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NEW JERSEY COMMUNITY COLLEGES: IS THERE A RELATIONSHIP BETWEEN PART TIME FACULTY AND STUDENT SUCCESS?

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NEW JERSEY COMMUNITY COLLEGES: IS THERE A RELATIONSHIP BETWEEN PART TIME FACULTY AND STUDENT SUCCESS?

by
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Dedication

To my mother Margaret, my wife Andrea, and my daughter Colette, all graduates of Atlantic Cape Community College with honors. For our family, community college provided a path to living wage employment and bachelor's degrees. We are a microcosm of the millions of families across many generations, striving for an education that leads to a better life.

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Abstract

Max Slusher
NEW JERSEY COMMUNITY COLLEGES:
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Doctor of Education

The increasing number of part time instructors in the community college professorate combined with low student retention and graduation rates makes research into part time faculty and student success highly germane. My dissertation investigated if higher ratios of adjunct faculty were related to student retention, certificate/degree attainment, and transfer without a credential while accounting for institutional, student body, and county characteristics. The dissertation was limited to New Jersey community colleges to eliminate differences in state policies. The sector was examined over 12 academic years yielding 228 data points arrayed into three panel models to run 12 regressions.

Using results from the dissertation's preferred model, I found the ratio of part time faculty to have a positive relationship with full time student retention ($p=.182$) and graduation ($p\leq.001$), and negative and statistically insignificant relationship with part time retention and full time transfer. Instructional expenditures per credit hour, an indicator of full time faculty employment was positive and statistically significant with respect to student retention, indicating that increasing outlays on instruction in conjunction with greater numbers of part time faculty have a mutually beneficial relationship with student retention. Finding implications, including further research and policy recommendations are discussed.

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Chapter 1

Introduction

Background

During the past ten years, the United States community college sector lost enrollment while simultaneously being pressured to improve student outcomes and credential attainment (Bennett, 2021; HESSA, 2021; Obama White House Archives, 2009; Shapiro et al., 2019). The COVID-19 pandemic capped the decade-long enrollment decline by recording an 11% year over year drop in community college enrollment for Fall 2020; until the advent of COVID-19, falling enrollment was attributed to the stagnant college age demographic (Brock & Diwa, 2021; Bulman & Fairlie, 2021). The decline in enrollment and consequential loss of revenue has been partially compensated by the Corona Aid, Relief, and Economic Security Act (CARES) and the American Rescue Plan (ARP; Brock & Diwa, 2021; Bulman & Fairlie, 2021). Another financial stressor is that community colleges receive considerably less public aid per student than senior postsecondary institutions, making the COVID-19 enrollment shocks financially disruptive to the sector (Brock & Diwa, 2021). One approach for addressing declining public and enrollment revenues has been employing adjunct faculty as a cost saving measure (Eagan & Jaeger, 2008a; 2008b; Ehrenberg & Zhang, 2004; Jenkins & Rodriguez, 2013; Rhoades, 2013). The need for frugality during declining public and institutional revenues balanced against the public insistence on improved student success makes the utilization of part-time faculty a topic of utmost importance to public policy. This dissertation examines the institutional use of higher ratios of part-time faculty and whether there is a relationship to community college student success. My research is

limited to New Jersey's two-year public colleges to eliminate state education public policy differences.

President Joseph Biden and Dr. Jill Biden, a community college educator, are adamant proponents of community college student success and free tuition. President Biden was Vice President during the Obama Administration, which at that time called for 5 million additional community college graduates by 2020 (Bennett, 2021; Obama White House Archives, 2009). The Obama Administration's goal was based on economic necessity and equity, with 65% of future employment requiring postsecondary training or credentials and the overwhelming number of new jobs created since the Great Recession of 2008 going to workers with education and training above the high school graduate level (Carnevale et al., 2018; Carnevale, Smith & Strohl, 2014; Howard, 2018). Unfortunately, only 40% of community college students earn a degree or certificate within six years or less (Shapiro et al., 2019).

The community college sector historically has generated revenues by increasing enrollments, not necessarily by improving student success, such as graduation (Juszkiewicz, 2016). Tuition and fees fund community colleges, and government appropriations are typically driven by enrollment; therefore, the institutional focus has been recruiting and enrolling students (Juszkiewicz, 2016; Shulock & Moore; 2007a, 2007b). Consequently, what is best for student success is often overwhelmed by the focus on enrollment driven revenues (Juszkiewicz, 2016).

Due to open admission and lower attendance costs, public two-year community colleges enroll a high percentage of first generation college students, individuals from low income households, older students, students of color, and female students (Bers &

Schuetz, 2014; Cohen & Brawer, 2003; Horn & Nevill, 2006; Horton, 2015; Kuh et al., 2006; Wyner, 2014). According to the AACC (2020), 62% of full time and 72% of part time community college students work, while first generation community college students spend significantly more time caring for dependents and are more likely to aspire to improve job skills rather than attain degrees (CCSSE, 2017). Consequently, graduation rates at community colleges were almost half the rate of senior institutions (NCES, 2017).

The New Jersey Community College sector experienced a more significant decline in enrollment between 2009 to 2019 relative to the national sector, followed by significant annual declines in enrollment during the COVID-19 years of 2020 and 2021 (Brock & Diwa, 2021; Bulman & Fairlie, 2021; NJOSHE, 2022). Concurrent with declining enrollments, New Jersey Governor Phil Murphy proposed free community college education for state residents and appointed a former Obama Administration senior education policy advisor as his secretary for higher education (Inside Higher Ed, 2018). The Murphy Administration did succeed in securing free community college education for families with gross incomes of $65,000 or less (HESSA, 2021). The Garden State Guarantee program also benefits students with gross family income between $65,001 and $80,000 based on a sliding income scale (HESSA, 2021).

However, few state representatives and higher education administrators recognize that the recent success with enhancing access to community colleges does not address the high proportion of part time instruction in the sector (Hurlburt, 2016; Liu, 2007; Snyder, de Brey & Dillow, 2016), which may have negative impacts on measures of student success (Benet & Walters, 2016; CCCSE, 2014; Kezar & Maxey, 2014; Kuh & Hu, 2001;

Kuh, Kinzie, Schuh, & Whitt, 2005; Tinto, 2008). The effort to improve community college student access does not address the effort to improve student retention and graduation, which is already challenging for the lower socioeconomic students that the Garden State Guarantee program is attempting to assist (Bailey, Jaggars, & Jenkins, 2015).

Between 1991 and 2011, total postsecondary faculty grew by 84%, with part time faculty (162%) growing at four times the rate of full time faculty (42%; NCES, 2014). This rapid increase in part time faculty was a result of constrained educational funding and competing demands for governmental resources resulting in reduced instructional expenditures (Ehrenberg, 2002; Gappa & Leslie, 1993; Jacoby, 2001; Leslie & Gappa, 2002; Meixner, Kruck & Madden, 2010). Presently, funding in the community college sector is acute, perhaps more constrained than ever (Bennett, 2021; Brock & Diwa, 2021; Bulman & Fairlie, 2021; HESSA, 2021). By the fall of 2018, there were 1.45 million postsecondary professors and instructors employed by a degree granting institutions, divided between full time instructors (51.5%) and part time instructors (48.5%). The ratio was more skewed towards part time faculty in the community college sector, with part time instructors making up 66.9% of the faculty and teaching about the same percentage of courses (Knapp, Kelly-Reid & Grinder, 2010; Liu, 2007; NCES, 2018; Snyder, de Brey & Dillow, 2016).

Many questions have been raised by academic researchers concerning higher education's ability to educate students through employing greater numbers of part time instructors (Bettinger & Long, 2005; Eagan & Jaeger, 2008a; 2008b; Ehrenberg & Zhang, 2004; Gross & Goldhaber, 2009; Harrington & Schibik, 2001; Harrington &

Shirbeck, 2004; Jacoby, 2006; Jaeger & Eagan, 2009; 2011; Jaeger & Hinz, 2008; Kehrberg & Turpin, 2002; Ran & Xu, 2018; Ronco & Cahill, 2004; 2006; Tinto, 2006; Umbach, 2007; Xu, 2018). In particular, the use of adjunct faculty in community colleges requires pause and reflection based on the sector's history of lower student retention and graduation outcomes relative to four-year colleges and universities (Calcagno et al., 2008; Datray, Saxon & Martirosyan, 2014; Horn, 2009; Jaeger & Eagan, 2011). Since community colleges provide access to higher education for large numbers of underprepared and nontraditional college students, the sector's reliance on part time faculty and the resulting student outcomes were of paramount importance (Datray, Saxon & Martirosyan, 2014; Eagan & Jaeger, 2008a; 2008b; Ehrenberg & Zhang, 2004; Gross & Goldhaber, 2009; Harrington & Schibik, 2001; Harrington & Shirbeck, 2004; Jacoby, 2006; Jaeger & Hinz, 2008; Kehrberg & Turpin, 2002; Umbach, 2007; Wyner, 2014).

Part Time In Relation To Full Time Faculty

Considerable discussion and research have taken place concerning the association between part time faculty and student success, especially the potential effect on students during the critical first year of college (Harrington & Schibik, 2001; Jacoby, 2006; Jaeger & Eagan, 2011; Ronco & Cahill, 2004; Umbach, 2007). Some higher education researchers have found that student exposure to adjunct faculty early in the education process was tied to student outcomes; increased exposure to part time faculty in the first semester was found to decrease student retention and academic performance in later semesters (Harrington & Schibik, 2001; Ran & Xu, 2018; Ronco & Cahill, 2004; Xu, 2018). Specifically, Jaeger and Eagan (2011) found a significant negative relationship between student retention and exposure to adjunct faculty after controlling for

background characteristics, enrollment traits, prior achievement, and financial aid. The negative relationship was particularly acute in introductory and gatekeeper courses (Jaeger & Eagan, 2011). Since community colleges teach the first two years of the undergraduate experience, it was not surprising that researchers found that an increase in the use of community college adjunct faculty resulted in decreases in student academic performance, retention, and graduation (Jacoby, 2006; Jaeger & Eagan, 2011; Ran & Xu, 2018; Umbach, 2007; Xu, 2018). However, some researchers found no negative relationship between adjunct faculty and student outcomes and sometimes even positive student outcomes, though many of these studies focused on four-year colleges and universities (Bettinger & Long, 2004; Bolge, 1995; Jaeger & Eagan, 2011; Rodgers, 2015; Ronco & Cahill, 2006). These studies and their methodologies are addressed in more detail in Chapter 2.

Full time instructors in community colleges are professional educators by nature of their full time employment in the education field. In addition to typically holding master's degrees and often doctorates, they spend a significant part of their workday directly educating and interacting with students (Baldwin & Wawrzynski, 2011; Banachowski, 1996; Benjamin; 2002; CCSSE, 2014; Jacoby, 2006; Kezar & Gehrke, 2013; NCES, 2006; Umbach, 2007). In the community college sector, which usually excludes research activities, the majority of the full time instructor's time and energy is dedicated to instruction, preparing for class, grading student work, and in many community colleges, advising and guiding students (Baldwin & Wawrzynski, 2011; Banachowski, 1996; Benjamin; 2002; CCSSE, 2014; Jacoby, 2006; Kezar & Gehrke, 2013; NCES, 2006; Umbach, 2007). This focus of full time instructors on the education

of their students may make them better educators, and consequently, result in improved student outcomes.

In contrast, part time instructors work in the fields where they teach and hold advanced degrees in their area of specialization (Snyder, de Brey & Dillow, 2016). Consequently, they may be better prepared and more current in their area of expertise. However, because of their part time employment in education, the opportunities to meet with students, prepare for class, and discuss pedagogy are limited (Benjamin, 2002; Umbach, 2007). Not knowing their students may result in ignorance of student life situations, which provide the necessary knowledge and context to proactively intervene and address students who dropped out and stopped out, or at minimum, academically underperformed or risked impending failure (Green, 2007; Jacobs, 1998; Levin, 2001; 2007; Wagoner, 2007). In the community college sector, instructors provide students with a significant portion of contact with the institution and the education process. Many researchers have concluded that there is a link between academic and student integration and student outcomes measures, making community college instructors critical for student integration in the institution (Deil-Aman, 2011; Karp, Hughes & O'Gara, 2010; Tinto, 1993; 1997; Wortman & Napoli, 1996). However, most academic and social integration studies were conducted at the four-year colleges and universities. Studies using two-year and community colleges were often predicated on the theory and findings developed from research performed at senior institutions, leaving the possibility that aspects of the community college student experience were being overlooked (Deil-Aman, 2011; Karp, Hughes & O'Gara, 2010; Tinto, 1997). Thus, this dissertation explores community college student outcomes and their relationship with full-time faculty and

part-time status using Tinto's (1975; 1993) Model of Institutional Departure as a conceptual framework.

Community College Background And Conceptual Framework

The physical differences between community colleges and senior institutions require a refreshed review of student success at the community college level. Overwhelmingly, community college students are commuters who reside in the vicinity of the community college; have roots in the community that often include parents, siblings, friends, and children; are usually employed in some capacity; and come from more diverse socioeconomic backgrounds relative to traditional four year students (Bailey & Alfonso, 2005; Bers & Schuetz, 2014; Dowd, 2005). Traditional students often move from home to college. They must integrate into their new environs while overcoming homesickness and the uneasiness of meeting new people, adjusting to new living and social arrangements, and concurrently performing well in their critical entry level scholastic work (Bean & Metzner, 1985; Tinto, 1993). Traditional college students must disengage from their home lives and integrate into campus life (Tinto, 1993). Though community college students have embarked on the higher education path, the shift into higher education can be less transformative than for students going away to college (Bailey & Alfonso, 2005; Bean & Metzner, 1985; CCSSE, 2018). The life changes that must take place to pursue an education at community colleges are often not as momentous as they are for students going to senior colleges (Bailey & Alfonso, 2005; Bean & Metzner, 1985; CCSSE, 2018). The community college student is often home while attending college, while university students are typically attending college and

adapting to being away from home, often for the first time in their lives (Bailey & Alfonso, 2005; Bean & Metzner, 1985 CCSSE, 2018).

An objective of the new institution of traditional college students is to keep them there and help them become successful students (Metz, 2005; Tinto, 1975; 1993; 1997; Wortman & Napoli, 1996). Consequently, four-year colleges and universities attempt to absorb their students into campus life and insulate them from the perceived attractions and consequent distractions of returning home (Astin, 1991; Bean & Metzner, 1985; Braxton, Hirschy, & McClendon, 2011; Pascarella & Terezini, 1991; Tight, 2020). Community college students usually remain in their community and embrace community college as they did their secondary schooling, treating it as just another part of their daily lives. Community college students need not socially integrate into campus life, but classroom integration remains vital for their academic success (Deil-Amen, 2011).

Nevertheless, community college student integration in the classroom is different from classroom integration at four-year colleges. Community college students often know their classmates or have common frames of reference due to shared experiences growing up in the same area (Deil-Amen, Hughes, & O'Gara, 2010; Tinto & Russo, 1994). Students attending senor institutions typically build all new relationships while navigating unfamiliar places. Community college students may already know their full and part-time instructors. Often, their instructors live in the community and share many of the same local experiences as the students. According to the AAUP (2009), 65% of community college part time instructors are not seeking full-time positions but are working second jobs or retired, which infers a local residence. These part time instructors

may have community experiences and relationships like their students' experiences and relationships, which may assist in the integration and retention of students.

Community college students have not been exposed to as diverse an assortment of people and new places as traditional students; they remain in an educational environment that was an extension of their current living arrangement (Deil-Amen, Hughes, & O'Gara, 2010; Tinto & Russo, 1994). The factors associated with student success at senior institutions are different and, in some cases, may not apply to the community college environment (Deil-Amen, Hughes, & O'Gara, 2010; Tinto & Russo, 1994). Due to these structural differences between higher education sectors and other reasons cited throughout this dissertation, an examination of the institutional association of part time and full time instructors on community college student success was necessary. In essence, two year and four year students are very different groups, coming from different backgrounds and exposed to different stimuli. It is not logical to assume that two-year and four-year students respond to full time verses part time instructors in the same way and magnitude.

Student Outcomes

One valid critique of the community college sector concerns its underperformance relative to the senior postsecondary institutions in student success measures. Community colleges perform well-below the senior institutions in year over year student retention rates and significantly worse in 150% of time graduation rates (Bettinger & Long, 2005; Eagan & Jaeger, 2008a; 2008b; Ehrenberg & Zhang, 2004; Gross & Goldhaber, 2009; Harrington & Schibik, 2001; Harrington & Shirbeck, 2004; Jacoby, 2006; Jaeger &

Eagan, 2008; 2009; Jaeger & Hinz, 2008; Kehrberg & Turpin, 2002; NCES, 2017; Ran & Xu, 2018; Ronco & Cahill, 2004; 2006; Tinto, 2006; Umbach, 2007; Xu, 2018).

Supporters of community colleges argue that its student population is drawn from diverse socioeconomic cohorts that in many cases would not or could not pursue higher education without the community college system (Bird, 1956; Rouse, 1995). Many of these cohorts would be classified as high risk of stopping and dropping out at senior postsecondary institutions (Bers & Schuetz, 2014; Clark, 1960; Doughty, 2001; Hilmer, 1997; Roderick, Nagaoke, & Coca, 2009). At the community college level, such students do not leave behind their family, community, and work responsibilities and integrate into their new education community. They may build new relationships at community college, but they typically maintain the familial, community, and work relationships that they brought with them (Adelman, 1999; Bailey & Alfonso, 2005; Bean & Metzer, 1985; Horn & Carroll, 1998; Matross & Huesman, 2002; Myran, 2013; Myran & Ivery, 2013; Pascarella & Terenzini, 1991). There may be new engagements and experiences in the community college environment. However, the bonds and attractions of family, friendships, and colleagues often remain an everyday aspect of the student's lives. Community college students may learn new things, but their way of thinking often remains akin to the environment in which they were raised and continue to live. In other words, their knowledge and skill sets may expand, but their mentality and thinking may remain essentially unchanged. The attraction of the community college student's family, community, and work often transcends any connection or integration made while on campus (Bailey & Alfonso, 2005; Bean & Metzner, 1985; Horn & Carroll, 1998; Myran, 2013; Myran & Ivery, 2013; Pascarella & Terenzini, 1991).

At senior institutions, the integration of the traditional student into the new environment, and the typically slow and inexorable reduction of the bonds that attract the student back home, allow and encourage the building of new relationships and the exposure to new ideas and ways of seeing the world. Students' underlying values may not fundamentally change. However, their attitudes evolve with the socialization that takes place over four or more years of undergraduate education and experiences that historically take place without the day-to-day distractions from home (Bailey & Alfonso, 2005; Bean & Metzner, 1985; Horn & Carroll, 1998; Myran, 2013; Myran & Ivery, 2013; Pascarella & Terenzini, 1991).

The pressure to persist for senior postsecondary students is often more acute than for community college students. Stopping and dropping out of a senior postsecondary institution is typically perceived as a failure by the administration, faculty, and students (Astin, 1991; Barefoot, 2005; Bean & Metzner, 1985; Chen & Markle, 2015; Pascarella & Terezini, 1991; Tinto, 1975). A stopped out or dropped out student results in the student leaving the college community, potentially never returning. In contrast, community college students typically remain in their communities whether they persist in their education or not. Community college was often an extension of their existing lives (Adelman, 1999; Bailey & Alfonso, 2005). In life, where adults must juggle many competing demands for time, attention, and resources, difficult decisions must be made. The community college student’s perceived cost of leaving community college pales in comparison to family concerns, job requirements, and financial matters (Adelman, 1999; Bailey & Alfonso, 2005; Bean & Metzer, 1985; Goldrick-Rab & Pfeffer, 2009; Horn & Carroll, 1998; 2009; Matross & Huesman, 2002; Pascarella & Terenzini, 1991).

Additionally, whereas senior postsecondary students leave their academic and peer support structure behind when dropping out, community college students remain embedded in their community, with one less requirement absorbing time from their busy schedule (Adelman, 1999; Bailey & Alfonso, 2005; Bean & Metzer, 1985; Goldrick-Rab & Pfeffer, 2009; Horn & Carroll, 1998; Matross & Huesman, 2002; Pascarella & Terenzini, 1991).

It is evident that the perceived costs of stopping and dropping out of college are significantly different between the senior and community college level (Adelman, 1999; Bailey & Alfonso, 2005; Bean & Metzer, 1985; Horn & Carroll, 1998; Matross & Huesman, 2002; Pascarella & Terenzini, 1991). At the senior postsecondary level, dropout is often a life event; at the community college level, it is sometimes a consequence of life (Adelman, 1999; Bailey & Alfonso, 2005; Bean & Metzer, 1985; Horn & Carroll, 1998; Matross & Huesman, 2002; Pascarella & Terenzini, 1991). Therefore, the financial costs and perceptions are very different between the two groups. Community college students can easily view their decision as a stop-out (Adelman, 1999; Bailey & Alfonso, 2005; Bean & Metzer, 1985; Horn & Carroll, 1998; Matross & Huesman, 2002; Pascarella & Terenzini, 1991). The barriers to returning to the classroom include a moderate tuition payment and a time commitment paid when classes begin (Denning, 2017; Heller, 1997; Shapiro & Yoder, 2021). The same cannot be said of senior institutions, where a reapplication and review process take place, overshadowing a real possibility of rejection from the community to which the student was trying to return. The institutional barriers and hurdles of reenrolling in a senior institution after stopping or dropping out can be high but pale considering student expenditures on housing, book,

and tuition costs without earning a bachelor's degree. The bachelor's degree is the credential correlated to higher monetary compensation in the workplace and provides the return necessary to compensate for the years of deferred earnings and educational outlays (Rendon, 1993; Rendon, 2004; Selingo, 2017; Quigley & Bailey, 2003).

How stopped out and dropped out are perceived and treated between two and four year institutions and students is significantly different and may influence how each sector's students behave concerning these outcomes (Adelman, 1999; Bailey & Alfonso, 2005; Bean & Metzer, 1985; Datray, Saxon & Martirosyan, 2014; Horn & Carroll, 1998; Matross & Huesman, 2002; Pascarella & Terenzini, 1991). For senior institutions and students, it is the story of their journey through higher education. For community colleges and their students, it is the journey through life. Thus, because of these apparent differences between sectors, the ability of full and part time instructors to influence positive retention outcomes in the community college sector cannot be assumed to be similar to the four-year college sector and requires further investigation.

