
		5	Foreign born	
Control	Marital Status (MARST)	1	Married, spouse present	0 – Ever married (1-5)
		2	Married, spouse absent	1 – Never married (6)
		3	Separated	
		4	Divorced	
		5	Widowed	
		6	Never married/single	
Control	Occupation Last Year (OCCLY)	3255	Registered nurses	0 – Not nurse (all other values)
		3500	Licensed practical and licensed vocational nurses	1 – Nurse (3255, 3500)
			For entire list of 2019 occupation codes, see	
			https://cps.ipums.org/cps/codes/occ_20112019_codes.shtml	
Control	Age		Age gives each person's age at last birthday.	Continuous variable
Control	Metro	0	Not identifiable	0 – City (2, 3)
		1	Not in metro area	1 – Not city/unknown (0, 1, 4)
		2	Central city	
		3	Outside central city	
		4	Central city status unknown	

Type of Variable	Variable Name (IPUMS Code)	IPUMS Codes		Recoding for this Analysis
Dependent	Income (INCWAGE)	Total pre-tax wage and salary income for the previous calendar year, continuous variable.		Natural log of this continuous variable.
Dependent	Group health care coverage last year (GRPCOVLY)	0 1 2	NIU No Yes	Drop NIU 0 – No (1) 1 – Yes (2)
Dependent	Private health care coverage last year (PHINSUR)	1 2	No Yes	0 – No (1) 1 – Yes (2)
Dependent	Medicaid, CHIP or other means tested coverage last year (HIMCAIDNW)	1 2	No Yes	0 – No (1) 1 – Yes (2)
Dependent	Employer pension plan (PENSION)	0 1 2 3	NIU No pension plan at work Pension plan at work, but not included Included in pension plan at work	Drop NIU 0 – No (1, 2) 1 – Yes (3)

Vita

Kathleen Elisabeth Lee (Katybeth) was born in Elgin, IL as an American citizen. She graduated from Kingswood Regional High School in Wolfeboro, NH in 1998. She earned her Bachelor of Arts in Religious Studies from the College of William & Mary in 2002. She traveled around the world doing service work before going back to school and earning her Master of Arts in Higher Education and Student Affairs at The Ohio State University in 2005. She worked at the University of Richmond from 2005 to 2014 and Virginia Commonwealth University from 2014 until the present in a variety of roles related to career development and workforce training.