Researchers have found that community college student outcomes indicators vary considerably between states, such as graduation and transfer to senior institutions (Jacoby, 2006; Jenkins & Fink, 2016). New Jersey provides an ideal setting for studying the association of part time faculty with student outcomes in the public community college sector. New Jersey is a relatively small state nestled within the Northeast megalopolis. The long axis of the state from Cape May City in the far south to Montague Township in the far north is traversable in less than four hours of travel by auto (Google Maps, 2021). Additionally, New Jersey provides a uniform state public policy forum that allows public colleges and universities considerable freedom in governance and decision

making. The freedom of colleges to make substantive independent decisions allows considerable variation in institutional operations while adhering to uniform state education statutes and laws. Research has shown that institutional characteristics and practices are associated with student success outcomes and require examination in greater detail (Datray, Saxon, & Martirosyan, 2014; Jenkins & Fink, 2016).

The New Jersey Context

In addition to addressing part time faculty and student success at the national level, reviewing the New Jersey community college public policy driving part time faculty is necessary to inform decision makers. Initially, the expectation in the New Jersey statute was that the state, county, and student would each pay a third of the community college tuition costs (Nespoli & Farbman, 2010). This noble goal was never achieved, and in recent years the state, counties, and students pay 14%, 21%, and 61% of the tuition, respectively (NJCCC, 2016). In the last eight years, the state credit rating had been lowered eleven times (Rizzo, 2017), while counties were held to 2% budget increases annually (Heininger, 2010). The result was that New Jersey community college students had been paying a higher percentage of their education costs than any time in the past three decades (NJCCC, 1995; 2016).

To address this historical imbalance, New Jersey Governor Phil Murphy proposed free community college education for state residents (Inside Higher Ed, 2018) but had to settle for mandating free community college education for families with gross incomes of $65,000 or less (HESSA, 2021). The impact of the Garden State Guarantee tuition program remains to be seen, as the targeted student cohort presently received considerable federal and state grant funding that must be used before the Garden State

Guarantee program kicks in. However, students with gross family incomes between $65,001 and $80,000 also benefit from the program on a sliding income scale (HESSA, 2021).

With the state and counties stressed about providing additional financial resources to community colleges, the students and their ability to pay often determine access to higher education. Since the expense of education is significantly higher with full time relative to part time faculty, the relationship and cost effectiveness of part time faculty on community college student success is as important as it is relevant. The choices made by policy makers may be a choice of lesser evils; the loss of students due to employing part time faculty versus the loss of students by pricing them out of higher education.

Significance Of This Dissertation

Several studies on adjunct faculty have been conducted at the institutional level using the Integrated Postsecondary Data Sets (IPEDS), often focusing individually on the student success indicators of graduation, graduation net of transfers, or retention. The literature on adjunct faculty provides limited examples of combining IPEDS graduation and graduation net of transfer into one study (Jacoby, 2006). However, there are few institutional level studies on adjunct faculty exploring IPEDS graduation, retention, and transfer as distinct and interrelated outcomes. This dissertation adds to the existing literature by examining all four IPEDS student success outcomes - graduation, graduation net of transfer, transfer, and retention - while accounting for institutional, student, and county social context variables. Furthermore, this dissertation is unique in that it incorporates many years of student right to know information available to explore the

association of retention to graduation by adding retention as an independent variable to the equation.

The transfer component in IPEDs is commonly used to adjust to graduation, not penalizing institutions for students who transfer. As Jacoby (2006) did in his research, this dissertation examines graduation outcomes with transfers both in and removed from the variable. This dissertation extends the research in the higher education field by examining transfer as a dependent outcome of the institution and its operations, including the ratio of part time faculty to all faculty. At present, where transferees go is not tracked by IPEDS; students can transfer to senior postsecondary institutions, other community colleges, and postsecondary trade schools and be counted as transfers. Though the transfer statistic is unclear as to where the students had transferred to, that the student did transfer is essential information considering the lack of information on students who stopped or dropped out of institutions. Examining the association of part time faculty with all four student success outcomes expands the field of research while providing community college research practitioners with a framework for tracking student outcomes to furnishing institutional decision makers with practical insight for improving those outcomes.

Statement Of The Problem

States, counties, and community colleges struggle with making tough resource allocation decisions. Decision makers must identify and understand the relationship with student outcomes, if any, from increasing numbers of part time faculty. In the extreme, if we can serve students at lower costs by using more significant numbers of part time faculty, the students fail to succeed at the same rates as before. Resources may be wasted

from a budgeting perspective. Hiring significant numbers of part time faculty has not been thoroughly analyzed at the institution-student outcomes level, and decisions are being made based on budgeting and operations without consideration of the education services and student outcomes produced. While attempting to save money, the money spent may return marginally less educational products than before. In other words, community colleges may be spending less but are receiving lesser returns measured by student outcomes for each dollar spent. This dissertation addresses whether the use of part time faculty is associated with student outcomes and attempts to answer the question of what, if anything, taxpayers and students are losing from substituting part time instructors for full time instructors.

Research Questions

When controlling for the academic, institutional, student body, and county characteristics, which are defined and discussed in detail in Chapter 3, the research questions posed in this dissertation include:

1) Is the ratio of part time faculty at New Jersey community colleges associated with first time full time (FTFT) and first time part time (FTPT) student fall to fall retention rates?

2) Is FTFT student retention a statistically significant independent variable when regressing the ratio of part time faculty against FTFT student three year graduation rates net of transfer students?

3) Is the ratio of part time faculty associated with FTFT student graduation rates when retention rate is included as an independent variable?

4) Is the ratio of part time faculty associated with FTFT students three year transfer rates without receiving a degree or certificate?

Conceptually, student retention should be strongly and significantly associated with student graduation; one must be retained to graduate (Attewell, Heil, & Reisel, 2012; Astin, 1997; DesJardins, Ahlburg & McCall, 1999; Bailey, Crosta, & Jenkins, 2007). This dissertation attempts to answer whether the percentage of part time faculty is associated with FTFT student retention, as stated in research question 1, and whether FTFT student retention is associated with student graduation, as stated in research question 2 (Calcagno & Jenkins, 2007). Research question 3 examines whether the ratio of part time faculty to all faculty is associated with student graduation after accounting for the influence of student retention. Research question 4 asks if the ratio of part time faculty is associated with FTFT transfer without receiving a community college credential.

Methodological Approach

Based on the previous research, with mixed findings regarding the use of part time instructors and the need to improve community college student retention and graduation, this dissertation investigates whether the ratio of adjunct or part time faculty is associated with student retention, transfer, and certificate/degree attainment. Recent studies examining community college part time faculty and the effect on student outcomes employ the student as the unit of analysis. The advent of large student survey data sets allows for the testing of many variables with a vast number of observations, thereby increasing the robustness of the regressions and providing greater confidence in the coefficient estimates (Cofer & Somers, 2001; Martin & Somers, 2002). This

dissertation uses higher education institutions as the unit of analysis. It incorporates Integrated Postsecondary Educational Data System (IPEDS) information in concert with other data sources to explore how adjunct faculty are associated with institutional level student outcomes using linear regression.

According to Jacoby (2006), there were three reasons for performing research on the relationship between part time faculty and student success with institutions as the unit of analysis: higher education institutions were being held accountable for student success, including graduation rates; institutions make the hiring decisions and choose the composition of full and part time instructors; and accurate information concerning part time faculty is found at the institutional level. Additionally, data and information required to perform institutional level analysis were available after almost 20 years of the National Center for Education Statistics (NCES) collecting student "right-to-know" information via the Integrated Postsecondary Data System (IPEDS).

Institutional level analysis in New Jersey serves multiple purposes. Student level data does not capture the complex characteristics of institutional decision making on student outcomes. Though "dummy" intercepts and variables may capture differences between institutions, there is little explanation for the underlying causes of those differences. The use of institutional level analysis allows the focus to be placed on institutional decision making and its association with student outcomes. Limiting the dissertation to New Jersey community colleges ensures that the state policy environment is uniform; however, higher education was decentralized in New Jersey in 1994, allowing considerable autonomy in institutional decision making and consequently considerable variation in institutional approaches and operations within the common framework of the

state's higher education public policy. Since this dissertation uses New Jersey community colleges as the unit of analysis, the data set was limited to 19 New Jersey community colleges. The 19 community colleges were studied across multiple years using a statistical technique called panel data to provide a more significant number of observations, increasing the statistical degrees of freedom (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). Panel data combines multiple time periods and observations within one data field (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). The more significant number of observations relative to the number of independent variables being estimated provides greater degrees of freedom, making the coefficient and statistical estimates more robust and stable (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012).

The next chapter expands upon the instruction and student success literature. Chapter 3 contains the dissertation methodology. Chapters 4 and 5 include the findings and conclusions, respectively.

Chapter 2

Literature Review

The Study Of Student Success In Higher Education

This dissertation addresses the rise of part time faculty in the community college sector. It investigates its association with student success, defined as a first time full time (FTFT) and first time part time (FTPT) student retention, FTFT student transfer, and FTFT student graduation. The use of part time or adjunct faculty is not isolated to the community college sector; higher education, in general, has experienced rapid growth in part time instructors. The primary concern is the association part time faculty has on student outcomes in a sector that serves students prone to stopping and dropping out due to various and often overlapping student risk characteristics. This research explores whether the utilization of part time faculty as a ratio of all faculty is associated with FTFT and FTPT student retention, FTFT student graduation, and FTFT student transfer.

The study of retention and graduation is well documented at four-year colleges and universities. The student retention and graduation models used in senior institution studies were adapted for early community college studies, with varying degrees of success. But evidence exists that community college student populations differ from those at senior institutions (Bailey & Alfonso, 2005). While matriculated students at four-year colleges and universities generally were degree seeking and goal oriented, community college students had different motivations, aspirations, and academic preparation (Dowd, 2005). Many of the characteristics of community college students were like Bean and Metzner's (1985) model of senior institutions' nontraditional students; they were older, did not live on campus, attended part time, and were not overly

influenced by the social environment of the institution, and were primarily concerned with the academic offerings. Bean and Metzner (1985) argue that nontraditional students had more contact with the external environment around the college and less contact with the college itself. Many community college students were similar to drop-in students at senior institutions who center their lives on work and family and treat their academics as a secondary endeavor. Drop-ins work long hours, take fewer credits, pay their tuition, and do not get involved in school activities. Drop-ins also stopped out multiple times in their academic careers, and they had a much higher probability of dropping out and failing to complete their degrees (Matross & Huesman, 2002). Not surprisingly, students who dropped out of their first institution of higher education and did not enroll elsewhere in five years were older, worked full time, and were less academically integrated (Horn & Carroll, 1998). Pascarella and Terenzini (1991) further elaborate that the persistence of commuter students had no relationship to their social integration on campus and that nontraditional students at four-year institutions were defined by their lack of social integration.

The similarities of community college students to these nontraditional commuters and drop-in students led Adelman (1999) to radically redefine community colleges' outcomes as transfer to and graduation from senior institutions; earning a terminal associate degree; earning a certificate in a coherent course of study; and completing a sufficient degree of program course work to achieve one's goals. Adelman (1999) went as far as to recommend that the significant number of community college students who drop out without earning any credits should be discounted from outcomes calculations. Such

students were incidental, and Adelman (1999) unsuccessfully argued for their exclusion from the community college institutional outcomes and effectiveness analysis.

However, several of Adelman's recommendations were adopted for measuring community college outcomes, including transfer and certificate completion, and are in common use today in community college student outcomes research (Bettinger & Long, 2005; Datray, Saxon & Martirosyan, 2014; Eagan & Jaeger, 2008a; 2008b; Ehrenberg & Zhang, 2004; Gross & Goldhaber, 2009; Harrington & Schibik, 2001; Jacoby, 2006; Jaeger & Eagan, 2008; 2009; Jaeger & Hinz, 2008; Kehrberg & Turpin, 2002; Ronco & Cahill, 2004; 2006; Umbach, 2007). The community college student outcomes research may be divided into student level and institutional level studies. Student-level studies had been more plentiful due to the greater availability and depth of student survey data. Regardless, institutional level research may offer insight and understanding into student outcomes and enlighten educational researchers and practitioners about how institutional actions relate to student outcomes (Datray, Saxon & Martirosyan, 2014; Jacoby, 2006; Jenkins & Fink, 2016).

Background On Community Colleges

The advantages of a community college education relative to four-year colleges and universities were well documented in the literature. Community colleges offer open enrollment programs, nationwide access, and competitive tuition relative to public and private senior postsecondary institutions (Culp, 2005; Jacobson, 2005; Rouse, 1998; NCES, 2014; Wyner, 2014). Public, private, and for-profit two-year colleges account for 1,050 institutions, enrolling 41% of all college students (AACC, 2020; Snyder, de Brey & Dillow, 2016). Community colleges serve a significant portion of postsecondary

students. According to the American Association of Community Colleges (2020), 6.8 million students enrolled in two-year colleges in fall 2018.

Community colleges provide flexible scheduling that allows students to make academic progress while employed (Kane & Rouse, 1999; Remenick, 2019). Community college attendance and employment are more complementary, while enrollment and work at senior institutions are discouraged except for work-study programs (Molitor & Leigh, 2005). This is significant and important as 62% of full time and 72% of part time community college students work (AACC, 2020). In contrast, the typical four-year student attends college as their primary focus, while other considerations, such as work, are secondary (Glass & Bunn, 1998; Remenick, 2019). Moreover, the opportunity to live at home was cited by 63% of students as a "somewhat or very important" reason for attending a two-year college compared to 25% of those attending a four-year college (Reynolds, 2009).

Attendance at a four-year college or university typically requires academic preparation, physical access to the campus and classroom, and financial resources (Gleezer, 1998; Wyner, 2014), which excludes many higher education aspirants. Due to open admission policies and lower attendance costs, public two-year institutions enroll a high percentage of first generation college students, individuals from low income households, older students, students of color, and female students (Bers & Schuetz, 2014; Cohen & Brawer, 2003; Horn & Nevill, 2006; Horton, 2015; Kuh et al., 2006; Wyner, 2014). Nevertheless, community colleges also serve a diverse clientele, including developmental and high achieving high school students concurrently enrolled in secondary and postsecondary education (Bailey & Morest, 2006; Chen, 2016; Grubb,

1991; Morest, 2006). For many low-income and academically underprepared students, higher education was the choice between community college enrollment or not attending higher education (Roderick, Nagaoke, & Coca, 2009; Wyner, 2014).

Community colleges are also critical for providing opportunities for academically underprepared and lower socioeconomic students to move into the education and economic mainstream by providing pathways to a bachelor's degree (Bowen, Chingos, & McPherson, 2009; Carnevale et al., 2018; Carnevale, Strohl, & Smith, 2009; Handel & Williams, 2012). The Community College Survey of Student Engagement (2017) reports that first generation community college students spend significantly more time caring for dependents. They were also less likely than their peers to have had senior institution transfer intentions and more likely to aspire to improve their job skills.

Higher education access close to home encourages women who are traditionally caregivers to enroll in community college at greater rates than men, though they were less likely to transfer to a four-year college (St Rose & Hill, 2013; Surette, 2001). Community college access allows Hispanic students to remain close to home, ultimately completing bachelor's degrees at the same rate as Hispanic students who initially enroll at four-year colleges and universities (Gonzales & Hilmer, 2006). Moreover, community college access allows students, especially economically disadvantaged students, to transfer to higher quality four-year institutions than had been initially possible (Hilmer, 1997; Wyner, 2014).

State governments previously encouraged attendance at two-year colleges due to the significantly reduced per-capita subsidies relative to senior institutions, even if the student attends for just a semester or a year before transferring (Anderson et al., 2006b;

Rouse, 1998). Consequently, states encourage initial community college enrollments through mandated articulation agreements between two and four-year institutions, and many educational institutions have adopted written course and credit transfer policies to encourage transition between junior and senior institutions (Anderson et al., 2006b; Ignash & Townsend, 2000). The history of the public community college sector is an ongoing endeavor to provide access to higher education at an affordable cost to both government and the student.

History Of Community Colleges

At the turn of the 20th century, the idea of dedicated colleges providing the first two years of higher education received attention among university theorists and leaders. In 1901, Joliet Junior College became the first public two-year college founded by the University of Chicago as a "feeder" institution that transferred students after completion of the second year of study (Cohen & Brawer, 2001; Witt, Wattenbarger, Gollattscheck, & Suppiger, 1994; Witt et al., 1994). Public junior colleges multiplied dramatically in the mid-west and south after World War I. Before that period, junior colleges were predominantly privately run institutions. Transfer of two-year graduates into the university system became more common, with three-quarters of the two-year college curricula focusing on liberal arts programs (Cohen & Brawer, 2003; Gleazer, 1968; Koos, 1924). Junior colleges proliferated and received an additional boost when funded by New Deal legislation during the Great Depression. After World War II, the GI Bill introduced millions of returning veterans to attend college, which generated rapid growth in the number of community colleges (Beach, 2012; Brubacher & Rudy, 1997; Grubbs, 2020). Two-year colleges took responsibility for the first and second years of liberal arts

education, permitting senior institutions to specialize in the junior and senior level courses (Cohen & Brawer, 2003; Grubbs, 2020; Lucas, 1994).

In the late 1940s, the Truman Commission popularized community college, quickly replacing junior college as the naming convention (Burke, 2008; Witt et al., 1994). In 1947, the Truman Commission released *Higher Education for American Democracy*, recommending expanding the two-year college system to offer the first half of a four-year education. The report made transfer and articulation a topic of interest in higher education (Anderson, Sun, & Alfonso, 2006; Kintzer, 1996) because junior colleges provide access to higher education for students who are not able to go directly to four-year institutions (Bird, 1956; Laanan, 2001). Cooperation between junior and senior institutions to build transfer policies is critical because of the need for pathways to bachelor programs. Scholars termed this the democratization effect, a figurative Ellis Island of Higher Education that provides an entryway for people unable to attend traditional college access to a four-year education through the community college system (Rouse, 1995; Wyner, 2014).

Clark (1960) provided a different perspective, describing community colleges as institutions where students' unrealistic expectations for higher education were rechanneled into vocational programs or as required, students were culled from their transfer programs through a lack of academic momentum, which he termed cooling out. The cooling out theory gained credence in the 1970s when the community college sector refocused its mission to include vocational education, often supplanting instead of supplementing the focus on transfer students and programs (Brint & Karabel, 1989; 1991; Doughty, 2001). The cooling out theory persists into the current era, with Doughty (2001)

stating that community colleges cool out mostly economically disadvantaged students and contribute to social inequality.

Specifically, community colleges impeded social mobility and educational opportunity for women and students of color (Brint & Karabel, 1989; Doughty, 2001). Nevertheless, Rouse (1995) and Wyner (2014) argue that community colleges provide greater access to education for millions of students, far exceeding the number diverted from attending four-year colleges and universities. Ultimately, Rouse (1995) and Wyner (2014) see community colleges providing greater overall educational attainment, though not necessarily increasing the probability of students attaining a bachelor's degree.

The Rise Of Part Time Faculty

The 1972 Carnegie Commission on Higher Education Report warned of future declines in enrollments and government funding for higher education. The Commission recommended using part time faculty to address these projected stressors. Additionally, researchers began recommending the separation of the teaching, student advising, and assessment instructor roles so that the community college professoriate could focus on teaching, thereby imparting greater utility to part time instructors (Gehrke & Leslie, 2015; Troutt, 1979). Three years after the Commission recommendations, part time faculty rose from 40% to 55% of all community college faculty (Gappa & Leslie, 1993; 2008).

Twenty years after the 1972 Carnegie Commission on Higher Education Report, part time faculty had become a financial necessity, teaching close to half of all community college course offerings (Lustig, 2002). Part time faculty provided higher education administrators the ability to react quickly and economically to changing

enrollments, the demand or lack thereof for specific courses and training, and responsiveness to unpredictable government appropriations (Lustig, 2006). Currently, the use of part time faculty has permeated the community college sector to the extent that 60% to 70% of all courses taught use part time faculty (Liu, 2007; Snyder, de Brey, & Dillow, 2016).

Part Time Faculty

The United States Department of Education (2013) reports that by the fall of 2013, there were 1.5 million higher education professors and instructors working in degree granting institutions, equally divided between full time and part time educators. In the twenty years between 1991 and 2011, total faculty grew by 84%, with growth occurring unevenly between full time faculty (42%) and part time faculty (162%). Part time faculty grew four times the rate of full time faculty (NCES, 2013). The disproportional increase in part time faculty was driven by constrained funding for higher education, resulting in the substitution of full time faculty with part time or adjunct professors. (Ehrenberg, 2002; Gappa & Leslie, 1993; Jacoby, 2001; Leslie & Gappa, 2002). Consequently, almost 70% of community college instructors received few benefits and no assurance of continued employment (Eagan, Jaeger, & Grantham, 2015; Rhoades, 2013; Yablonski, 2014).

Part-time instructors in higher education may also be traced to the segmentation of traditional professorial responsibilities into discrete job functions performed by specialized professionals. Traditionally, instructors teach, advise, build curriculum, and assess outcomes. More recently, these functions have been compartmentalized into discrete employment specialties (Paulson, 2002; Smith, 2010). Troutt (1979) was an early

proponent for unbundling the teaching-assessing-advising roles of community college instructors, thereby allowing specialization and focus on core competencies and subsequently permitting a greater focus on teaching and pedagogy (Baldwin & Chronister, 2001). Nevertheless, the unbundling of professorial responsibilities provided cost advantages to higher education, resulting in continued efforts to parse job responsibilities for greater efficiencies (Jewett, 2000; Pathak & Pathak, 2010; Paulson, 2002; Schuster & Finkelstein, 2006). The splintering of professorial job responsibilities has contributed to more significant numbers of part time instructors teaching subject matter, often using standardized syllabi and course materials to maintain subject matter integrity and standardize learning outcomes (Bess, 2000; Datray, Saxon, & Martirosyan, 2014; Paulson, 2002; Smith, 2008; 2010).

In the new millennium, the number of part time faculty increased in all sectors of higher education (Knapp, Kelly-Reid, & Ginder, 2010). The rise in part time employment was higher education's response to the need to be more economically efficient in the face of decreased government funding and increased competition for students between and within all higher education sectors (Rhoades, 2013; Slaughter & Rhoades, 2004). The trend has been particularly evident in the community college sector, where fiscal pressures on government financing had been particularly acute while calls for greater institutional accountability increased (Levin, 2007; Smith, 2007). The increased cost of higher education that was not covered by government subsidies results in a decrease in consumption of higher education services by students; particularly so for community college students, who, in general, come from lower socioeconomic strata and were, therefore, more cost sensitive then four-year students (Denning, 2017; Heller, 1997;

Leslie & Brinkman, 1987; Shapiro & Yoder, 2021). In other words, an increase in the cost of a community college education had a more significant negative enrollment result than a comparable cost increase at four-year colleges and universities.

One strategy for addressing the constrained funding situation has been employing adjunct faculty as a cost saving measure (Eagan & Jaeger, 2008a; 2008b; Ehrenberg & Zhang, 2004; Jenkins & Rodriguez, 2013; Rhoades, 2013). Higher education is a low-productivity industry, which means there is little ability to increase academic output without decreasing the quality of the service. The production inputs, predominately the professor, require a high wage to bid his talents away from other employment. Consequently, with education output relatively constant and wages of highly educated laborers rising, the cost of education in total and by the student has increased dramatically during the last several decades (Archibald & Feldman, 2008; 2014; Baumol, 1967; Baumol & Blackman, 1995; Baumol & Bowen, 1966).

Full time faculty constitute a significant portion of instructional labor costs. With Baby Boomers commonly working past the traditional retirement age, with legal discouragement of age discrimination and mandatory retirement, the direct costs of hiring and giving tenure to full time instructors have increased tremendously (Ehrenberg, 2002). Calculated hourly, adjuncts cost between a third to two-thirds of the full time instructor rate, and adjuncts typically receive no benefits (Akrody & Caison, 2005; Christensen, 2008). Adjunct faculty's reduced wage rate and lack of benefits can reduce typical classroom labor expenses by 80% (NCES 2001). Part time instructors provide considerable institutional flexibility. Adjuncts are needed employees, hired for classroom

work as required and cease employment without financial penalty when the instructional need ends (Rhoades, 2013; Yakoboski, 2014).

According to Ronco and Cahill (2006), adjuncts themselves are not homogenous and may be broken into four major groups: aspiring academics acquiring experience and contacts while waiting for the opportunity for a full time position; professionals and specialists bringing their real world expertise from their primary employment to the classroom; professors who had retired and subsequently teach courses as a precursor to full-retirement; and freelancers who chose to work in many professions. Leslie and Gappa (2002) and AAUP (2009) found that many adjuncts prefer to be part time. Many adjuncts teach as supplemental employment to their full time areas of expertise or as a continuation of their teaching career after retirement (Bogert, 2004; Snyder, de Brey, & Dillow, 2016; Wallen, 2004). Ran and Xu (2018) and Xu (2018) developed multiple categories for community college professoriate and concluded that employment status was associated with student course outcomes.

Community colleges were traditionally rewarded by increasing enrollments, not improving student success (Juszkiewicz, 2016). The impetus to focus on what is best for students is often overshadowed by maximizing enrollments through recruitment and retention, and after adjusting for instructor expenses, generating net revenues (Juszkiewicz, 2016). Shulock and Moore (2007a; 2007b) assert that tuition, fees funded by community colleges, and government appropriations are predicated on student enrollments and not student outcomes; the impetus is on recruiting students and not necessarily the students' success (Juszkiewicz, 2016). Morest and Jenkins (2007) found that many community college administrators do not review student outcomes or the

relationship between institutional programs and services on student outcomes. Existing institutional programs for improvement, such as program review, budgeting, and strategic planning, do not focus on improving student learning outcomes or programs that may contribute to student success (Habley & McClanahan, 2004). In short, the ratio of full to part time faculty and any effect on student outcomes has not been a significant concern for many community college administrators.

Business principles and decision making based on income and expense have superseded the philosophy and practice of student learning traditionally espoused by higher education in the United States (Kezar, 2004; 2019; Slaughter & Rhoades, 2004). The business of higher education has reached a stage where education and knowledge are treated as a commodity that is produced and sold like any other service (Slaughter & Rhoades, 2004).

Part Time Vs. Full Time Faculty

There are many salient differences between full time and part time faculty. Baldwin and Wawrzynski (2011) concluded that part time and full time faculty (both tenured and non-tenured) differ significantly in their teaching methods and practices. Benjamin (2002) concluded that part time faculty utilize teaching methods less demanding than their full time colleagues, and part time instructors were often unavailable to students outside of the classroom. Umbach's (2007) research shows that part time faculty spend less time preparing for class, interacting with students, using innovative pedagogical techniques, and advising students compared to full time faculty. The degree of difference was dependent on the institutional classification. In addition, research has shown that, in general, part time faculty rarely apply culturally sensitive

teaching methods, do not embrace student centered and active learning principles, and are less progressive in their pedagogy than full time instructors (Baldwin & Wawrzynski, 2011; Banachowski, 1996; Jacoby, 2006; Kezar & Gehrke, 2013; Umbach, 2007).

Moreover, part time instructors typically had less teaching experience, spent less time preparing for class, were not as well credentialed, and were exposed to fewer professional development opportunities (CCSSE, 2018; NCES, 2006). Halcrow and Olson (2011) and Jacobs (1998) state that part time instructors were used to keep instructional costs low while maximizing the institution's ability to add or subtract courses as required. Part time faculty hold a lower proportion of advanced degrees compared to full time faculty (Eagan, 2007). In community colleges, 23% of full time faculty hold doctorates compared to 15% of part time faculty, though two-thirds of part time faculty hold master's degrees compared to 60% for full time faculty (CCSSE, 2018). While adjunct faculty often bring rich applied experience to programs in which they teach, the increase in adjunct representation in the community college sector often had little to do with teaching, professional experience, or specialty knowledge (Green, 2007; Jacobs, 1998; Levin; 2001, 2007; Wagoner, 2007). Adjunct pay scales were typically well below the prorated salary of full time instructors. They had limited or no health and retirement benefits, no commitment to ongoing employment beyond the semester, and limited support from clerical and professional staff (Brewster, 2000; Gappa & Leslie, 1993; Levin et al., 2006; Levinetal, 2006). In 2003, part time instructors made, on average, $2,836 per class compared to full timers who, on a prorated basis, made $10,563 per class (NEA, 2007). Only 20% of part time instructors received institutional pension contributions, and 17% received subsidized health insurance, compared to well over 90%

of full time instructors in both categories (Salzman, 2000). Employment restrictions on the number of classes and credits taught had been imposed by institutions attempting to avoid the national health benefits requirement imposed after attaining a 29 hour work week (Keller, 2014). Based on prep time for classes and any institutional administrative requirements, teaching three classes could require expenditure for expensive institutional health benefits, a threshold that many administrators were careful not to exceed (Keller, 2014).

Part time instructors were poorly integrated into the college culture and life (Brewster, 2000). Part time faculty were usually on campus only during class periods and therefore were not involved in college activities, policies, and curriculum decisions (Brewster, 2000). CCCSE (2014) and Grappe and Leslie (1997) state part timers were not available to work on committees, counsel and advise students, or keep office hours. The lack of part time instructor engagement in the college community places greater non-classroom demands on full time instructors, creating more significant stressors on the educational process and inter-instructor relations. Within higher education, academics typically view greater reliance on part time faculty as harmful to program quality (CCCSE, 2014; Haeger, 1998).

For most community college students, the classroom experience was their primary contact with the institution, placing the instructor as both educator and primary representative of the college (Bailey & Alfonso, 2005). Due to the importance of instructors as educators and the student's primary contact with the college, understanding the association of part time faculty with student success outcomes is of paramount concern. Adjunct commitment to student learning was questionable when two-thirds of

part time faculty were working on a semester long contract (CCCSE, 2014; Gappa & Leslie, 1997). The same proportion of adjuncts typically receives only three weeks' notice of a class assignment, thereby limiting time for class preparation (CCCSE, 2014; Rhoades, 2013; Sweet, Maisto, Merves, & Rhoades, 2012). Moreover, last minute class cancellations and the resulting loss of part time income were common.

A primary concern was that the lack of institutional commitment and integration of adjuncts resulted in several issues. These included adjuncts' lack of commitment to the institution or its culture, isolation from full time faculty, lack of understanding of student progression within academic programs, limited knowledge of student support resources, lack of office or office hours, reduced communication with students outside of the classroom, restricted knowledge of learning theory and pedagogy, lower academic credentials, and in some cases, superficial knowledge of the course material being taught (Benjamin, 2003a, 2003b; CCCSE, 2014; Cross & Goldenberg, 2003; Elman, 2003; Schuster, 2003; Thompson, 2003; Townsend, 2003). In one qualitative study of 20 part time instructors, Jolley, Cross, and Bryant (2013) reported a lack of institutional engagement by instructors and no meaningful assessment of institutional procedures for teaching effectiveness.

Research illustrates many similarities in student engagement between senior institutions and community college populations. Tinto (1997) finds that classroom engagement was a determinant of community college student persistence, supporting his earlier work that social engagement, institutional commitment, and academic engagement at senior institutions were determinants of student retention (Tinto, 1993; 2006). Deil-Amen (2011) and Wortman and Napoli (1996) find that academic and social integration

were associated with community college student persistence, consistent with Tinto's model of student retention. Metz (2005) re-examined Tinto's work and found that community college student involvement had distinct layers and was related to student persistence.

Faculty interaction with students in and out of the classroom has positive associations with student retention, learning, and classroom success (Astin, 1993; Cole & Griffin, 2013; Danley-Scott & Scott, 2014; Eagan, Jaeger & Grantham, 2015; Felten et al., 2016; Gantt, 2010; Kezar & Maxey, 2014; Kuh, 2003; Kuh & Hu, 2001; Pascarella & Terenzini, 2005; Schreiner et al., 2011; Tinto, 2006). The quality of the student-teacher interaction in and outside of the classroom has been tied to higher grade point averages (Anaya, 1992; Anaya & Cole, 2001; Carini, Kuh, & Klein, 2006; Gantt, 2010) and subsequently to retention and degree completion (Braxton, Bray, & Berger, 2000; Kezar & Maxey, 2014; Lundquist, Spalding, & Landrum, 2003; Wang & Grimes, 2001). These implications were even more significant for first generation students and students of color (Allen, 1992; Amelink, 2005; Anaya & Cole, 2001). Social capital theorists assert that lower socioeconomic and first-generation college students benefit from developing relationships with college employees; students have considerable exposure to instructors in class and can benefit from those relationships outside of class (Gupta, 2007; Moschetti, 2014; Saunders & Serna, 2004). Nakajima, Dembo, and Mossler (2012) found that student interaction with faculty is correlated with classes and credits taken, which was an indicator of student success outcomes.

Even so, part time instructors are less integrated into the college community and therefore were less accessible to their students (Schuster, 2003; Umbach, 2007). This lack

of student access to part time instructors outside of the classroom results in reduced student-teacher interaction and engagement (Cotton & Wilson, 2006; Kezar & Maxey, 2014; Milem & Berger, 1997; Schreiner et al., 2011; Tinto, 2006; Umbach, 2007). This, combined with adjunct's poor knowledge of and participation in college support services, has negative implications for learning and success (CCCSE, 2014; Kezar & Maxey, 2014; Kuh, Kinzie, Schuh, & Whitt, 2005). Benet and Walters (2016), Kuh and Hu (2001), and Tinto (2008) assert that low socioeconomic students, who make up a large percentage of community college enrollments, were best served in structured learning communities that take advantage of classroom and non-classroom college experiences. Similarly, Ryan (2012) found in a limited study of 14 class sections that students receiving intrusive advising from their instructors had higher grade point averages and retention rates into the next semester than students who did not.

In addition, the lack of adjunct participation outside of the classroom separates academic and student affairs services, and that separation has been demonstrated to be harmful to student learning (CCCSE, 2014; Kezar & Lester, 2009). Umbach and Wawrzynsky (2005) concluded that faculty matter and were a primary and central part of the student's education experience. Faculty behavior influences engagement and, consequently, learning. In essence, full time faculty had the time and experience to engage, motivate, and educate students. The importance of instruction is relevant considering community colleges' open enrollment, which often results in academically underprepared and economically challenged nontraditional students (Bailey & Alfonso, 2005; Cohen & Brawer, 1996; Wyner, 2014).

Student Retention And Persistence At The Senior Institutions

Student retention and persistence were common indicators of college-level student success (Astin, 1993, 1997; Tinto, 2006). To graduate from college, persistence, retention outcomes, and continued progress were necessary (Complete College America, 2017; Horn, 2009). A required level of academic activity and progression, often labeled as academic momentum, must be maintained to earn a degree (Adelman, 1999; Complete College America, 2017). Stopping out, even once, places students at greater risk of stopping out in the future (Crosta, 2014; DesJardins, Ahlburg & McCall, 1999; 2006). However, higher levels of student retention have been linked to elevated levels of institutional performance (Astin, 1997; Calcagno et al., 2008; Datray, Saxon & Martirosyan, 2014; Horn, 2009; Jaeger & Eagan; 2011).

How well colleges and universities provide student support services positively correlates with student retention and degree completion (Felten et al., 2016; Lundberg, 2014; Nasr & Jackson-Harris, 2016; Pascarella & Terinzini, 1991). Advising, counseling, and student support services have been identified as factors that drive student retention. Students who left college before graduation had poor perceptions of advising and support services (Astin, Korn & Green, 1987; Felten et al., 2016). At four-year colleges and universities, students who left the institution were less satisfied with counseling services than students who persisted (Mohr, Eiche & Sedlacek, 1998; Willcoxson, Cottor, & Joy, 2011). In summary, contact with institutional representatives was a factor in achieving student success and must be encouraged and supported (Felten et al., 2016; Lundberg, 2014; Nasr & Jackson-Harris, 2016).

Additional institutional factors contributing to student retention and persistence include enhanced pedagogy and learning and effectiveness in enabling students to attain their educational goals (CCCSE, 2014; Kezar & Gehrke, 2013; Noel et al., 1985; Tinto et al., 1994). Teaching quality and rigor in introductory classes are positively associated with student success in subsequent classes (Carrell & West, 2010). Consequently, recommendations were made to assign as many full time faculty as possible to those courses to shape the critical first year student experience (Harrington & Schibik, 2004; Ronco & Cahill, 2004; Carrell & West, 2010). Early student exposure to adjunct faculty was associated with lower student success and retention (Harrington & Shirbeck, 2004; Jaeger & Hinz, 2008; Kehrberg & Turpin, 2002; Ronco & Cahill, 2006). Specifically, increasing levels of first semester exposure to part time faculty decreased student retention in later semesters (Harrington & Schibik, 2004; Ronco & Cahill, 2004). However, in other studies, adjuncts are positively associated with future course sequence enrollment within specific majors such as engineering and education (Bettinger & Long, 2004; Bettinger & Long, 2010). Additionally, Jaeger and Eagan (2011) identified two intensive doctoral institutions where part-time faculty was positively associated with student retention. Both universities made significant efforts to support adjunct instructors with support services and other institutional resources (Jaeger & Eagan, 2011).

Senior Postsecondary Similarity To Community Colleges

The study of persistence and retention is well documented at four-year colleges and universities. The models of student persistence and retention at senior institutions were often adapted to community college populations, with varying degrees of success. But evidence exists to argue that community college student populations are quite

different from student populations at senior institutions (Bailey & Alfonso, 2005). However, some senior postsecondary students approximate the characteristics of community college students. Bean and Metzner (1985) and Webber (2014) point out that senior institutions had nontraditional students with greater contact with the outside community and less with the college itself. The community college cohort is very similar to "drop-in" students at senior institutions who center their lives on work and family and treat their academics as a secondary endeavor. Drop-ins work long hours, take fewer credits, pay their tuition, and do not get involved in school activities. Drop-ins stopped out multiple times in their academic career and had a much higher probability of dropping out and failing to complete their degree (Matross & Huesman, 2002). Matross and Huesman's (2002) findings support Horn and Carroll (1998), who found that students who dropped out of their first institution of higher education and did not enroll elsewhere in five years were older, worked full time, and were less academically integrated, characteristics that approximate the community college cohort.

Community College Retention And Persistence

Many characteristics of community college students were akin to Bean and Metzner's (1985) model of four-year college nontraditional students: they were older, did not live on campus, attended part time, were not overly influenced by the social environment of the institution, and were primarily concerned with the academic offerings (Bailey & Alfonso, 2005; Bers & Schuetz, 2014; Dowd, 2005). Community college students had different motivations, aspirations, and academic preparation (Dowd, 2005). The Community College Survey of Student Engagement (2017) reports that first generation community college students spend significantly more time caring for

dependents than their peers. They were less likely to have senior institution transfer intentions and more likely to aspire to improve their job skills. Community college students have unique needs due to their work schedules, commutes, and family responsibilities and consequently experience unusual academic outcomes at the university level (Matti, 2000; McJunkin, 2005).

Consequently, community college retention and persistence statistics can be startling. Approximately 45% of community college students leave without returning in their first three years; over half of these students leave in the first year, predominantly for financial (29%) and family reasons (17%) (Horn, 2009). For those students who persisted for three years, 65% were continuously enrolled, and 35% had stopped out for five months or more at least once during the period (Calcagno et al., 2008). As with senior institutions, academic momentum, persistence, and maintaining good academic standing were imperative for achieving positive student success (Calcagno et al., 2008; Complete College America, 2017; Horn, 2009). Consequently, student persistence across multiple semesters, coupled with a minimum number of stop outs, was associated with student success in course work (Burley, Butner, & Cejda, 2001).

Research on academic support services finds that orientation courses, counseling, assessment and placement, and formal matriculation had a positive association with student success and retention (Bettinger & Baker, 2014; Derby & Smith, 2004; Hatch & Garcia, 2017; Martinez, 2003; Spurling, 2000). These findings were supported by Carroll (1998), who found that persisting community college students had favorable impressions of counseling, by Beverly (1999), who documented retained students' positive opinions of college advisors, and by Martin and Somers (2002) and Hatch and Garcia (2017) who

found a correlation between students discussing career plans with college counselors and a significant increase in persistence. Contact with institutional representatives was a factor in achieving student success and must be encouraged and supported (Bettinger & Baker, 2014; Felten et al., 2016; Hatch and Garcia, 2017; Lundberg, 2014; Nasr & Jackson-Harris, 2016).

Additional research indicates that personal and socioeconomic characteristics were good indicators of retention, including age, work, placement scores, course withdrawal rates, tuition, financial aid, earned credits, GPA, and the community college being the student's first choice of institutions (Allison, 1999; Bers & Schuetz, 2014; Borglum & Kubala, 2000; Denning, 2017; Hippensteel, St. John & Starkey, 1996; Heller,1997; Horton, 2015; Kuh et al., 2006; Starkey, 1994). Using extensive survey databases of the Beginning Postsecondary Student of the National Postsecondary Student Aid Study of 1996, one engagement and ten descriptive variables were associated with retention, including low household income, high household income, no high school diploma, GED, low college GPA, full time work while in college, full time college attendance, tuition, grants, loans, and meeting with an advisor to discuss career plans (Martin & Somers, 2002). Using the same database, Cofer and Somers (2001) found that students over 30 were more likely to persist relative to students between the ages of 22 and 30. Dependent students persisted at higher rates than independent students. Full time students persisted at higher rates than FTPT students. Sophomores persisted over first-year students. Higher GPAs persisted over lower GPAs; degree aspirants significantly persisted over non-aspirants.

Receiving grants, loans, and work study was positively associated with retention, while higher tuition rates were negatively related to retention. Low income students tend to be more tuition sensitive than higher income students, and returning students tend to be more sensitive than first time students (Denning, 2017; Heller, 1996; 1997). African American, Hispanic, and low-income students are more sensitive to tuition changes than White and higher income students. Tuition sensitivity influences enrollment, maintaining enrollment and transfer behavior (Denning, 2017; Heller, 1996; 1997; Hemelt & Marcotte, 2008; 2011; Jackson & Weatherby, 1975; Leslie & Brinkman, 1988; Shapiro & Yoder, 2021).

It is not surprising that some community college research suggests that an increase in the use of adjunct faculty resulted in a decrease in student retention and graduation (Jacoby, 2006; Jaeger & Eagan, 2011; Umbach, 2007). Jaeger and Eagan (2011) find that, after controlling for background characteristics, enrollment traits, prior achievement, and financial aid, there is a significant negative relationship between student retention and exposure to adjunct faculty, with exceptions in institutions with substantial part time faculty development programs. The relationship is particularly acute in introductory and gatekeeper courses (Eagan & Jaeger, 2008a; 2008b). Similarly, Xu (2018) and Ran and Xu (2018) report that adjuncts teaching introductory classes passed students at higher rates and with higher grades than full time and tenured instructors. The adjunct educated student cohorts attempt fewer subsequent classes, and when they do enroll in subsequent classes, they pass at lower rates than other students (Ran & Xu, 2018; Xu, 2018). Many higher education researchers argue that adjunct instructors directly or inadvertently engaged in grade inflation, making students appear more

proficient and accomplished in the subject matter than they were (Caruth & Caruth, 2013; Kezin et al., 2005; Sonner, 2000).

Due to community colleges' focus on developmental classes and gatekeeper courses, researchers question the appropriateness of adjunct faculty teaching in these areas of instruction (Bettinger & Long, 2005; Chen, 2016). For example, one study finds that adjuncts at the Maricopa County Community College system are underprepared for class and retain fewer students in gateway math and English classes (Burgess & Samuel, 1999). This is particularly troubling as academic momentum is crucial for community college student success, and most remedial classes are taught by adjuncts (Saxon & Boylan, 2010). For many community college students, remedial education is a barrier requiring additional classes that do not count toward graduation, reducing and sometimes stopping earned credit momentum, and thus acting as a barrier to academic progression (Adelman, 2006; Bailey & Alfonso, 2005; Saxon & Boylan, 2010). Consequently, students become frustrated with their lack of academic progress and are more inclined to stop or drop out rather than complete degrees or transfer.

However, conflicting results show no effect on remedial and first year students' retention due to adjunct faculty. One study at a community college finds no correlation between student learning and part time versus full time faculty of remedial math classes (Bolge, 1995), leading to the possibility that remedial education, and not the instructor, may be detrimental to student academic progression. In another limited study of student success in prerequisite courses followed by an intermediate course, no difference exists in retention between classes taught by part time and full time instructors, calling into question the efficacy of spending more money on full time faculty and suggesting greater

institutional effectiveness is possible by shifting resources to adjunct support services (Rogers, 2015). A dissertation studying nine sections of modular developmental mathematics classes in the Virginia Community College systems reports that adjuncts had better student success outcomes than fulltime instructors (Keniston, 2016). These outcomes may be due to adjuncts' ability to provide more straightforward and practical explanations of basic math concepts (Figlio et al., 2013; Keniston, 2016; Leslie & Gappa, 1995). Student success in the modular remediation classes was seen in traditional college age, women, White and suburban students. Men, African American, Hispanic, and rural and urban students had adverse outcomes in the modular classes (Keniston, 2016).

Community College Graduation And Adjunct Faculty

One potential outcome of student retention, persistence, and success is graduation. Considerable research exists on part time faculty and degree completion. Substantial research also focuses on graduation generally. Adelman (1999) indicates that the two most important determinants for degree completion were high school academic content, performance, and continuous college enrollment. Calcagno et al. (2008) report that three years after enrollment, 49% of first time community college students had graduated, transferred, or were retained: 10% earned a degree, 5% a certificate, 11% transferred to senior institutions, 8% to other two-year institutions, and 15% persisted in their enrollment. Yet, a lack of academic preparation often leaves students unprepared for college work and slows their academic progress to complete required remedial classes that do not count toward graduation (Adelman, 1999; Melguizo, Boz & Prather, 2011). Nontraditional students, a significant component of the community college cohort, are hampered by a lack of academic preparation and display a complex pattern of intermittent

academic attendance that slows and often terminates program completion (Astin, Korn & Green, 1987; Complete College American, 2017; Horn, 2009). For students enrolled and without an associate degree after three years, 35% had stopped out for five months or longer (Horn, 2009). Dowd and Coury (2006) concur that being a nontraditional student, such as older students, single parents, students living independently, vocational majors, and GPA, were significantly associated with associate degree graduation rates. A further complication to degree completion was that half of all community college students attend more than one institution, an additional reduction in academic momentum (Peter & Cataldi, 2005).

It is important to note that associate degree completion rates are statistically decreased by students declaring themselves as a degree seeking to qualify for financial aid when their actual intent is not to attain a degree (Offenstein & Shulock, 2009). The incidence of declaring a major for financial aid eligibility cannot be overemphasized. Astin (1975) reported a generation ago that there was a clear pattern of higher socioeconomic groups attending four-year colleges and universities while lower socioeconomic groups attend community colleges. The need for financial aid was a common requirement for many in community college attendance (Bers & Schuetz, 2014; Horton, 2015; Kuh et al., 2006). Student degree declarations and reported long-term intentions often provide poor insight into ultimate future actions (Adelman, 2005; Cohen, 1991; Glass & Bunn, 1998).

Moreover, evidence exists that institutional factors do influence associate degree completion. Community college graduation rates are related to school size, instructional expenditures, faculty resources, and the size of minority populations (Pascarella &

Terenzini, 2005). Institutional actions are also important. Student records from six Florida community colleges were used to assess institutional success in graduating students of color, and identified institutional characteristics that frame the high-performance institutions, which include proactive student support services with targeted advising; academic support for at-risk students; innovative teaching; and the use of data analysis to track student progress (Jenkins, 2007). However, nationwide studies of two-year colleges found that, as the percentage of part time faculty rises, graduation rates fall (Jacoby, 2005), and Jaeger and Eagan (2009) calculate that a 10% increase in exposure to adjunct instructors resulted in a 1% decrease in graduation rates. Consistently, greater utilization of part time faculty reduces community college graduation rates (Ehrenberg & Zhang, 2004; Jacoby, 2006; Jaeger & Eagan, 2009).

Transfers To Four-Year College And University And Graduation

Though not a focus of this dissertation, as the use of part time faculty increased throughout all sectors of higher education, questions arose concerning part time faculty and graduation rates among all institutional sectors. Studies at four-year colleges and universities raise concerns about the employment of part time and contingent faculty at senior postsecondary institutions. In one study, Ehrenberg and Zang (2005) examined institutional information from the College Board and other sources. They conclude that part time and full time non-tenure track faculty had a negative relationship with five and six year graduation rates at four-year colleges and universities. The association of part time faculty at both community colleges and senior institutions and the interaction of both sectors' adjuncts on the outcomes of community college transfer students to four-year colleges and universities remains an interesting and unexplored field. There is

existing research that provides some background for future studies. Within six years of transfer from community colleges to senior institutions, 62% of the transfer cohort earned a bachelor's degree (Shapiroet al., 2013). After accounting for student expectations, self-selection bias, and non-traditional enrollment patterns, a strong negative effect on bachelor's degree attainment for students who begin at a community college remains (Alfoso, 2006; Doyle, 2009; Sandy, Gonzales & Hilmer, 2006), which may be due to the academic preparation of the community college students themselves.

The type and characteristics of the senior institutions where community college students transfer also relate to bachelor's degree attainment (Jenkins & Fink, 2016). Community college students who transfer to very selective institutions graduate at almost three times the rate (58%) of students who transfer to nonselective institutions (22%) (Jenkins & Fink, 2016). Additionally, public institutions confer bachelor's degrees at higher rates to community college students (42%) than private non-profits (31%) and for-profit institutions (8%) do (Jenkins & Fink, 2016). Senior institutions that serve students from higher SES backgrounds graduate community college transferees at higher rates (43%) than institutions that serve lower SES students (28%), indicating that both student and institutional characteristics are associated with post-community college student success (Jenkins & Fink, 2016).

Bound, Lovenheim, and Turner (2010) conclude that lack of academic preparation, especially in men, explains lower bachelor's degree completion rates for community college students. From 1972 to 1992, the large influx of students to community colleges and the lower tiered four-year colleges brought a higher percentage of non-college prepared students into higher education, resulting in reduced community

college student success outcomes. The authors ascribe 90% of the reduction in community college bachelor's degree completion rates to inadequate secondary school preparation for college students (Bound, Lovenheim & Turner, 2010). Nevertheless, Adelman (2009) finds no difference in graduation outcomes between community college transfer students and students who began in a four-year college or university after eight years. However, his analysis did not account for students who began at a community college and failed to achieve their transfer goal. A separate qualitative study of 20 successful community college transfer students observed they were persistent, engaged, highly motivated, and believed their community colleges prepared them well for senior postsecondary attendance (Ellis, 2012).

Student Transfer In Place Of Community College Graduation

The least understood indicator of student success is transfer from community college; the topic is less researched due to data limitations. Based on community college students' eventual intentions to earn a bachelor's degree, transfer to a senior institution before community college graduation may be viewed as a positive outcome. This definition contrasts with that of many four-year institutions, which view transfer as a negative outcome (Matross & Huesman, 2002). In a representative sample of higher education students, 81% who began at a community college intended to earn a bachelor's degree or higher award (NCES, 2011), yet only 25% of community college students transfer to senior institutions in five years (Hossler et al., 2012). Preparation for transfer to senior postsecondary institutions is a major goal of the community college system and the intention of most of the community college student cohort (Brint & Karabel, 1989; Grubb, 1991; Townsend, Bragg & Rudd, 2009; Wellman, 2002). Based on this,

community college attendance, not necessarily graduation, bridges the gap between junior and senior institutions, providing the path to the coveted four-year degree (Rendon, 1993; 1994; Quigley & Bailey, 2003). Rendon (1993; 1994) states that for students, the prize is a bachelor's degree; transferring from a community college is a way to attain the prize. She argues that associate degrees were consolation prizes in place of a bachelor's degree, an assertion that has slowly deteriorated over time (Rendon, 1993; 1994; Selingo, 2017).

Additionally, evidence exists that community college students who transfer were accepted at more selective colleges and universities than would be possible before their community college attendance (Hilmer, 1997; 2000). Consequently, many students were not focused on associate degree attainment and instead were preparing for admittance to a senior postsecondary institution. In one study, approximately two-thirds of all community college students anticipated transferring to a four-year college or university. However, only 38.5% foresaw receiving an associate degree before transfer (Hoachlander, Sikora, & Horn, 2003). The value of a two-year degree was often questioned; in one study community college students transferring to senior institutions without associate degrees earn bachelor's degrees at higher rates than students who earn an associate degree before transfer (Carlan & Byxbe, 2000).

Other studies conclude that an associate degree had value. For examine, one finds that community college students who transfer to senior institutions persist and graduate at higher rates if they first earn a community college degree (Cejda, Rewey & Kaylor, 1998). More recent studies report positive relationships between transferring with a two-year degree and earning a bachelor’s degree (Jenkins & Fink, 2016; Sharpiro et al.,

2013). Overall, Crosta and Kopta (2014) indicate a significant relationship between earning associate's transfer degrees (AA/AS) and subsequent bachelor's degree conferral, but no relationship for occupational degrees (AAS). Bachelor's degree conferral success is often better measured by statewide community college transfer rates to senior institutions (Jenkins & Fink, 2016).

Student and senior institutions' respect accorded to associate degrees may be driven by state-based occupational certification and mandated articulation requirements (Crosta & Kopko, 2014; Roska & Keith, 2008). Cejda and Kaylor (2001) explore students' reasons for transferring without an associate degree and find in rank order: completing four-year college general education requirements; getting the challenging classes out of the way; saving money for a year or two; deciding on a major; completing prerequisites of upper level courses; encouragement to transfer; financial reasons to be most important. Tellingly, many students report transferring early due to faculty encouragement and family members' support (Cejda & Kaylor, 2001). Consequently, these transfer students did not view the associate degree as an academic milestone. However, it was mandatory for occupational licensure, especially in the allied health fields where the credential was required by government and accreditation boards.

Jaeger and Eagan (2009) indicate that students with a declared vocational program major had outcomes akin to those without a declared major and were 3% to 5% less likely to graduate than transfer majors were. Vocational degrees and certificates provide the opportunity for gainful employment with one to three years of full time study. Consequently, non-traditional students seeking an economic return for their academic investment (Belfield & Bailey, 2011; Xu & Trimble, 2015) overly subscribe to vocational

programs. In many cases, non-traditional students are not academically prepared and are constrained by their busy personal lives from successfully navigating the competing demands of a college education (Bailey & Alfonso, 2005; Cohen & Brawer, 1996). Not surprisingly, community college students who were able to attain early academic momentum in their course work and community colleges that achieve early positive student outcomes had higher graduation rates than students and institutions that do not (Attewell, Heil, & Reisel, 2012; Bailey, Complete College America, 2017; Crosta, & Jenkins, 2006).

Adjunct Instructors And Transfer Students

Regardless of associate degree completion, two-year colleges are an important steppingstone to a bachelor's degree for many students, and adjuncts appear to influence the community college senior postsecondary college transfer process. Eagan and Jaeger (2008a; 2008b) found an inverse relationship between student exposure to adjuncts and transfer to four-year college or university; for an increase of 10% in earned credits from adjuncts, transfer rates fell by 2%. The authors focused on students whose academic programs suggested future transfer. Approaching this topic from a different angle, Gross and Goldhaber (2009) find that a 10% increase in tenured faculty resulted in a 4% increase in the colleges' transfer rate to four-year colleges and universities. Due to the lack of detail from the IPEDS dataset on why community college students transfer, interpreting transfer as positive or negative in relation to graduating with an associate degree requires additional study and interpretation.

Though many states encourage community college attendance and sometimes graduation through mandated articulation agreements and credit transfers (Anderson et

al., 2006; Ignash & Townsend, 2000), most states do not provide legal or monetary incentives to encourage the transfer of students from community colleges to senior institutions (Wellman, 2002). This lack of incentives in the face of student tuition and fees, and revenues based on enrollment, not success, make transfer a less attractive economic priority for community colleges (Juszkiewicz, 2016). Tellingly, active state support of community college transfer to senior institutions was limited. Only two states use transfer as a criterion for budgeting and performance funding. In both cases, the transfer criteria apply exclusively to the community college sector (Dougherty & Reddy, 2013).

Tinto's Model Of Institutional Departure Framework

The models and regressions developed in this dissertation use Tinto's integration framework and theory for guidance (Tinto, 1975; 1993; 1997; 2006). Tinto (1993) theorizes that students are more likely to be retained if they integrate academically and socially into the social and academic fabric of the college. Students who make social connections through friendships and group activities, combined with academic engagement in and out of the classroom, are more likely to persist in higher education versus students who do not engage socially and academically (Tinto, 1993; 1997; 2006). Students integrate by developing personal relationships with instructors, college employees, and fellow students. Not building these relationships results in a lack of institutional fit leading the student to conclude that the college was not helping them meet academic and individual goals, and consequently, the student drops out of the institution (Tinto, 1975; 1993; 1997; 2006).

Tinto's Model of Institutional Departure provides five interrelated categories that lead to the outcome of student departure or retention (Tinto, 1993; Tinto et al., 1994; Tinto, 2006). The characteristics include students' pre-entry attributes, goals and commitments, institutional experiences, academic and social integration, and a culmination of updated goals and commitment (Tinto, 1993; Tinto et al., 1994; Tinto, 2006). Pre-entry attributes include family background characteristics, individual skills and abilities, and prior education (Tinto, 1993; Tinto et al., 1994; Tinto, 2006). Goals and commitments entail student intentions, academic and professional goals, commitment to the institution, and external commitments (Tinto, 1993; Tinto et al., 1994; Tinto, 2006). Institutional experience consists of academic performance and faculty/staff interaction leading to academic integration, extracurricular activities, and peer group interaction leading to social integration. Integration, as just explained, was the outcome of institutional experiences. Finally, the students update their goals and commitment to the institution based on the institution's degree of academic and social integration (Tinto, 1993; Tinto et al., 1994; Tinto, 2006). The final departure-retention decision was predicated on the students' revised goals and commitment to the institution (Tinto, 1993; Tinto et al., 1994; Tinto, 2006).

Tinto's Theory on Institutional Departure had been criticized for its difficulty explaining non-traditional and community college students. He modified his theory throughout the years to account for critiques and published additional research on student integration, engagement, and retention (Tinto, 1975; 1993; 1997; 2006). Tinto's model also accounted for the campus environment's complexity. Tinto (1993) recognized that different student cohorts behaved and responded differently within the model framework,

for example, low income students, racial and ethnic minority students, non-traditional students, and transfer students. Tinto's model provided an impetus for implementing academic and student support services tailored to specific groups of students to improve the group's retention and success (Swail, 1995; Swail, 2004; Wyckoff, 1998). Other programs included student orientations, intrusive advising and counseling, learning communities, and study groups (Bailey & Alfonso, 2005; Bettinger & Baker, 2014; Bonet & Walters, 2016; Hatch & Garcia, 2017). These structured programs had shown some promise at the individual level, though institutional persistence had improved little or not at all (Bailey & Alfonso, 2005).

The community college sector differs considerably from four year higher education; consequently, community college students' academic and social integration manifests in different and unique ways (Deil-Amen, 2011). Academic and social integration can coincide via classroom interaction (Deil-Amen, 2011; Karp, Hughes & O'Gara, 2010). As community college students integrate academically, they simultaneously develop social relationships with faculty, students, and staff, developing informal information networks that provide information on navigating college structures, such as enrolling in classes and academic advising (Karp, Hughes & O'Gara, 2010). The information networks extend beyond human interaction and inclusion. The networks provide critical information for successfully navigating the community college bureaucracy and were a necessary enabler of the student's academic success and persistence (Deil-Amen, 2011; Karp, Hughes & O'Gara, 2010).

Applicability of Tinto's Model of Institutional Departure assumes that social and academic integration appears differently in the community college sector than four-year

colleges and universities (Deil-Amen, 2011; Karp, Hughes & O'Gara, 2010). Community college students attain social and academic integration in classroom and classroom related activities where both integrations occur in tandem with each other and perhaps simultaneously (Deil-Amen, 2011; Karp, Hughes & O'Gara, 2010). The potential association of the classroom and classroom related activities and student retention in community colleges makes the topic of instruction and instructors critical in the conversation of student success for the sector (Tinto & Russo, 1994).

Tinto's Model of Institutional Departure has often been tested in the literature using student level information gathered from local and national surveys. This dissertation uses Tinto's model to organize and provide context to institutional and county level data. As an example, for Tinto's pre-entry attributes of family background, skills and abilities, and prior schooling, this dissertation used the percent of students receiving need-based financial aid, county unemployment rate, and percentage of the county population enrolled in the college while limiting the cohort to FTFT degree seeking students based on self-identification as a first time college students. Additional information on the use of Tinto's Model of Institutional Departure to inform this dissertation is contained in the subsequent chapter on methodology.

Chapter 3

Methodology

The increasing number and ratio of part time instructors teaching in the community college professorate makes examining the association of part time faculty with student success outcomes relevant and timely (Bettinger & Long, 2005; Eagan & Jaeger, 2008a; 2008b; Ehrenberg & Zhang, 2004; Gross & Goldhaber, 2009; Harrington & Schibik, 2001; Harrington & Shirbeck, 2004; Jacoby, 2006; Jaeger & Eagan, 2009; 2011; Jaeger & Hinz, 2008; Kehrberg & Turpin, 2002; Ran & Xu, 2018; Ronco & Cahill, 2004; 2006; Tinto, 2006; Umbach, 2007; Xu, 2018). This dissertation investigates whether a higher ratio of adjunct or part time faculty, relative to all faculty, influences FTFT and FTPT student retention, FTFT transfer, and FTFT certificate/degree attainment outcomes while accounting for the institutional, student body, and county characteristics. The research questions posed in this paper are:

1) Is the ratio of part time faculty at New Jersey community colleges associated with FTFT and FTPT student fall to fall retention rates?

2) Is FTFT student retention a statistically significant independent variable when regressing the ratio of part time faculty against FTFT student three year graduation rates net of transfer students?

3) Is the ratio of part time faculty associated with FTFT student graduation rates when retention rate is included as an independent variable?

4) Is the ratio of part time faculty associated with FTFT student three year transfer rates without receiving a degree or certificate?

Student retention is associated with graduation, as a student must be retained to graduate (Calcagno & Jenkins, 2007; Tinto, 1993;1997; 2004). I examine whether the ratio of part time faculty relative to all faculty is associated with FTFT and FTPT student retention and, subsequently, whether FTFT student retention is associated with FTFT student graduation with transfers removed (Calcagno & Jenkins, 2007; Tinto, 1993;1997; 2004). I also investigate whether the ratio of part time faculty to all faculty is associated with student FTFT graduation net of transfer students after accounting for FTFT student retention. Finally, transfers as a ratio of the FTFT degree seeking cohort were analyzed to investigate the associations that part time faculty, institutional, student body, and county characteristic had on the FTFT student transfer outcome.

Statistical Tools

Using Jacoby's (2006) research and methodology as a guide, multiple linear regression is utilized to examine the associations between student outcomes and the independent variables. Multiple regression was chosen because the dependent variables are continuous. The regression results explain that a unit change in the independent variable was associated with an outcome in the dependent variable while controlling for other independent variables (Jeon, 2015). Multiple regression allows for the investigation of the relationships between student success outcomes and the ratio of part time faculty while controlling for other variables that may be associated with student outcomes (Jeon, 2105).

The dissertation extends beyond Jacoby (2006) by analyzing multiple years of information across multiple institutions, commonly referred to as panel data. Jacoby (2006) used one year of information across all public community colleges in the United

States. Panel data combines multiple time periods and observations within time into one field for analysis (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). Panel data provides advantages over cross sectional data by increasing the number of data points and degrees of freedom, thereby improving the precision of the independent or explanatory variable coefficient estimates (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). In this dissertation, the pooling across time and community colleges allows the estimation of multiple variables to investigate the dependent and independent variable relationships (Hsiao, 2003).

Reliability And Validity

The reliability of the dissertation is based on the ability to replicate the data field and the methodology used to complete the dissertation. This dissertation uses Integrated Postsecondary Education Data System (IPEDS) data, United States Department of Labor data, and United States Bureau of Census data. The data was collected from IPEDS for 12 years for 19 New Jersey community colleges and was for that period a census for the state's community college sector. The United States Bureau of the Census (2018) describes reliability issues with population data. Reliability was potentially challenged by an inability to identify all cases in the actual universe; definition and classification difficulties; differences in the interpretation of questions; errors in recording or coding the data obtained and other errors in the collection, response, coverage, processing, and estimation errors for missing or misreported data. However, the reliability of the IPEDS, US Department of Labor, and United States Bureau of the Census data rests on the professionalism and reputation of these organizations. Ultimately, the dissertation can be

considered reliable if it is replicable; thus, I provide substantive methodological detail to improve replicability and, thus, reliability.

To use multiple linear regressions to investigate the associations between the dependent and independent variables and to be confident that the regressions measured these relationships correctly, I examine their ability to meet the best linear unbiased estimator (BLUE) criteria (Hsiao, 2003). In doing so, I prioritize minimizing statistical problems that may distort the coefficient estimates or regression statistical calculations (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). Using linear regression assumes that the regression error terms are uncorrelated and have equal variances and a mean of zero (Hsiao, 2003). To ensure unbiased estimators for the independent or explanatory regressors, I address the phenomena of misspecification, multicollinearity, heteroskedasticity, and autocorrelation. I intended to estimate regressions with precise, robust, statistically significant coefficient estimates to test the association of part time faculty when regressed on New Jersey community college student success (Hsiao, 2003).

Misspecification typically occurs by including independent variables that account for variation in the dependent variables and independent variables that were endogenous or not genuinely independent from the dependent variable (Flensburg, 2014; Halaby, 2004; Keele & Kelly, 2005). Misspecification and endogeneity can bias the regression error term and the independent coefficient estimates and variances. Fixed Effects Panel Models were added to the dissertation to account for possible time invariant and college-specific effects to investigate if misspecification and endogeneity were possible issues. Due to this dissertation's relatively small sample size, multicollinearity was tested and is addressed in Chapter 4. Multicollinearity occurs when the independent regressors or

explanatory variables are highly correlated. The presence of multicollinearity results in large standard errors that lead the researcher to conclude that the highly correlated explanatory variables are not statistically significant when statistical significance exists (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). This is commonly referred to as a Type II error or failing to reject the null hypothesis that the coefficient estimate was statistically significant. Indicators of multicollinearity are low t-statistics and high R-squares.

Additionally, in instances of multicollinearity, the independent regression coefficient estimates lack robustness and are unstable, resulting in large coefficient estimate changes with small changes in the regression (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). Changes in the sign of the coefficients are also common with multicollinearity. Since I explored the relationship of adjunct instructors to student success and considering the relatively small sample size, great care was taken to keep multicollinearity to a minimum by using and interpreting variance inflation factors (VIF) for each independent variable when constructing each regression (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). VIF is covered in more detail in Chapter 4.

Further, using panel data requires addressing the inevitable heteroscedasticity of the residuals. Heteroscedasticity refers to the variance of the residuals of the regression not being uniform (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). This can occur when the relative size of the regressors significantly varies from one another. Using the natural log transformation for numeric values, I transformed standardized variables to account for this problem. Natural logs also benefit by smoothing data series

and tempering outliers (Kennedy 1998; Wooldridge, 2012). Misspecification can further impact heteroskedasticity when variables germane to the model are inevitably missing. Heteroskedasticity can result in imprecise coefficient estimates and small p-values, which may lead to a type I error of rejecting the null when the variable is not statistically significant (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012).

Finally, autocorrelation occurs when the regression error terms are correlated with one another. The error terms are not independent and can track positive and negative patterns (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). Autocorrelation can occur across time and data sets; therefore, panel data is susceptible to autocorrelation. I used statistical tests to ascertain whether it was an issue in this research (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). In addition to autocorrelation across time periods, subsets of New Jersey community colleges are geographically positioned near one another, and spatial correlation may also be an issue. In statistical terms, the degree of autocorrelation can inhibit the regression from meeting the best linear unbiased estimator assumption (BLUE) required for ordinary least squares modeling (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012).

Data Sources And Methodology

This dissertation used New Jersey community college institutions as the unit of analysis and incorporated Integrated Postsecondary Educational Data System (IPEDS) information in concert with other US Government data sources to explore the extent to which the ratio of adjunct instructors to all faculty is associated with institutional level student outcomes. Institutional level research offers insight and understanding concerning how institutional actions are associated with student outcomes (Jacoby, 2006; Jenkins &

Fink, 2016). According to Jacoby (2006), there are three reasons for performing research with institutions as the unit of analysis: institutions are held accountable for student success, including graduation rates; institutions make the hiring decisions and choose the ratio of part time and full time instructors; and the most accurate information on part time faculty is found at the institution level. Importantly, data and information required to perform the institutional level analysis are now available after approximately two decades of the National Center for Education Statistics (NCES) collection of student cohort right-to-know retention and graduation information via the Integrated Postsecondary Data System (IPEDS).

The data set was restricted to New Jersey public two-year institutions to allow the state government policy and regulatory framework to remain constant across institutions. Researchers found that community college student success indicators vary considerably between states, such as graduation and transfer to senior institutions (Jacoby, 2006; Jenkins & Fink, 2016). Since this dissertation research was institution based and confined to one state, information from New Jersey's 19 community colleges across 12 years of operations is combined to provide the maximum number of observations and, consequently, degrees of freedom. The body of research investigating part time faculty in relation to full time faculty and their association with student outcomes has increased over the last 25 years, with most of the research using student unit record data. While student record data provide insight to students and sometimes limited institutional characteristics that inform student success outcomes, these studies were student focused and did not capture the association, if any, of institutional-based characteristics. My dissertation viewed student success from an institutional perspective, limiting student

characteristics to cohort level statistics that lose the more minute details inherent in student level records analysis.

I examine institutional level student outcomes at New Jersey community colleges, a state which had allowed considerable institutional control of operations, thereby permitting wide variability in institutional choices and approaches and, ultimately, outcomes (Nespoli, 2010). Additionally, limiting the data set to one state provides uniformity relative to the state policy environment. At the same time, the use of institution level data addresses a gap in the body of research concerning community college faculty employment decisions and the consequent association with student retention and graduation outcomes (Jacoby, 2006; Jenkins & Fink, 2016).

Outline Of Model Structure

This dissertation uses Tinto's Model of Institutional Departure (Tinto, 1975; 1993; 1997) to structure the modeling and analysis. The potential influence of classroom and classroom related activities on student retention and graduation in community colleges makes the topic of part time and full time faculty critical in the conversation about student success (Deil-Amen, 2011; Karp, Hughes & O'Gara, 2010). Tinto's (1975; 1993) Model of Institutional Departure provides structure by grouping the independent variables into academic and social context categories. The academic context variables consist of part time faculty to all faculty, instructional expenditures, and certificates granted to all awards. The social context variables were divided into the institutional, student, and county explanatory variables. The institutional explanatory variables were academic service expenditures, student service expenditures, in-county tuition and fees, and total fall enrollment. Student explanatory variables were FTFT federal grant

recipients to the entering cohort, Black and Hispanic students to all students, and women students to all students. The county explanatory variables were total college enrollment to county population and county unemployment rate. The institutional level data was taken from IPEDS, unemployment rate statistics from the US Department of Labor, and county population from the US Bureau of the Census.

The dissertation's first and second set of regressions modify Tinto's Model of Institutional Departure (Tinto, 1993; Tinto, 2006), defining student integration as the fall over fall retention of FTFT and FTPT degree seeking student cohorts (IPEDS), thereby capturing the critical first year of student higher education. For community college students, being retained through the first year of college was a necessary but not a sufficient condition for graduation. Graduation was examined in the third regression in each set. Graduation, the ultimate indicator of institution student success and integration, was based on the IPEDS definition of graduation within 150% of the time from FTFT student matriculation. FTFT student retention, examined as a student outcome in the first set of regressions, was tested as an independent regressor in the graduation regressions. The student transfer outcome was examined in the fourth set of regressions. Transfer was the number of FTFT students who transferred 150% of time from the fall of matriculation (IPEDS) without receiving a two-year degree or certificate.

Explanation Of The Modelling

I use FTFT degree seeking students enrolling in the fall term of each academic year, although full time students make up just 36% of the community college student enrollment (AACC, 2020). In recognition of this limitation, part time retention was examined to provide greater context and definition to the FTFT cohort. Using the FTFT

degree seeking cohort serves multiple purposes. The students from each institution begin at the same starting point in the higher education journey. The students in the cohort were attending full time and had declared a degree or certificate program, which may indicate an intent to complete a formal course of study. Ratios were constructed for retention, graduation, and transfer from the FTFT student degree seeking cohort matriculating in the fall of each academic year used in the dissertation. Therefore, there are three dependent variables for the FTFT student cohort: retention, graduation, and transfer. A fourth dependent variable was included to account for FTPT retention. The equations are as follows:

FTFT retention:

$$RET\_FT(it) = \beta0+\beta1(PTFAC(it))+\beta2(INST\_EXP(it))+\beta3(CERT(it))+\beta4(ACAD\_EXP(it))+\beta5(STU\_EXP(it))+\beta6(TUIT(it))+\beta7(ENRL(it))+\beta8(BLK\_HSP(it))+\beta9(WOMAN(it))+\beta10(FEDGRT(it))+\beta11(UNEMP(it))+\beta12(ENRL\_POP(it))+\varepsilon(\imath t)$$

FTPT retention:

$$RET\_PT(\imath t) = \beta0+\beta1(PTFAC(it))+\beta2(INST\_EXP(it))+\beta3(CERT(it))+\beta4(ACAD\_EXP(it))+\beta5(STU\_EXP(it))+\beta6(TUIT(it))+\beta7(ENRL(it))+\beta8(BLK\_HSP(it))+\beta9(WOMAN(it))+\beta10(FEDGRT(it))+\beta11(UNEMP(it))+\beta12(ENRL\_POP(it))+\varepsilon(\imath t)$$

FTFT graduation:

$$GRAD(\imath t) = \beta0+\beta1(PTFAC(it))+\beta2(INST\_EXP(it))+\beta3(CERT(it))+\beta4(ACAD\_EXP(it))+\beta5(STU\_EXP(it))+\beta6(TUIT(it))+\beta7(ENRL(it))+\beta8(BLK\_HSP(it))+\beta9(WOMAN(it))+\beta10(FEDGRT(it))+\beta11(UNEMP(it))+\beta12(ENRL\_POP(it))+\beta13(RET\_FT-1(it))+\varepsilon(\imath t)$$

FTFT transfer:

$$TRAN(\imath t) = B0+\beta1(PTFAC(it))+\beta2(INST\_EXP(it))+\beta3(CERT(it))+\beta4(ACAD\_EXP(it))+\beta5(STU\_EXP(it))+\beta6(TUIT(it))+\beta7(ENRL(it))+\beta8(BLK\_HSP(it))+\beta9(WOMAN(it))+\beta10(FEDGRT(it))+\beta11(UNEMP(it))+\beta12(ENRL\_POP(it))+\varepsilon(\imath t)$$

These four regressions were used to estimate three different models using Tinto's Model of Institutional Departure for guidance. The models were the Base Panel Model, the Time Fixed Effects Panel Model, and the College Fixed Effects Panel Model.

The first set of equations were multiple linear regressions for the Base Panel Model consisting of 228 observations across 19 community colleges and 12 years of operations from Academic Year 2004 to 2015. The first regression dependent variable was the ratio of FTFT degree seeking students retained from the fall of matriculation to the following fall term. The second dependent variable was the ratio of FTPT degree seeking students retained from the fall of matriculation to the following fall term. The third dependent variable was the ratio of student graduates, net of transfer students, 150% of the time from the FTFT degree seeking cohort. The fourth dependent variable was the ratio of FTFT student transferees from the FTFT student degree seeking cohort.

The second set of equations were multiple linear regressions for the Time Fixed Effects Panel Model consisting of 228 observations across 19 community colleges and 12 years of operations from Academic Year 2004 to 2015. The four dependent variables from the Base Panel Model were rerun in the Time Fixed Effects Panel Model.

The third set of equations were multiple linear regressions for the College Fixed Effects Panel Model consisting of 228 observations across 19 community colleges and 12 years of operations from Academic Year 2004 to 2015. The dependent variables from the Base Panel Model were rerun in the College Fixed Effects Panel Model.

As the graduation data field consists of 19 community colleges and 11 or 12 years of information based on the model examined, there was a need to conserve available degrees of freedom whenever possible. I ran models using theoretically relevant

continuous independent variables. I compared them to models that incorporate time and institutional fixed effects. I included institutional fixed effects to address systematic differences in unobserved, time-invariant institutional characteristics that may be associated with both the dependent variable and the ratio of part time faculty. Analysis of the data field was performed using SPSS version 26. The sources of this data come include the Integrated Postsecondary Education Data System (IPEDS), the US Department of Labor, and the US Bureau of the Census.

The Base Panel Model is a random effects model that does not account for shocks that effect a specific year or years, such as the 2008 – 2010 Great Recession. The Time Fixed Effects Model attempts to account for time shocks in the data field. The College Fixed Effects Model controls for all the time-invariant characteristics of each community college such as campus location, college culture, business practices, and other difficult to measure and quantity aspects of each entity that could bias the coefficient estimates of the independent variables and provide erroneous results (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). Consequently, I will look at the outcomes of all three models, but in the event the models differ in their outcomes, I will prioritize the results of the College Fixed Effects Model over the other two.

Student Success Dependent Variables

Full And Part Time Student Retention – Student Success Outcomes

Retention and early academic momentum are required to graduate from college (Adelman, 1999; Astin, 1993, 1997; Attewell, Heil, & Reisel, 2012; Bailey, Complete College America, 2017; Crosta, & Jenkins, 2006; Horn, 2009). Academic and social student engagement, especially by faculty, have been found to encourage student success

and retention (Astin, 1984, 1993, 1997; Astin & Astin, 2000; Bean, 1983; Bean & Eaton, 2000; Kezar & Maxey, 2014; Kuh, 2003; Kuh et al., 2006; Pascarella & Terenzini, 2005; Tinto, 1987, 1993, 2005, 2010). While institutional conditions and characteristics do impact student success and retention throughout the students' academic journey (Lei, 2016), students who persist early on in their careers become more experienced in attaining academic success, thereby strengthening their academic goals and institutional commitment (Bean & Eaton, 2000; Tinto, 1993). For example, sophomore cohorts persist over freshmen partially due to sophomores' successful retention experiences, which reinforce their commitment to the institution and personal goals, ultimately leading to graduation (Cofer & Somers, 2001; Tinto, 1975; 1993; 1997). Additionally, Gabovitch (2014) found that the quality of instruction and teaching skills were just as important, if not more so, for FTPT student success in community colleges.

FTFT retention was defined as the ratio of students from the FTFT cohort retained from the fall of matriculation to the following fall semester. FTPT retention was defined as the ratio of students from the FTPT cohort retained from the fall of matriculation to the following fall semester.

Full Time Student Graduation – Student Success Outcome

Graduation is the penultimate measure of student success; higher rates of student retention are linked to higher rates of student graduation (Attewell, Heil, & Reisel, 2012; Astin, 1997; Calcagno et al., 2007; DesJardins, Ahlburg & McCall, 1999; Bailey, Crosta, & Jenkins, 2007; Tinto, 1993;1997; 2004). Retention and enrolling in consecutive semesters positively drive student graduation (Crosta, 2014), and student-faculty interaction positively contributes to student retention and graduation (Kuh et al., 2006).

Additionally, institutional conditions and characteristics influence student success, retention, and graduation (Lei, 2016). FTFT graduation was defined as the ratio of FTFT students who graduate with a degree or certificate within three years of the fall of the cohort's matriculation.

Full Time Student Transfer Before Graduation – Student Success Outcome

Transfer was considered a negative or, at best, neutral student outcome until the advent of Adelman's (1999) seminal work. Some higher education researchers have found that transfer students exhibit characteristics akin to other measures of student success. Calcagno et al. (2008) found that the proportion of part time faculty had a statistically significant and negative impact on transfer to four-year colleges. Regardless of Adelman's research, bachelor's degree graduation was depressed by students who transferred without first receiving an associate degree or certificate (Cejda & Kaylor, 2001; Hoachlander, Sikora & Horn, 2003; Quigley & Bailey, 2003; Rendon, 1993; Rendon,1994).

Preparation for transfer, with or without an associate degree, is a primary goal of most community college students (Brint & Karabel, 1989; Grubb, 1991; Townsend, Bragg & Rudd, 2009; Wellman, 2002). Unfortunately, IPEDS does not require reporting the students' transfer sector; consequently, transfers to senior institutions, other community colleges, or trade schools were not included in the IPEDS data gathering or transfer statistics. FTFT transfer was defined as the ratio of FTFT students who transfer without a degree or certificate within three years of the fall of the cohorts' matriculation.

Independent Variables & The Academic & Social Context Overview

Academic and social integration are theorized to drive student retention and graduation (Tinto et al., 1994). Tinto theorizes that community college students have limited time on campus, thereby making their academic integration critical (Tinto, 1990). The students' connection to the community college was the classroom, and this aspect of student involvement was most important in the first year of attendance (Tinto, 1990). In support, Strauss and Volkwein (2004) found that students at two-year institutions were less sensitive to social integration than in other sectors. Borglum and Kubala (2000) commented that community college students who felt academically integrated also reported being socially integrated. Later research on the student departure model theorized that community college students attain social and academic integration in the classroom using classroom related activities; academic and social integration takes place in tandem and perhaps simultaneously (Deil-Amen, 2011; Karp, Hughes & O'Gara, 2010).

Many community college students see themselves transferring to a senior college or university. Extracurricular activities were not a necessary part of their community college plan or experience (Brint & Karabel, 1989; Bragg & Rudd, 2009; Grubb, 1991; Wellman, 2002); consequently, many students did not desire or were ambivalent about remaining on campus after class. Interestingly, Borglum and Kubala (2000) found no relationship between academic and social retention and student withdrawal rates, while Bailey et al. (2005; 2006) found a negative relationship between the level of academic support services and student completion.

Part Time Faculty To All Faculty – Academic Context

For most community college students, instructors were their primary contact with the institution (Bailey & Alfonso, 2005). The literature documents multiple concerns with adjuncts, including a lack of commitment to the institution, isolation from full time faculty, lack of understanding of student academic progression, little knowledge of student support resources, lack of office hours, lack of communication with students outside of the classroom, limited knowledge of pedagogy, lower academic credentials, and often limited knowledge of course materials (Benjamin, 2003a, 2003b; CCCSE, 2014; Cross & Goldenberg, 2003; Elman, 2003; Schuster, 2003; Thompson, 2003; Townsend, 2003).

Jacoby (2006) and Calcagno et al. (2008) find that the ratio of part time faculty had a statistically significant negative impact on student two year graduation rates and transfer to four-year colleges. Students lack access to part time instructors outside the classroom, combined with adjunct's poor knowledge of teaching, course materials, and college support services, had negative implications for learning and, consequently, student success (Calcagno et al., 2008; CCCSE, 2014; Cotton & Wilson, 2006; Eagan & Jaeger, 2008a; 2008b; Jacoby, 2006; Jaeger & Eagan, 2009; 2011; Jaeger & Hinz, 2009; Kezar & Lester, 2009; Kuh, Kinzie, Schuh, & Whitt, 2005; Milem & Berger, 1997; Schuster, 2003; Umbach, 2007).

Though Jacoby (2006) found adverse effects on graduation rates related to part time faculty, those effects were partially offset by increased faculty to student ratios where part time faculty were counted as four-tenths of a fulltime faculty member. In contrast, Ehrenberg and Zang (2005) found no relationship between part time faculty and

student graduation, while Yu (2015) found the proportion of part time faculty had a positive statistical impact on student graduation but, interestingly, a statistically negative impact on student academic integration. Part time faculty was defined as the ratio of part time faculty to all faculty in the Spring term of each student cohort's academic year of matriculation.

Instruction Expenditures – Academic Context

Classroom engagement in tandem with social engagement is a determinant of community college student persistence (Metz, 2005; Tinto, 1993; 1997; Wortman & Napoli; 1996). Students persist by integrating into the college and developing personal relationships with instructors (Tinto, 1975; 1993; 1997). Not building these relationships can result in a lack of institutional fit, leading students to conclude that the college was not helping them meet academic and individual goals, and consequently, students drop out of institutions (Tinto, 1975; 1993; 1997). Academic and social student engagement, especially with faculty, encourage student success and retention (Astin, 1984, 1993, 1997; Astin & Astin, 2000; Bean, 1983; Bean & Eaton, 2000; Kezar & Maxey, 2014; Kuh, 2003; Kuh et al., 2006; Pascarella & Terenzini, 2005; Tinto, 1987, 1993, 2005, 2010). Gabovitch (2014) found instruction quality and teaching skills to be critical for part time student success in community college.

Considerable academic research has found that full time faculty is superior to part time faculty in generating positive student outcomes, especially in the critical first year of attendance (Calcagno et al., 2008; Cotton & Wilson, 2006; Eagan & Jaeger, 2008a; 2008b; Jacoby, 2006; Jaeger & Eagan, 2009; Jaeger & Eagan 2011; Jaeger & Hinz, 2009; Kezar & Lester, 2009; Kuh, Kinzie, Schuh, & Whitt, 2005; Milem & Berger, 1997;

Schuster, 2003; Umbach, 2007). Higher levels of instructional expenditures indicate greater reliance on full time faculty whose salaries and benefits packages far exceed that of part time faculty, often by many multiples based on a per class average (Eagan, Jaeger, & Grantham, 2015; Ehrenberg, 2002; Gappa & Leslie, 1993; Jacoby, 2001; Leslie & Gappa, 2002; Rhoades, 2013; Yablonski, 2014).

Instructional expenditures were defined as the academic, remedial, occupational, vocational instruction, and non-credit expenditures (IPEDS) for each student cohort's matriculation year. Instructional expenditures were divided by total academic year credit hours, deflated by the CPI deflator, and transformed using the natural log. The total instructional expenditures per credit hour rendered may also act as a rough proxy for student class sizes and resources provided in the classroom.

Certificate Granted To All Awards – Academic Context

Students with a declared vocational program leading to a certificate had academic outcomes akin to students without a declared major. They were 3% to 5% less likely to graduate compared to students in transfer programs (Jaeger & Eagan, 2009). Certificates provide the opportunity for gainful employment in less time than a two-year degree; consequently, vocational programs were overly subscribed by non-traditional students seeking a more immediate employment return for their academic investment (Belfield & Bailey, 2011; Xu & Trimble, 2015). In many cases, non-traditional students were not academically prepared for higher education. They were constrained by their busy work and family lives from successfully navigating the competing demands of attaining a college education (Bailey & Alfonso, 2005; Cohen & Brawer, 1996).

The research had been mixed concerning certificate and vocational programs. Dowd and Coury (2006) observed that students in vocational programs experience lower completion rates, while Jacoby (2006) found that higher percentages of transfer degree seeking students in the FTFT cohort resulted in lower percentages of completions. Calcagno et al. (2008) noted little difference in student outcomes between transfer and occupational programs. Certificates granted to all awards were defined as the ratio of certificate recipients to all degrees and certificate recipients conferred in the year of each student cohort's matriculation.

Academic Support And Student Support Expenditures – Social Context (Institutional)

Tinto's (1975; 1993) Model of Institutional Departure theorizes that student attrition versus retention was directly tied to student academic and social integration. Tinto (1993) theorizes that students are more likely to be retained if they integrate academically and socially into the fabric of the college. For my dissertation, academic support and student support services were classified as social context independent variables. However, it was acknowledged that there was potential for crossover these expenditures into the academic or classroom realm.

Tinto's research was followed by work that found that academic and student support services and their interactions with students were imperative to student success. Contact with institutional representatives is vital for student success and must be encouraged and supported (Felten et al., 2016; Lundberg, 2014; Nasr & Jackson-Harris, 2016). Nippert (2000) observed that participation in college activities resulted in greater educational attainment. This effect was more pronounced at four-year institutions than at community colleges. Conversely, Bailey et al. (2005; 2006) found that more significant

expenditures on academic support services were associated with decreased student completion.

Student support services were identified as a factor that drives student retention and degree completion (Felten et al., 2016; Lundberg, 2014; Nasr & Jackson-Harris, 2016; Pascarella & Terinzini, 1991). Institutional actions were necessary, including proactive student support services, targeted advising, academic support for at-risk students; innovative teaching; and data analysis to track student progress (Jenkins, 2007). Students who leave college before graduation had poor perceptions of support services, including counseling and advising (Astin, Korn & Green, 1987; Felten et al., 2016; Mohr, Eiche, & Sedlacek, 1998; Willcoxson, Cottor, & Joy, 2011). Connecting with mentors and college employees was essential to the student's social integration (Swail, 2004). The earlier and more frequent these interactions occur in the student's academic career, the greater the students' institutional commitment and retention (Swail, 2004).

To account for social integration in Tinto's Model of Institutional Departure (Tinto, 1975; 1990; 1993; 1997), academic support and student services expenditures were defined below. Academic support expenditures were for libraries, support services to academic instruction, audiovisual services, academic administration, academic personnel development, and course and curriculum development for each academic year. Academic support expenditures were divided by total academic year credit hours, deflated by the CPI deflator, and transformed using the natural log. Student services were the expenditures for admissions, registrar activities, student activities, cultural events, student newspapers, intramural athletics, student organizations, supplemental instruction outside the normal administration, and student records. Student services expenditures

were divided by total academic year credit hours, deflated by the CPI deflator, and transformed using the natural log.

In County Tuition And Fees – Social Context (Institutional)

Many academic studies found that a tuition increase was associated with lower enrollment (Denning, 2017; Gallet, 2007; Heller, 1996; 1997; Hemelt & Marcotte, 2008; 2011; Kane, 1995; Rouse, 1994; Shapiro & Yoder, 2021). The impact on community college enrollments was particularly troublesome as the lower socioeconomic background of community college students renders them more price sensitive than their four-year counterparts (Denning, 2017; Gallet, 2007; Heller, 1997; Leslie & Brinkman, 1987, Shapiro & Yoder, 2021). Within the community college sector, students of color were the most tuition sensitive of all cohorts (Denning, 2017; Gallet, 2007). Additionally, higher tuition rates were associated with lower student retention (Cofer & Somers, 2001) and lower graduation rates (Jacoby, 2006). However, the negative effect was not significant when state dummy variables were introduced. In county tuition and fees were calculated by taking full time student in-county tuition and fees in the fall of matriculation for each FTFT student cohort, deflated by the CPI, and transformed by the natural log.

Total Fall Enrollment – Social Context (Institutional)

Across all college sectors, student success rates were associated with the college's enrollment size (Pascarella & Terenzini, 2005). Community colleges with larger enrollments have consistently shown lower student graduation rates and transfer to senior institutions (Calcagno et al., 2008; Yu, 2015). The total number of undergraduate students was calculated by adding full and part time students (IPEDS) enrolled in courses

receiving academic, occupational, or vocational credits leading to a degree or certificate and transformed using the natural log.

African American And Hispanic Students – Social Context (Student)

Historically, the lack of community college student success was associated with the size of each institution's student of color population (Goldrick-Rab, 2010; Pascarella & Terenzini, 2005). Institutions with larger proportions of minoritized students, including African American students, had a statistically significant impact on student graduation and transfer to four-year colleges. (Bailey et al., 2005; Calcagno et al., 2008; Clotfelter; Jacoby, 2006; Ladd, Muschkin & Vigdor, 2012). African American and Hispanic students were significantly less likely than their peers to navigate remedial education classes, often ending their academic careers with few or no college credits (Acevedo-Gil et al., 2015; Bailey et al., 2010; Keniston, 2016). It was often cited that the quality of academic instruction from full and part time faculty had a significant association with the retention of first-generation students and students of color (Allen, 1992; Amelink, 2005; Anaya & Cole, 2001). African American and Hispanic students were defined as the ratio of all African American and Hispanic to all students enrolled at the institution in the fall of each cohort's matriculation.

Women Students - Social Context (Student)

The ratio of women to all students (IPEDS) accounted for the differences between the sexes. Women carry the brunt of household and family responsibilities relative to men, often placed ahead of academic responsibilities, negatively impacting their academic success (Bailey & Alfonso, 2005; Cohen & Brawer, 1996). However, women consistently demonstrate greater success at navigating complex developmental and

remedial courses, especially college level math, that were requisite to move into college level work (Bailey et al., 2010; Bettinger & Long, 2005; Chen, 2016: Cho, 2011; Fike & Fike, 2007; Keniston, 2016; Roska, 2009). Consequently, Nippert (2000) found that women had higher retention and educational attainment than men. Conversely, most African American and Hispanic men begin their postsecondary academic careers at community colleges. Yet, African American and Hispanic men experience lower levels of academic and social integration at two-year schools than their brethren at four-year colleges and universities; consequently, they perform poorly on retention and graduation indicators relative to other cohorts and women (Bailey et al., 2005; Calcagno et al., 2008; Clotfelter; Flowers, 2006; Jacoby, 2006; Ladd, Muschkin & Vigdor, 2012; Wood & Palmer, 2014). The full and part time women variables were defined as all full time women as a ratio of all full time students in the fall of the student cohorts' matriculation and part time women students as a ratio of all part time students in the fall of the student cohorts' matriculation.

Need Based Pell Grants - Social Context (Student)

Qualification for need-based Pell Grants was used to account for the higher ratios of students attending from lower socioeconomic backgrounds. Need based federal financial aid is provided to students who apply from qualified low-income households (Bailey, 2016; NCES, 2015). Socioeconomic status is correlated with academic preparation, which is critical for academic success at the postsecondary level; a lack of academic preparation leaves students unprepared for college work (Adelman, 1999; Bound, Lovenheim & Turner, 2010; Goldrick-Rab, 2010).

Public community college open enrollment matriculation often had large numbers of economically challenged and academically underprepared non-traditional students (Bailey & Alfonso, 2005; Cohen & Brawer, 1996; 2003; Horn & Neville, 2006; Umbach & Wawrzynsky, 2005; Wyner, 2014). While students from higher socioeconomic backgrounds often focus on degree completion, students from lower socioeconomic backgrounds have familial and work obligations that compete with their classroom attendance and, ultimately, their higher education performance (Adelman, 1999; Matti, 2000; McJunkin, 2005: Tinto, 1993; 1997). Additionally, lower income students were often first-generation college attendees and benefited from relationships with college instructors both in and outside of class (Bers & Schuetz, 2014; Gupta, 2007; Moschetti, 2014; Saunders & Serna, 2004). Federal grant recipients were all FTFT federal grant recipients to all FTFT students in the fall of matriculation.

County Unemployment Rate - Social Context (County)

The county unemployment rate accounted for the economic tradeoff between work and education. The higher the unemployment rate, the lower the opportunity cost of giving up work to attend college, as employment is difficult to attain (Hillman, Nicholas & Orians, Erica, 2013). The lower the unemployment rate, the higher the opportunity cost of attending college, as work is available and must be foregone to attend college (Hillman, Nicholas & Orians, Erica, 2013). Fain (2014) and Juszkiewicz (2016) found that community colleges experience significant recession-driven increases in enrollment. Conversely, as the economy improves and employment is plentiful, students leave school for the workforce, negatively impacting graduation rates (Fain, 2014). The county unemployment rate was defined as the ratio of workers 16 years of age and older who

were actively seeking work divided by workers 16 years of age and older who were actively seeking work or were working in each county during the year of each cohort's fall of matriculation.

Total College Enrollment To County Population - Social Context (County)

The college enrollment to county population was defined as the total fall college enrollment ratio to the total county population as of July 1 of the calendar year of FTFT and FTPT student cohort matriculation. Taken from IPEDS, the total number of undergraduate students includes full, and part time students enrolled in courses receiving academic, occupational, or vocational credits that lead to a degree or certificate in the fall of the student cohorts' matriculation. The annual county population was drawn from the United States Census Bureau. This independent variable was included to capture potential county based tendencies to utilize or not utilize the county community college based on population characteristics not captured by other independent regressors.

Transformation Variables

In addition to the dependent and independent variables, two data sets were used to transform the data sets. Total Academic Year Credit Hour from IPEDS was the total student credit hours generated at each community college during the academic year of matriculation. This variable was calculated by multiplying the credit hours of each course by the number of students enrolled in the course and summed to a total. Academic Year Credit Hours were used to transform total instructional, academic support, and student service support expenditures to a per credit basis for analysis. Since instructional, academic support, and student services support expenditures were annual expenditures divided by the total number of academic year credit hours, provided the expenditures for

each student credit hour rendered. Consumer Price Index for Urban Consumers (CPI-U) is the estimated changes in the price of goods and services purchased for consumption by urban consumers for the academic year July to June and was used to deflate dollar based variables used in this dissertation, thereby allowing comparison across time. The consumer price index deflated full time fall tuition and fees and the per credit hour instructional, academic support, and student service expenditures.

Available Observations In Data Set

The number of observations in the data set was limited by the availability of the dependent variable information, retention, graduation, and transfer rates. The collection of graduation rates by the US Department of Education began in the academic year 1998 with the enactment of the Student Right-to-Know and Campus Security Act of 1990 (USDOE, 2018). The Student Right-to-Know Security Act required the reporting of graduation and transfer without receiving a degree or certificate for all FTFT degree seeking students at institutions that received student federal financial aid (USDOE, 2018).

Three year graduation rates for the FTFT degree seeking cohort entering the fall require tracking the cohort outcomes until the conclusion of the summer term immediately before the third fall of matriculation. The college reports this information in the next IPEDS data collection period, and the National Center for Education Statistics reports the information approximately a year later. The early years of graduation and transfer collection were beset with missing data points and many outliers. More importantly, the collection of one year retention information for the FTFT degree seeking student cohorts was required with the entering cohort of fall 2003 (USDOE, 2018).

Student retention is an important research component of this dissertation; therefore, the fall 2003 cohort was the first year used.

Due to structural changes in the New Jersey Community College sector, beginning with Gloucester County College developing a partnership with Rowan University effective in the fall of 2014, followed by Burlington County College and Rowan University in 2015, and subsequent changes, the entering cohort of fall of 2014 was the final cohort utilized in the data field. The entering cohort for 2014 was incorporated to increase the size of the data field for greater robustness with the assumption that the first year of the community college-university partnership did not unduly influence the 2014 student cohort's critical first year of matriculation. This final adjustment provides 12 years of information for 19 community colleges or 228 data points. Analysis was performed using retention, graduation, and transfer as the dependent variables to estimate each model's coefficients.

Research Limitations

The limited number of data points in this dissertation weakens the reliability of the coefficient estimates and the statistical calculations of the models. In addition, the use of this dissertation to infer the national public community college sector is limited as this data field consists exclusively of New Jersey public two-year colleges. Part time and full time instructors' ratios were numeric head counts and do not account for teaching experience, professional work experience, instructor motivation, or education level. Equally important was the degree of exposure of FTFT degree seeking students to part time and full time faculty. The full and part time instructor information limitations create

questions about the applicability and usefulness of the regression outcomes and dissertation conclusions.

I used Tinto's Model of Institutional Departure to organize my model. However, I was not attempting to explore the validity of Tinto's theory. Tinto and subsequent academic researchers state pre-entry characteristics, such as student goals and academic preparation, were important (Tinto, 1993; Tinto et al., 1994; Tinto, 2006). My dissertation uses rough proxies to address student pre-entry characteristics by using federal financial aid recipients, the county unemployment rate, and the ratio of students to county population. These variables were rough proxies for pre-entry characteristics and did not fully address Tinto's model (Tinto, 1993). I account for student goals by limiting my data to full-time degree or certificate seeking students. Using degree seeking students as a proxy for intent was a blunt tool as declaring a major is a requirement to receive financial aid, and full-time attendance may not be the student's decision or a reflection of intent to build academic momentum or attain a degree.

Chapter 4

Results

This quantitative dissertation aimed to explore the relationship between community college student success outcomes and the ratio of part time faculty to all faculty employed by the 19 New Jersey community colleges for the 12 entering student cohorts identified in the preceding section. This relationship was explored, accounting for the potential influences that may arise from institutional academic and social context variables and student and county environmental variables to capture student pre-enrollment characteristics. As stated previously, the FTFT degree seeking cohort was used to account for the student intent to pursue a credentialed field of study. The student success variables were FTFT student fall over fall retention rate, FTPT student fall over fall retention rates, three year FTFT graduation rates, and three year FTFT transfer rates without graduation. The retention, graduation, and transfer rates were calculated using the FTFT matriculated fall student cohorts that met FTFT retention, graduation, and transfer criteria. In the case of part time retention, the cohort was the FTPT cohort matriculating in the fall term. The dissertation research questions, after controlling for academic and social variables intent, were:

1) Is the ratio of part time faculty at New Jersey community colleges associated with FTFT and FTPT student fall to fall retention rates?

2) Is FTFT student retention a statistically significant independent variable when regressing the ratio of part time faculty against FTFT student three year graduation rates net of transfer students?

3) Is the ratio of part time faculty associated with FTFT student graduation rates when retention rate is included as an independent variable?

4) Is the ratio of part time faculty associated with FTFT student three year transfer rates without receiving a degree or certificate?

The data field includes academic and social context variables that include student and county data for the 19 New Jersey community colleges for academic years 2004 to 2015, or the entering cohorts for fall 2003 to fall 2014, for a total of 228 observations arrayed into panel data. Four dependent and 13 independent variables were in my three panel data regression models. The panel data models used were a Base Panel Model and the two fixed effects models: the Time Fixed Effects Panel Model and the College Fixed Effects Panel Model. The Base Panel Model examines the four student success outcomes using four separate regressions to estimate the four independent regressors. The potential time invariant effects stemming from each year and each college's uniqueness were addressed by using the fixed effects models. Due to degrees of freedom limitations, the Time and College Fixed Effects Models were employed independently from each other.

The Base Panel Model is a random effects model. The Time Fixed Effects Model attempts to account for time invariant shocks in the data field. The College Fixed Effects Model controls for all the time invariant characteristics attributed to each community college such as location, culture, business practices, and other difficult to measure and quantity aspects that could bias the coefficient estimates of the independent variables and provide erroneous results (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). I examine the outcomes of all three models, but in the event of model differences, I take the results of the College Fixed Effects Model over the other two models.

First, I ran descriptive statistics for the student success or independent variables. The results are displayed in Table 1.

Table 1

Descriptive Statistics – Dependent Variables

	N	Minimum	Maximum	Mean	Std. Dev.
Full time Retention	228	.17	.80	.6242	.06352
Part time Retention	228	.26	.62	.4293	.05589
3 Year Graduation Rate	228	.05	.49	.2209	.09101
Transfer Rate before Grad	228	.06	.31	.1736	.04565

The FTFT student retention rate mean was 62%, with a minimum of 17% and a maximum of 80%. The FTPT student retention rate mean was 43%, with a minimum of 26% and a maximum of 62%. The FTFT student graduation rate mean was 22%, with a minimum of 5% and a maximum of 49%. The FTFT student transfer rate mean was 17%, with a minimum of 6% and a maximum of 31%. Descriptive Statistics for the independent variables are presented in Table 2.

Table 2

Descriptive Statistics – Independent Variables

	N	Minimum	Maximum	Mean	Std. Dev.
Part time to all Faculty	228	.58	.91	.7669	.06751
Instruction Expenditure	228	3.35	4.40	3.9723	.21340
Certificates/All Awards	228	.00	.48	.0627	.07031
Academic Services Expend.	228	1.08	3.32	2.2733	.54932
Student Services Expenditure	228	2.04	3.31	2.5817	.23709
In County Tuition & Fees	228	6.96	7.68	7.3201	.14638
Total Fall Enrollment	228	7.05	9.76	8.8910	.66838
Black & Hispanic/All Student	228	.05	.73	.3114	.18679
Women/Full time Students	228	.43	.84	.5453	.05936
Women/Part time Students	228	.53	.81	.6321	.04708
Federal Grant Students to All	228	.01	.92	.4149	.16517
County Unemployment Rate	228	.03	.14	.0702	.02546
Total Enrollment /Population	228	.01	.03	.0196	.00425

The part time faculty as a ratio to all faculty mean was 77%, with a minimum of 58% and a maximum of 91%. Instructional expenditures divided by total academic year credit hours, deflated by the CPI deflator, and transformed using the natural log had a

mean of 3.97 with a minimum of 3.35 and a maximum of 4.40. The certificates to all degree recipients were 6%, with a minimum of 0% and a maximum of 48%.

Academic expenditures divided by total academic year credit hours, deflated by the CPI deflator, and transformed using the natural log had a mean of 2.27 with a minimum of 1.08 and a maximum of 3.32. Student expenditures divided by total academic year credit hours, deflated by the CPI deflator, and transformed using the natural log had a mean of 2.58, a minimum of 2.04, and a maximum of 3.31. Tuition and fees were the full time in-county fall tuition and fees deflated by the CPI and transformed by the natural log with a mean of 7.32, a minimum of 6.96, and a maximum of 7.32. Total fall enrollment was full and part time college enrollment in the fall term transformed by the natural log with a mean of 8.89, a minimum of 7.05, and a maximum of 9.67.

Black and Hispanic students as a ratio of all students mean were 31%, with a minimum of 5% and a maximum of 73%. Full time women students as a ratio to all full time students mean was 55%, with a minimum of 43% and a maximum of 84%. Part time women students as a ratio to all FTPT students mean was 63%, with a minimum of 53% and a maximum of 81%. FTFT federal grant recipients as a ratio of the FTFT matriculated cohort mean of 41%, with a minimum of 1% and a maximum of 92%.

The county unemployed as a ratio of the county labor force mean was 7%, with a minimum of 3% and a maximum of 14%. The college enrollment as a ratio to county population mean was 2%, with a minimum of 1% and a maximum of 3%.

Correlation Analysis

Correlation is the mathematical calculation of the relationship between two variables (Evans, 1996). The calculated relationship may be positive, negative, or no relationship. Correlation is useful for determining if there is a relationship between independent variables that may result in multicollinearity. Correlation analysis is also valuable in determining whether relationships exist between independent and dependent variables. This becomes apparent when modeling and panel analysis is employed. My dissertation used the Pearson correlation statistic to analyze the relationship among and between the study's dependent and independent variables. The Pearson correlation was interpreted using Evans (1996) scale for the calculated correlation r = .00-.19 “very weak association”; r = .20-.39 “weak association”; r = .40-.59 “moderate association”; r = .60-.79 “strong association”; and r = .80-1.0 “very strong association”.

Pearson Two-Tailed Correlation Matrix Of The Dependent Variables

Using a two-tailed Pearson correlation statistic, the student success outcomes used in this dissertation were positively and significantly correlated with one another except for an instance where there was little to no association, the relationship between part time retention and FTFT student transfer. FTFT student retention, three year student graduation, and three year student transfer were all positively and significantly correlated at the ($p \leq .01$) level. FTPT student retention was positively and significantly correlated at the ($p \leq .01$) level with FTFT student retention and three year student graduation. Part time retention and FTFT student transfer had little to no association with one another.

Table 3

Correlations Dependent Variables

	FT_Retent	PT_Retent	Grad_Rate_WO_Trans	Trans_Rate
FT_Retent	1	.427**	.516**	.186**
PT_Retent		1	.161*	-0.022
Grad_Rate_WO_Trans			1	.313**
Trans_Rate				1

**. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed).

FTFT retention was positively and significantly ($p \leq .001$) correlated with FTFT graduation, a logical result as students must be retained to graduate (Attewell, Heil, & Reisel, 2012; Astin, 1997; DesJardins, Ahlburg & McCall, 1999; Bailey, Crosta, & Jenkins, 2007). With a r=.516 Pearson correlation calculation, FTFT retention, and FTFT graduation track each other by 27%. Part time retention was positively and significantly ($p \leq .01$) correlated with FTFT retention and graduation and had little relationship with FTFT student transfer. Since FTPT retention and FTFT student transfer before graduation were different cohorts and had different outcomes, this lack of a relationship was logical. FTPT student retention was positively correlated with FTFT student retention with r = .427, and they track each other by 18%, indicating that institutional retention efforts may benefit both groups. FTPT student retention was positively correlated with FTFT student graduation with r = .161 and track each other by 3%.

Graduation and transfer before graduation are mutually exclusive outcomes, yet they were moderately correlated with r=.313 and track each other's variation by approximately 10%, indicating that New Jersey community colleges that graduate higher percentages of FTFT students also transfer higher percentages of FTFT students before graduation. This relationship lends credence to the assertion that community college characteristics and practices are associated with student success outcomes (Datray, Saxon & Martirosyan, 2014; Jenkins & Fink, 2016).

As student success outcomes were positively correlated with one another, community colleges experiencing higher levels of students' success in one outcome typically experience higher levels of student success in other outcomes. Logically, higher levels of student retention were required for higher levels of student graduation as a student must be retained in some capacity to graduate (Attewell, Heil, & Reisel, 2012; Astin, 1997; Calcagno et al., 2007; DesJardins, Ahlburg & McCall, 1999; Bailey, Crosta, & Jenkins, 2007; Tinto, 1993;1997; 2004). Not as intuitive was the result that higher levels of FTFT student graduation were correlated to higher levels of FTFT student transfer before graduation, as these two categories are mutually exclusive. Though graduation and transfer before graduation are mutually exclusive, both outcomes are common goals of community college attendees. Perhaps some institutions were better at helping students reach these goals via different paths (Brint & Karabel, 1989; Grubb, 1991; Townsend, Bragg & Rudd, 2009; Wellman, 2002). Though IPEDS does not differentiate between transfer to senior colleges, cross transfer to community colleges, or transfer to trade schools, the Pearson Correlation coefficient results display a greater

propensity to transfer before FTFT student graduation if the institution had higher FTFT student graduation rates.

Pearson Two-Tailed Correlation Matrix Of The Independent Variables

Black and Hispanic students as a ratio of the total student population was negatively and significantly correlated with academic support expenditures r = -.644 and tracked each other by 41%. This was an unsettling finding as Black, Hispanic, and non-traditional students were the cohorts that most require additional guidance to navigate postsecondary education successfully and attain their education objectives (Bailey & Alfonso, 2005; Cohen & Brawer, 1996; 2003; Horn & Neville, 2006; Surette, 2001; Umbach & Wawrzynsky, 2005). Black and Hispanic students to the total student population were positively and significantly correlated with the ratio of FTFT federal grant recipients to all FTFT cohorts with r =. 683, and track each other by 47%. Total fall enrollment was negatively and significantly correlated with student services expenditures, r = -.522, and they track each other by 27%. The unemployment rate was positively and significantly correlated with the percent of FTFT federal grant recipients, r = -.558, and tracked each other by 31%.

Table 4

Correlations Independent Variables – Moderate to Strong Association Only

	Fedgrnt_FTenrol	BLK&HISP	Women/FTenrol	Unemploy	Acadserv_Exp	Studserv_Exp	Fall_Enroll	Tuit&Fees	Instruct_Exp	PTFac/TotFac
Fedgrnt_FTenrol	1	.683**	.443**	.558**	-.252**	0.045	0.073	.345**	-0.034	0.076
BLK&HISP		1	.452**	.274**	-.644**	-.211**	.319**	0.100	0.001	0.055
Women/FTenrol			1	.164*	-0.106	.153*	-.138*	-0.013	-0.040	-0.045
Unemploy				1	-0.022	.185**	-0.036	.441**	-.145*	.337**
Acadserv_Exp					1	.473**	-.371**	.235**	0.035	-.165*
Studserv_Exp						1	-.522**	.216**	.325**	-0.084
Fall_Enroll							1	-0.072	-0.076	-.170**
Tuit&Fees								1	0.024	0.125
Instruct_Exp									1	-.580**
PTFac/TotFac										1

**. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed).

The Pearson correlation finds multiple interrelationships between many of the independent variables. The ratio of Black and Hispanic students, the ratio of FTFT federal grant recipients, and the ratio of fulltime women students show a positive and statistically significant relationship between all three variables. Community colleges disproportionately enroll students of color and low income students. Access close to home encourages women and Hispanic students to enroll at greater rates than other populations (Bailey & Alfonso, 2005; Cohen & Brawer, 1996; 2003; Gonzales & Hilmer, 2006; Horn & Neville, 2006; Surette, 2001; Umbach & Wawrzynsky, 2005; Wood & Palmer, 2014; Wyner, 2014). The strength of this three-way correlated relationship indicates that all three variables rose and fell in tandem, requiring vigilance for potential

multicollinearity and recognition that these variables may draw predictive power away from one another. A further implication was that all three variables had the same groups of students in common: for example, women and Black and Hispanic students overlap, as do FTFT federal grant recipients with women and Black and Hispanic students. This may be due to community college open enrollment resulting in the matriculation of high numbers of economically challenged and non-traditional students such as caregivers, older students, and underprepared students (Bailey & Alfonso, 2005; Cohen & Brawer, 1996; 2003; Horn & Neville, 2006; Surette, 2001; Umbach & Wawrzynsky, 2005; Wyner, 2014).

Additional results show unemployment rates positively and significantly tracking FTFT federal grant recipients and full time tuition and fees. The unemployment rate tracking FTFT federal grant recipients is logical, as the unemployed were encouraged to retrain for new skill sets, a traditional community college function, or go to college instead of work (Fain, 2014). Consequently, federal grants were necessary for the unemployed to realize this course of action. Unemployment rates positively tracking full time tuition and fees is an equity concern as tuition and fees were higher in counties with higher unemployment rates suggesting a barrier to higher education for people who most require such access. Academic studies found that a tuition increase was associated with lowered enrollment (Denning, 2017; Heller, 1996, 1997; Hemelt & Marcotte, 2008; 2011; Kane, 1995; Rouse, 1994; Shapiro & Yoder, 2021). The lower socioeconomic background of community college students makes them more cost sensitive to tuition changes than four-year college students (Heller, 1997; Leslie & Brinkman, 1987; Shapiro

& Yoder, 2021), and *w*ithin the community college sector, students of color were the most price sensitive of all groups (Denning, 2017; Gallet, 2007).

Student services expenditures were positive and statistically significant with academic support services and negative and statistically significant with total fall enrollment. These relationships were consistent with community colleges budgeting months ahead of each academic year. The budgeting figures were known, while enrollment was projected. Since student services expenditures and academic support services variables were divided by the academic year credit hours, the rise and fall of academic credit hours had these two variables rise and fall in tandem with each other. Logically, when fall enrollments go up, annual credit hours go up as the fall semester makes up the plurality of the annual credit hours generated, and fall enrollments drive spring enrollments.

Finally, the ratio of part time faculty to all faculty and total instruction expenditures were negatively and statistically significant with one another, a result of the substitution of part time faculty in place of full time faculty (Akrody & Caison, 2005; Christensen, 2008). The swap of part time in place of full time faculty reduced instruction expenditures, which was the institutional intent of the substitution (Akrody & Caison, 2005; Christensen, 2008).

Pearson Correlation Of Independent And Dependent Variables

The Pearson two-tailed correlation matrix of dependent variables to independent variables indicates the degree and direction of how well regressed and regressor variables track each other. The strength of the correlation provides insight into potential statistical significance in the regression models.

Table 5

Correlations Independent and Dependent Variables – Moderate to Strong Associations

	FT_Retent	PT_Retent	Grad_Rate_WO_Trans	Trans_Rate	Acadserv_Exp	Fedgrnt_FTenrol	BLK&HISP	Women/FTenrol
FT_Retent	1	.427**	.516**	.186**	.306**	-.343**	-.430**	-.397**
PT_Retent		1	.161*	-0.022	.130*	-0.087	-0.081	-.225**
Grad_Rate_WO_Trans			1	.313**	.569**	-.353**	-.678**	-.328**
Trans_Rate				1	0.055	-.480**	-.483**	-.429**
Acadserv_Exp					1	-.252**	-.644**	-0.106
Fedgrnt_FTenrol						1	.683**	.443**
BLK&HISP							1	.452**
Women/FTenrol								1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

While there are several weak and moderate correlations, I am focusing on the moderate to strong Pearson Correlations, defined as calculated correlations of .4 and above and -.4 and below. FTFT retention rates were negatively and significantly ($p \leq .001$) correlated with the ratio of Black and Hispanic students to all students with r=-.430 and track each other by 18%. There were no moderate to strong correlations for part time retention, with Black and Hispanic students not attaining statistical significance with part time retention. Three year FTFT student graduation rates were negatively and significantly ($p \leq .001$) correlated with Black and Hispanic students' ratio to total college enrollment with r=-.678. They track each other by 46%, while academic services expenditures were positively and significantly ($p \leq .001$) correlated with graduation rates with r=.569 and track each other by 32%.

Three year FTFT student transfer rates without receiving a degree or certificate were negatively and significantly ($p \leq .001$) correlated to the ratio of Black and Hispanic students to total college enrollment with $r = -.483$ and tracked each other by 23%. Three year FTFT student transfer rates without receiving a degree or certificate were negatively and significantly ($p \leq .01$) correlated with the ratio of full time FTFT federal grant recipients to FTFT college enrollment with $r = -.480$ and track each other by 23%. Three year FTFT student transfer rates without receiving a degree or certificate were negatively and significantly ($p \leq .001$) correlated with the ratio of full time women to full time college enrollment with $r = -.429$ and track each other by 18%.

A Pearson correlation analysis between the independent regressors Black and Hispanic students, FTFT federal grant recipients, and full time women students showed positive and statistically significant relationships between all three variables, indicating potential overlap of student populations among these groups. These three independent variables were negatively associated and statistically significant with three student outcomes: FTFT student retention, FTFT three year student graduation rates, and FTFT student transfer before graduation. All three independent regressors were negative to FTPT retention though only FTPT women to all FTPT students was statistically significant. Academic support services were positive and statistically significant with FTFT graduation rates, FTFT retention, and FTPT retention, and yet were negatively correlated and statistically significant with Black and Hispanic students.

Modeling With Panel Data Analysis

The current study used panel data analysis to investigate the association between independent and dependent regressors. Panel data analysis was used to provide

more data points for more robust coefficient estimates across the 19 New Jersey Community Colleges and 12 years of operational information and outcomes. The hypothesis testing for the coefficient estimates is:

(Ho): b is equal to 0 – there is no relationship between the dependent and independent variables

(Ha): b not equal to 0 – reject the null hypothesis that there is no relationship between the independent and dependent variables

Independent regressors that generate a statistical significance of ($p \leq .05$) or less are discussed in greater detail, as they demonstrate a statistically significant relationship with the dependent variable. There is a statistical possibility that this relationship may be due to chance. Reliability is discussed, as this dissertation's sample size is small relative to data sets commonly used in social science research.

Models

My dissertation utilized three panel model approaches to run four regression equations each to estimate FTFT retention, FTPT retention, FTFT graduation, and FTFT transfer. Since the data field consists of 19 community colleges with 12 years of information, this dissertation had a data field of 228 available observations, thereby requiring attention to the conservation of degrees of freedom.

Each model used four regressions to examine the four student outcomes in relation to 12 independent regressors, with the addition of a 13th regressor to examine the relationship between FTFT student retention and graduation. The Base Panel Model is the primary model in the dissertation and will act as the base for comparison purposes with the other models. The fixed effects models were used to account for individual years

and colleges to address the possibility of time invariant misspecification of the model. Model misspecification may result in autocorrelation, which biases the error terms (Flensburg, 2014; Halaby, 2004; Keele & Kelly, 2005).

I compared the Base Panel Models to the Time Fixed Effects Panel Model and College Fixed Effects Panel Model. The Time Fixed Effects Panel Model accounts for changes in the data, particularly individual years or time invariant effects, which may influence the relationship between the dependent variables and the ratio of part time faculty. The College Fixed Effects Panel Model addresses systematic differences in unobserved, time-invariant institutional characteristics that may be associated with both the dependent variables and the ratio of part time faculty. Analysis of the data field was performed using SPSS version 27.0.1.0. The sources of the data were the Integrated Postsecondary Education Data System (IPEDS), the US Department of Labor, and the US Bureau of the Census.

Use Of FTFT Retention As An Independent Variable

The 13th Independent Regressor

I am interested in investigating FTFT retention as a student outcome and if using FTFT retention as an independent variable adds additional power to the graduation regressions (Attewell, Heil, & Reisel, 2012; Astin, 1997; Calcagno et al., 2007; DesJardins, Ahlburg & McCall, 1999; Bailey, Crosta, & Jenkins, 2007; Tinto, 1993;1997; 2004). Adding FTFT retention to the graduate regression adds an indirect independent regressor that must be tested using mediation analysis (Hayes, 2017; Uedufy, 2022). The mediation analysis determines if the inclusion of FTFT retention to the graduation regression is warranted.

Using Uedufy (2022) as my guide, I downloaded from the world wide web the Process macro (version 2022) written by Dr. A. F. Hayes (Hayes, 2017). I uploaded the Process macro to SPSS 27. I ran FTFT retention as the mediation variable with FTFT graduation as the dependent variable and the ratio of part time instructors as the independent variable. The independent variables used as control variables were added as covariates. I used the Process macro in SPSS, and FTFT retention was significant at the .05 level and may be included in the model as an indirect or mediating independent variable. Further review using the Process macro found that FTFT retention accounted for 27.1% of the total effect of the Process model (Hayes, 2017; Uedufy, 2022).

After running the Base Panel Model graduation regression with and without retention as an independent regressor, I found that FTFT retention was statistically significant with a positive relationship to FTFT student three year graduation rate, an unsurprising result based on the overwhelming body of literature supporting this relationship (Attewell, Heil, & Reisel, 2012; Astin, 1997; Calcagno et al., 2007; DesJardins, Ahlburg & McCall, 1999; Bailey, Crosta, & Jenkins, 2007; Tinto, 1993;1997; 2004).

Base Panel Model

The first model was the Base Panel Model combining all 19 community colleges across 12 years of operation. In the Base Panel Model, the four student outcomes were regressed on the ratio of part time faculty to all faculty, instruction expenditures, certificate awards to all awards, academic support expenditures, student services expenditures, in-county tuition and fees, total fall enrollment, Black and Hispanic enrollment to all college enrollment, full time women enrollment to all enrollment, FTFT

federal grant recipients to full time enrollment, county unemployment rate, college enrollment to county population. In the case of the graduation equations, the FTFT student retention rate was added as an independent variable.

The first equation run was a panel regression consisting of 228 observations from the Academic Years 2004 to 2015. The first dependent variable was FTFT retention from the FTFT degree seeking cohort, defined as maintaining enrollment from the fall of matriculation to the succeeding fall semester. The second equation and dependent variable was part time retention which was the ratio of FTPT degree seeking students retained from the fall of matriculation to the following fall semester term. The third equation and dependent variable was the graduation rate which was the ratio of FTFT degree seeking students graduating 150% of the time or three years from the fall of matriculation. The FTFT student graduation ratio had been adjusted to remove FTFT student transfer students from the numerator and denominator of the ratio. The fourth dependent variable was the transfer rate which was the ratio of transferees from the FTFT degree seeking cohort who transferred within 150% of time or three years from the fall of matriculation with receiving a degree or certificate. The equations for this model were stated as follows:

Regression 1 of the Base Panel Model estimates FTFT retention:

$$RET\_FT(it) = \beta0+\beta1(PTFAC(it))+\beta2(INST\_EXP(it))+\beta3(CERT(it))+\beta4(ACAD\_EXP(it))+$$
$$\beta5(STU\_EXP(it))+\beta6(TUIT(it))+\beta7(ENRL(it))+\beta8(BLK\_HSP(it))+\beta9(WOMAN(it))+$$
$$\beta10(FEDGRT(it))+\beta11(UNEMP(it))+\beta12(ENRL\_POP(it))+\varepsilon(\imath t)$$

Regression 2 of the Base Panel Model estimates FTPT retention:

RET_PT(ιt) =
β0+β1(PTFAC(it))+β2(INST_EXP(it))+β3(CERT(it))+β4(ACAD_EXP(it))+

β5(STU_EXP(it))+β6(TUIT(it))+β7(ENRL(it))+β8(BLK_HSP(it))+β9(WOMAN(it))+

β10(FEDGRT(it))+β11(UNEMP(it))+β12(ENRL_POP(it))+ε(ιt)

Regression 3 of the Base Panel Model estimates FTFT graduation:

GRAD(ιt) =
β0+β1(PTFAC(it))+β2(INST_EXP(it))+β3(CERT(it))+β4(ACAD_EXP(it))+

β5(STU_EXP(it))+β6(TUIT(it))+β7(ENRL(it))+β8(BLK_HSP(it))+β9(WOMAN(it))+

β10(FEDGRT(it))+β11(UNEMP(it))+β12(ENRL_POP(it))+β13(RET_FT-1(it))+ε(ιt)

Regression 4 of the Base Panel Model estimates FTFT transfer:

TRAN(ιt) =
B0+β1(PTFAC(it))+β2(INST_EXP(it))+β3(CERT(it))+β4(ACAD_EXP(it))+

β5(STU_EXP(it))+β6(TUIT(it))+β7(ENRL(it))+β8(BLK_HSP(it))+β9(WOMAN(it))+

β10(FEDGRT(it))+β11(UNEMP(it))+β12(ENRL_POP(it))+ε(ιt)

The results of the Base Panel Model are contained in the following table.

Table 6

Base Panel Model Results

Variable	Regression 1	Regression 2	Regression 3	Regression 4
	FT retention	PT retention	Graduation	Transfer
Constant	-0.72	-.786**	-1.035***	0.056
	0.259	-0.246	-0.266	-0.181
Part time Faculty to all Faculty	.212**	-0.052	.171*	-0.055
	0.079	-0.073	-0.081	-0.055
Instructional Expenditures	.053*	.056**	-0.003	0.01
	0.023	-0.022	-0.024	-0.016
Certificates Granted to all Awards	-0.064	-0.052	-0.114	0.014
	0.059	-0.054	0.059	-0.041
Academic Services Expenditures	0.014	0.009	0.009	-.037***
	0.011	-0.01	-0.011	-0.007
Student Services Expenditures	0.018	.050**	0.01	-0.01
	0.021	-0.019	-0.021	-0.015
In County Tuition and Fees	.104***	.104***	.169***	.050*
	0.029	-0.026	-0.03	-0.02
Total Fall Enrollment	.030***	.033***	-.028***	-0.005
	0.008	-0.007	-0.008	-0.005
Black and Hispanic Students to all Students	-.111***	-0.031	-.244***	-.133***
	0.039	-0.035	-0.04	-0.027
Full time Women students to all full time Students	-0.115	-0.137	-0.035	-.106*
	0.075	-0.086	-0.076	-0.052
Federal Grant Recipients to Total Entering Cohort	-0.061	-0.022	0.002	-0.039
	0.036	-0.032	-0.037	-0.025
County Unemployment Rate	0.028	-0.141	0.055	-0.163
	0.196	-0.18	-0.199	-0.137

Variable	Regression 1	Regression 2	Regression 3	Regression 4
	FT retention	PT retention	Graduation	Transfer
Total College Enrollment to County Population	-0.472	-2.768**	0.676	1.774*
	1.009	-0.953	1.021	-0.704
Full time Retention Rate			.299***	
			-0.069	
Adjusted R2	0.35	0.319	0.676	0.388
F – test	11.200***	9.875***	37.504***	12.988***

*significant at the 0.05 level; **significant at the .01 level; ***significant at the .001 level

Base Panel Model – Academic Context Variables

The academic context variables in this dissertation were part time faculty to all faculty, instructional expenditures, and certificates granted to all awards. Certificates granted to all awards were not significant to FTFT student retention, graduation, or transfer. The ratio of part time faculty to all faculty and instructional expenditures were statistically significant and positively related to full time retention. Conceptually, increasing the ratio of part time faculty and expenditures on instruction per credit hour was akin to hiring more relatively lower cost part time faculty while maintaining or increasing the expenditures on total instruction. The literature was rich in finding that faculty interaction with students and the quality of that interaction in and outside of the classroom had a positive association with student retention, learning, and classroom success (Allen, 1992; Amelink, 2005; Anaya, 1992; Anaya & Cole, 2001; Astin, 1993; Cole & Griffin, 2013; Danley-Scott & Scott, 2014; Eagan, Jaeger & Grantham, 2015; Gantt, 2010; Kezar & Maxey, 2014; Kuh, 2003; Kuh & Hu, 2001; Pascarella &

Terenzini, 2005; Schreiner et al., 2011; Tinto, 2006). While the significant coefficient estimate for instructional expenditures was consistent with these findings, the ratio of part time faculty to all faculty was not (Calcagno et al., 2008; Jacoby, 2006; Jaeger & Eagan, 2011; Ran & Xu, 2018; Umbach, 2007; Xu, 2018).

Increasing the ratio of part time faculty and instructional expenditures per student credit hour and experiencing higher levels of FTFT student retention may be due to smaller class sizes, higher faculty to student ratios, and an optimum mix of part time and full time faculty in the classrooms (Ake-Little, von der Embse & Dawson 2020; Bettinger & Long, 2018; Diette & Raghav, 2015; Edmonds, 2021; Jacoby, 2006; Johnson, 2011; Maringe & Sing, 2014; Millea et al., 2018; Taft, Keston, El-Banna, 2019; Wright, Bergom & Bartholomew, 2019). I cannot ascertain the underlying reasons for the positive association, only that a significant and positive relationship exists in this model. The positive association between part time faculty and full time retention was not congruous with previous institutional and student-level student success research that overwhelmingly found a negative relationship between the use of part time faculty and student retention and graduation (Calcagno et al., 2008; Jacoby, 2006; Jaeger & Eagan, 2011; Ran & Xu, 2018; Umbach, 2007; Xu, 2018).

I found little to no relationship between instruction expenditures and FTFT student graduation, while the part time faculty ratio was positive and significant with FTFT student graduation. This was a departure from most of the research cited in the above paragraph, though some studies suggested different relationships. While Calcagno et al. (2008) and Jacoby (2006) found that part time faculty harmed student graduation rates, some researchers found that part time faculty had no impact on graduation (Allison

& Beyers, 2011; Ehrenberg & Zang, 2005), and more recently, a small number of researchers reported a positive relationship between part time faculty and graduation (Keniston, 2016; Yu, 2015).

The Base Panel Model shows a significant and positive relationship between instructional expenditures and FTPT retention and a negative but statistically non-significant relationship between part time and part-time faculty. Part time community college students were a sparsely studied area of research, but Hyland (2016) found that full and part time faculty had little to no difference in FTFT student retention outcomes. However, full time faculty performed significantly better in retaining FTPT students, a finding that concurs with this dissertation model findings.

Base Panel Model – Social Context Variables

The rise of academic and student services functions in higher education resulted from the evolution and popularity of student attrition, integration, and departure theories (Bean, 1980, 1983; Tinto, 1975, 1993, 1997, 2006). In the Base Panel Model, academic services expenditures per student credit hour had a statistically significant negative association with FTFT student transfer before graduation. Student services expenditures per student credit hour had a statistically significant and positive relationship with FTPT student retention. Both academic and student services expenditures had relationships with the student outcomes that demonstrate an enhancement of student retention. Though these relationships were the only two statistically significant for these regressors, the remaining coefficient estimates had relationships that demonstrate a positive contribution to FTFT and FTPT student retention and FTFT graduation and negative for FTFT transfer before graduation. This was consistent with both the theory and the research in the field (Bailey

& Alfonso, 2005; Swail, 1995, 2004; Tinto, 1993; Wortman & Napoli, 1996; Wyckoff, 1998).

The institutional social context variable full time in-county tuition and fees was positively associated and statistically significant with FTFT retention, FTPT retention, FTFT graduation, and FTFT transfer. The literature often finds tuition and fees to be negatively associated with graduation, leading to the possible conclusion that higher tuition and fees may constrain student success (Calcagno et al., 2008; Jacoby, 2006). This model's positive association and statistically significant relationship between in county tuition and fees and all four student success outcomes suggest that higher education costs sift out students least able to afford higher education, a cohort that institutions were less ready to support (Denning, 2017; Gallet, 2007; Heller, 1997; Jackson & Weatherby, 1975; Leslie & Brinkman, 1988; Shapiro & Yoder, 2021). Regardless, this result was supported by Raikes, Berling, and Davis (2012), who found higher tuition to be a significant and positive outcome for student graduation in an institution-based study.

The institutional social context variable total fall enrollment was positively and significantly associated with FTFT and FTPT student retention. Paradoxically, this model found that total fall enrollment, or the institution's size, was negatively and significantly associated with FTFT graduation. The literature points to a negative relationship between community college institution size and student outcomes that were often statistically significant and commonly explained as the larger institutions being detrimental to the social integration of their students (Bailey, 2005; Bailey et al., 2006; Calcagno et al., 2008; Jacoby, 2006; Pascarella & Terenzini, 2005; Youmans, 2017).

Base Panel Model – Student Variables

The student variables were the ratio of Black and Hispanic students to all students, full time women to all full time students, part time women to all FTPT students, and the ratio of FTFT federal grant recipients or Pell students to the entering FTFT cohort. These variables were all significantly correlated to each other. Black and Hispanic students to all students had a negative relationship with all four student success outcomes. In three outcomes, FTFT retention, FTFT graduation, and FTFT transfer, the negative relationship was statistically significant at the ($p \leq .001$) level. This negative and often statistically significant relationship between Black and Hispanic students with student success outcomes was well documented in the literature (Allen, 1992; Amelink, 2005; Anaya & Cole, 2001; Bailey, 2005; Bailey et al., 2006; Calcagno et al., 2008; Jacoby, 2006; Ladd, Muschkin & Vigdor, 2012; Youmans, 2017).

Women students to all students was negative with all student success indicators but was only statistically significant with FTFT student transfer. Calcagno et al. (2008) found no relationship between the ratio of women and degree attainment, but other researchers found that women's traditional role as caregivers in the family negatively impacts their success in community college (Bailey & Alfonso, 2005; Cohen & Brawer, 1996). The ratio of FTFT federal grant recipients or Pell students in the entering FTFT cohort was not statistically significant with any of the four student success outcomes.

Base Panel Model – County Variables

The county variables were county unemployment rate and total college enrollment to county population. The county unemployed as a ratio of the county labor force was not significant across the four student success outcomes. Total college enrollment to the

county population was negative and significant to part time retention and positive and significant to FTFT student transfer. Both outcomes were logical. Higher percentages of county residents using the community college may reflect a greater propensity for locals to take a course of two to improve their work skill sets, relationships with local businesses with formal agreements to partake of workforce training, and the tendency of traditional age students to take their 101 classes before moving onto senior institutions, an outcome partially supported by the ratio of total college enrollment to county population being positive and significant with FTFT student transfer.

FTFT Retention Rate And The Graduation Regressions

In the Base Panel Model, FTFT retention was positively and significantly associated with FTFT graduation at the ($p \leq .001$) level. This positive relationship and level of statistical significance were also found in the Time Fixed Effects Panel Model and the College Fixed Effects Panel Model. FTFT retention being positively and significantly associated with FTFT graduation was expected based on the overwhelming body of academic research literature (Attewell, Heil, & Reisel, 2012; Astin, 1997; Calcagno et al., 2007; DesJardins, Ahlburg & McCall, 1999; Bailey, Crosta, & Jenkins, 2007; Tinto, 1993;1997; 2004). Based on the consistency and statistical strength of FTFT retention rate in all three graduation regression models, further discussion on this relationship occurs in Chapter 5.

Time Fixed Effects Panel Model

The second regression run was the Time Fixed Effects Panel Model consisting of 228 observations across 19 community colleges and 12 years of operations from Academic Year 2004 to 2015. The Time Fixed Effects Panel Model adds 11 intercepts

for each fiscal year, with the 12th fiscal year embedded in the original intercept. The Time Fixed Effects Panel Model was run to ascertain whether adding fiscal year fixed effects provides better goodness of fit to the model. Adding the fiscal year fixed effects in the regression results in a Variance Inflation Factor (VIF) of over 10 for the annual county unemployment rate in relation to the fixed effects time intercepts. A high VIF indicates multicollinearity among these regressors (Hair et al., 2018; Kennedy, 2008; Lea & Hong, 2016; Nestor, 1996; Ringle, 2015).

There were several standards concerning how large is too large a VIF for a coefficient to remain in the model. Hair et al. (2018) and Lea and Hong (2016) said a VIF of 3 or less was ideal. Kennedy (2008), Nestor (1996), and Ringle (2015) stated that VIFs below 10 were acceptable. In this dissertation predicated on the small database sample size of 228 observations, VIFs were minimized whenever possible to reduce multicollinearity. The Black and Hispanic student variable was kept in the models. However, it had a VIF slightly above four but consistently demonstrated a statistically significant negative relationship with the student success outcome variables in all models examined in this dissertation (Hair et al., 2018; Lea & Hong, 2016). The county unemployment rate VIF was over ten and therefore removed from the model regressions where time fixed effects were employed.

The four dependent variables were run in the Time Fixed Effects Panel Model, defined by the following equations:

Regression 5 of the Time Fixed Effects Panel Model estimates FTFT retention:

$$RET\_FT(it) = \beta 0+\beta 1(PTFAC(it))+\beta 2(INST\_EXP(it))+\beta 3(CERT(it))+\beta 4(ACAD\_EXP(it))+$$

β5(STU_EXP(it))+β6(TUIT(it))+β7(ENRL(it))+β8(BLK_HSP(it))+β9(WOMAN(it))+

β10(FEDGRT(it))+ β11(ENRL_POP(it))+ β12…β22(YEAR(i))+ε(ιt)

Regression 6 of the Time Fixed Effects Panel Model estimates FTPT retention:

RET_PT(ιt) =

β0+β1(PTFAC(it))+β2(INST_EXP(it))+β3(CERT(it)+β4(ACAD_EXP(it))+

β5(STU_EXP(it))+β6(TUIT(it))+β7(ENRL(it))+β8(BLK_HSP(it))+β9(WOMAN(it))+

β10(FEDGRT(it))+β11(ENRL_POP(it)) +β12…β22(YEAR(i))+ε(ιt)

Regression 7 of the Time Fixed Effects Panel Model estimates FTFT graduation:

GRAD(ιt) =

β0+β1(PTFAC(it))+β2(INST_EXP(it))+β3(CERT(it))+β4(ACAD_EXP(it))+

β5(STU_EXP(it))+β6(TUIT(it))+β7(ENRL(it))+β8(BLK_HSP(it))+β9(WOMAN(it))+

β10(FEDGRT(it))+β11(ENRL_POP(it))+β12(RET_FT-1(it))+β13…β23(YEAR(i))+ε(ιt)

Regression 8 of the Time Fixed Effects Panel Model estimates FTFT transfer:

TRAN(ιt) =
β0+β1(PTFAC(it))+β2(INST_EXP(it))+β3(CERT(it))+β4(ACAD_EXP(it))+

β5(STU_EXP(it))+β6(TUIT(it))+β7(ENRL(it))+β8(BLK_HSP(it))+β9(WOMAN(it))+

β10(FEDGRT(it))+β11(ENRL_POP(it))+β12…β22(YEAR(i)) +ε(ιt)

The time fixed effect panel model results are contained in Table 7.

Table 7

Time Fixed Effects Panel Model Results

Variable	Regression 5	Regression 6	Regression 7	Regression 8
	FT retention	PT retention	Graduation	Transfer
	FE Time	FE Time	FE Time	FE Time
Constant	-0.505	-.909***	0.168	0.088
	-0.298	-0.276	-0.245	-0.212
Part time Faculty to all Faculty	.199*	-0.035	-0.04	-0.048
	-0.084	-0.078	-0.069	-0.06
Instructional Expenditures	.054*	.063**	-.045*	0.018
	-0.024	-0.023	-0.02	-0.017
Certificates Granted to all Awards	-0.057	-0.051	-.187***	0.04
	-0.059	-0.055	-0.048	-0.042
Academic Services Expenditures	0.017	0.008	0.016	-.035***
	-0.011	-0.01	-0.009	-0.008
Student Services Expenditures	0.023	.046*	0.033	-0.012
	-0.02	-0.019	-0.017	-0.015
In County Tuition and Fees	.069*	.118***	0.052	0.036
	-0.033	-0.03	-0.027	-0.024
Total Fall Enrollment	.030***	.034***	-.037***	-0.003
	-0.008	-0.007	-0.007	-0.006
Black and Hispanic Students to all Students	-.104**	-0.041	-.192***	-.140***
	-0.04	-0.036	-0.033	-0.028
Full time Women students to all full time Students	-0.098	-0.168	-0.019	-0.093
	-0.075	-0.092	-0.061	-0.053
Federal Grant Recipients to Total Entering Cohort	-0.071	-0.103	-.088**	-0.045
	-0.036	-0.033	-0.03	-0.026
County Unemployment Rate				
Total College Enrollment to County Population	-0.878	-2.667**	0.792	1.139
	-1.019	-0.979	-0.833	-0.724
Full time Retention Rate			.197***	

Variable	Regression 5	Regression 6	Regression 7	Regression 8
	FT retention	PT retention	Graduation	Transfer
	FE Time	FE Time	FE Time	FE Time
			-0.057	
Academic Year 2005	0.017	0.012	0.017	-0.003
	-0.017	-0.015	-0.014	-0.012
Academic Year 2006	0.031	0.002	0.025	0.001
	-0.017	-0.015	-0.014	-0.012
Academic Year 2007	0.015	-0.002	.040**	0.015
	-0.017	-0.016	-0.014	-0.012
Academic Year 2008	0.029	-0.001	.065***	0.023
	-0.017	-0.016	-0.014	-0.012
Academic Year 2009	.057**	0.008	.066***	0.01
	-0.018	-0.016	-0.015	-0.013
Academic Year 2010	0.034	-0.001	.061***	0.01
	-0.018	-0.017	-0.015	-0.013
Academic Year 2011	0.026	-20	.059***	0.007
	-0.019	-0.018	-0.016	-0.014
Academic Year 2012	0.027	-0.015	.070***	0.012
	-0.019	-0.018	-0.016	-0.014
Academic Year 2013	.038*	-0.01	.101***	0.008
	-0.019	-0.018	-0.016	-0.014
Academic Year 2014	.048*	-0.007	.134***	0.006
	-0.019	-0.018	-0.016	-0.014
Academic Year 2015	0.037	-0.01	.148***	-0.001
	-0.02	-0.019	-0.016	-0.014
Adjusted R2	0.364	0.301	0.794	0.378
F – test	6.918***	5.440***	38.994***	7.281***

*significant at the 0.05 level; **significant at the .01 level; ***significant at the .001 level

Time Fixed Effects Panel Models – FTFT And FTPT Retention

The academic, social, student and county context regressors in the Time Fixed Effects Panel Model retain the signs and statistical significance found in the Base Panel Model for FTFT and FTPT student retention. In some cases, the statistical significance was lower than the Base Panel Model. The independent regressors that maintain their signs and statistical significance for FTFT retention were part time faculty to all faculty,

positive association with ($p \leq .01$); instructional expenditures, positive association with ($p \leq .05$); in county tuition and fees, positive association, $p \leq .001$; total fall enrollment, positive association with ($p \leq .001$); and Black and Hispanic students to all students, negative with ($p \leq .001$) (Allen, 1992; Amelink, 2005; Anaya, 1992; Anaya & Cole, 2001; Astin, 1993; Cole & Griffin, 2013; Danley-Scott & Scott, 2014; Eagan, Jaeger & Grantham, 2015; Gantt, 2010; Kezar & Maxey, 2014; Kuh, 2003; Kuh & Hu, 2001; Heller, 1997; Jackson & Weatherby, 1975; Leslie & Brinkman, 1988; Pascarella & Terenzini, 2005; Schreiner et al., 2011; Tinto, 2006).

The independent regressors that maintain their signs and statistical significance for part time retention were instructional expenditures, positive association with $p \leq .01$; student services expenditures, positive association with $p \leq .01$; in county tuition and fees, positive association with $p \leq .001$; total fall enrollment, positive association with $p \leq .001$; and total college enrollment to county population, positive association with $p \leq .01$ (Allison & Beyers, 2011; Calcagno et al., 2008; Ehrenberg & Zang, 2005; Heller, 1997; Jackson & Weatherby, 1975; Keniston, 2016; Leslie & Brinkman, 1988; Yu, 2015).

Time Fixed Effects Panel Model – Ftft Graduation

While the Base Panel Model and the Time Fixed Effects Panel Models were similar in coefficient estimates and statistical significance for the FTFT and FTPT retention regressions, there were major differences regarding the three year FTFT student graduation and transfer regressions. The academic context independent regressors show considerable changes. In the Base Panel Model, part time faculty was positively associated with FTFT student graduation and statistically significant ($p \leq .05$), while instructional expenditures were not significant. In the Time Fixed Effects Panel Model,

part time faculty was negative and not statistically significant. Instructional expenditures were negatively associated with FTFT student graduation and statistically significant ($p \leq .05$). While the loss of significance for part-time faculty was more in line with the existing academic research, the negative association and statistical significance of academic expenditures were counter to previous findings (Allen, 1992; Amelink, 2005; Anaya, 1992; Anaya & Cole, 2001; Astin, 1993; Calcagno et al., 2008; Cole & Griffin, 2013; Danley-Scott & Scott, 2014; Eagan, Jaeger & Grantham, 2015; Gantt, 2010; Jacoby, 2006; Jaeger & Eagan, 2011: Kezar & Maxey, 2014; Kuh, 2003; Kuh & Hu, 2001; Pascarella & Terenzini, 2005; Ran & Xu, 2018; Schreiner et al., 2011; Tinto, 2006; Umbach, 2007; Xu, 2018).

The last academic context variable, certificates to all awards, goes from negative and not significant in the Base Panel Model to negative and statistically significant in the Time Fixed Effects Panel Model, or a higher percentage of certificates to all awards, a lower percentage of completions. Vocational programs were overly enrolled by non-traditional students seeking an economic return for their higher education investment (Belfield & Bailey, 2011; Xu & Trimble, 2015). Often, non-traditional students were not academically prepared and were overly burdened by their personal lives, which interfered with success in a college program (Bailey & Alfonso, 2005; Cohen & Brawer, 1996). Dowd and Coury (2006) found that students in vocational programs experience lower associate degree completion rates, yet Jacoby (2006) found higher percentages of degree seeking students in the FTFT student cohort experience lower percentages of completions.

The social context student variables also experienced changes in the graduation regressions. Where tuition and fees were positive and statistically significant in the Base Panel Model, the regressor was no longer significant in the Time Fixed Effects Panel Model (Denning, 2017; Heller, 1996; 1997; Hemelt & Marcotte, 2008; 2011; Jackson & Weatherby, 1975; Leslie & Brinkman, 1988; Raikes, Berling, & Davis; 2012). FTFT federal grant recipients were not significant in the Base Panel Model and were negative and statistically significant ($p \leq .01$) in the Time Fixed Effects Panel Model. This dissertation consistently found a negative relationship between need based financial aid and student outcomes. Black and Hispanic students to all students were negative and statistically significant in both models ($p \leq .001$), a consistent finding in this dissertation and throughout the literature (Allen, 1992; Amelink, 2005; Anaya & Cole, 2001; Bailey, 2005; Bailey et al., 2006; Calcagno et al., 2008; Jacoby, 2006; Ladd, Muschkin & Vigdor, 2012; Youmans, 2017).

FTFT retention, the added independent regressor to all graduation regressions, was positively associated with FTFT student graduation and statistically significant ($p \leq .001$). It should be noted that FTFT retention added as an independent regressor to the graduation regression may capture some of the variances that the independent regressors did in the retention regressions. Therefore, the independent regressors may lose statistical significance between estimating FTFT student retention and then estimating FTFT graduation, as the addition of the FTFT retention regressor in the graduation regression may capture the variance previously seen in the retention equation. The regressors that continue to be statistically significant after adding FTFT retention as an independent variable may demonstrate more immediate relationships with the

graduation outcome in years two and three, as the FTFT student retention regressor was theoretically accounting for the variance in the first year of college attendance.

Time Fixed Effects Panel Model – Ftft Student Transfer

The transfer regression in the Time Fixed Effects Panel Model had three independent regressors with similar coefficient estimates and different levels of statistical significance. Tuition and fees were positive and statistically significant ($p \leq .05$) in the Base Panel Model and lost its significance in the Time Fixed Effects Panel Model. Women to all students were negative and statistically significant ($p \leq .05$) in the Base Panel Model and was not significant in the Time Fixed Effects Panel Model. Total college enrollment to the county population was positive and statistically significant ($p \leq .05$) in the Base Panel Model and not significant in the Time Fixed Effects Panel Model. Two independent regressors that were consistent in both the Base Panel Model and the Time Fixed Effects Panel Model were academic services expenditures and Black and Hispanic students, who were negatively associated with FTFT student transfer and statistically significant at the ($p \leq .001$) level.

College Fixed Effects Panel Models

The third model and set of equations run were the College Fixed Effects Panel Model, consisting of 228 observations across 19 community colleges and 12 years of operations from Academic Year 2004 to 2015. The College Fixed Effects Panel Model adds 18 intercepts to account for each community college; the 19th community college is embedded into the model intercept to avoid multicollinearity. This model displayed very high levels of multicollinearity among the independent regressors. Multicollinearity is when two or more independent regressors are highly correlated, causing unstable

coefficient estimates, high R2, and low t-statistic estimates (Moore, Notz, & Flinger, 2013). Significantly high correlation biases the model estimates so that p-values are underestimated, resulting in acceptance of the null hypothesis that coefficient estimates are not different from zero when the null hypothesis should be rejected (Moore, Notz, & Flinger; 2013). The degree of multicollinearity is calculated by the diagnostic statistic variance inflation factor statistic (VIF).

As previously stated, there were multiple positions concerning how high is too high a VIF for a coefficient to remain in the model. Hair et al. (2018) and Lea and Hong (2016) say a VIF of 3 or less was ideal. Kennedy (2008), Nestor (1996), and Ringle (2015) believe VIFs below 10 are acceptable. The first community College Fixed Effects Panel Model had several independent regressors with VIFs in the hundreds indicating severe multicollinearity (Kennedy, 2008; Nestor, 1996; Ringle, 2015). The classic signs of multicollinearity are loss of the estimated coefficient significance, high R2, and in some cases, the sign of the coefficient or/and the magnitude of the coefficient estimate changes and becomes unstable with minor changes to the model (Moore, Notz & Flinger, 2013).

To address the severe multicollinearity problem, the three independent regressors with VIF calculations over 100 were removed from the model: college fall enrollment, college enrollment to county population, and academic support expenditures. The revised model had one variable with a VIF above 10, Black and Hispanic students to all students. Though this variable displayed negative and statistically significant relationships with the two previous models, in this case, I removed the Black and Hispanic students' variable to

continue my investigation of the variable of interest, the ratio of part time faculty to all faculty.

The four dependent variables were run in the College Fixed Effects Panel Model based on the regression equations below:

Regression 9 of the College Fixed Effects Panel Model estimates FTFT retention:

$$RET\_FT(\imath t) = \beta 0+\beta 1(PTFAC(it))+\beta 2(CERT(it))+\beta 3(TUIT(it))+\beta 4(WOMAN(it))+ \beta 5(FEDGRT(it))+B6(UNEMP(it))+\beta 7\ldots\beta 24(COLLEGE(t))+\varepsilon(\imath t)$$

Regression 10 of the College Fixed Effects Panel Model estimates FTPT retention:

$$RET\_PT(\imath t) = \beta 0+\beta 1(PTFAC(it))+\beta 2(CERT(it))+\beta 3(TUIT(it))+\beta 4(WOMAN(it))+ \beta 5(FEDGRT(it))+B6(UNEMP(it))+\beta 7\ldots\beta 24(COLLEGE(t))+\varepsilon(\imath t)$$

Regression 11 of the College Fixed Effects Panel Model estimates FTFT graduation:

$$GRAD(\imath t) = \beta 0+\beta 1(PTFAC(it))+\beta 2(CERT(it))+ \beta 3(TUIT(it))+\beta 4(WOMAN(it))+ \beta 5(FEDGRT(it))+B6(UNEMP(it))+\beta 7(RET\_FT-1(it))+\beta 8\ldots\beta 25(COLLEGE(t))+\varepsilon(\imath t)$$

Regression 12 of the Time Fixed Effects Panel Model estimates FTFT transfer:

$$TRAN(\imath t) = \beta 0+\beta 1(PTFAC(it))+\beta 2(CERT(it))+ \beta 3(TUIT(it))+\beta 4(WOMAN(it))+ \beta 5(FEDGRT(it))+B6(UNEMP(it))+\beta 7\ldots\beta 24(COLLEGE(t))+\varepsilon(\imath t)$$

Table 8

College Fixed Effects Panel Model

Variable	Regression 9	Regression 10	Regression 11	Regression 12
	FT retention	PT retention	Graduation	Transfer
	FE college	FE college	FE college	FE college
Constant	0.008	0.38	-1.580***	0.267
	-0.244	-0.243	-0.212	-0.179
Part time Faculty to all Faculty	0.146	-0.082	.511***	-0.135
	-0.109	-0.101	-0.095	-0.08
Instructional Expenditures				
Certificates Granted to all Awards	-.205**	-0.001	-0.088	-0.006
	-0.076	-0.069	-0.067	-0.055
Academic Services Expenditures				
Student Services Expenditures				
In County Tuition and Fees	.073*	0.036	.160***	-0.004
	-0.035	-0.032	-0.031	-0.026
Total Fall Enrollment				
Black and Hispanic Students to all Students				
Full time Women students to all full time Students	-0.046	-0.191	.167*	0.001
	-0.08	-0.099	-0.076	-0.064
Federal Grant Recipients to Total Entering Cohort	-0.015	-0.016	.065*	-0.027
	-0.035	-0.032	-0.03	-0.026
County Unemployment Rate	-0.054	-0.121	-.396*	0.187
	-0.188	-0.171	-0.163	-0.138
Total College Enrollment to County Population				
Full time Retention Rate			.208***	
			-0.061	
Bergan	.044*	.052**	0.021	0.013
	-0.021	-0.02	-0.019	-0.016
Brookdale	.062**	0.013	.084***	.039*
	-0.023	-0.02	-0.02	-0.017
Burlington	-0.003	-0.041	0.002	.076***
	0.024	0.022	-0.021	-0.018
Camden	0.028	-0.033	-.058**	.042*
	-0.022	-0.02	-0.02	-0.016

Variable	Regression 9	Regression 10	Regression 11	Regression 12
	FT retention	PT retention	Graduation	Transfer
	FE college	FE college	FE college	FE college
Morris	0.048	.049**	.141***	.077***
	-0.027	-0.024	-0.024	-0.02
Cumberland	0.037	0.018	.036*	-0.001
	-0.021	-0.019	-0.018	-0.015
Essex	-.084***	-.055**	-.102***	-0.019
	-0.02	-0.018	-0.018	-0.015
Gloucester	-0.006	-0.031	.076***	.084***
	-0.02	-0.018	-0.017	-0.015
Hudson	-.079***	-0.023	-.139***	0.019
	-0.021	-0.019	-0.019	-0.015
Mercer	0.005	-.067**	0.037	.073***
	-0.022	-0.021	-0.018	-0.016
Middlesex	0.039	0.016	0.01	.057***
	-0.02	-0.02	-0.018	-0.015
Ocean	.063**	-0.02	.133***	0.012
	-0.02	-0.018	-0.018	-0.015
Passaic	0.017	0.009	-.127***	0.008
	-0.021	-0.019	-0.018	-0.015
Raritan	.072**	-0.013	.054*	.066***
	-0.025	-0.022	-0.022	-0.018
Salem	0.012	-0.026	.115***	0.027
	-0.026	-0.024	-0.022	-0.019
Sussex	0.033	-0.016	.072***	.057***
	-0.022	-0.02	-0.019	-0.016
Union	0.002	-0.024	-0.004	-0.012
	-0.024	-0.022	-0.021	-0.017
Warren	-0.007	-.078***	.102***	.063***
	-0.02	-0.019	-0.018	-0.015
Adjusted R2	0.486	0.454	0.811	0.465
F – test	9.927***	8.863***	39.965***	9.221***

*significant at the 0.05 level; **significant at the .01 level; ***significant at the .001 level

Once again, the ratio of part time faculty to all faculty is significantly and positively associated with graduation. Due to the severe multicollinearity problem introduced by adding fixed effects to capture time invariant college effects, six

independent regressors had to be removed from the model; Instructional expenditures in the academic context variables; academic services expenditures, student services expenditures, and total fall enrollment from the institutional social context variables; Black and Hispanic students to all students in the student social context variables, and total college enrollment to county population in the county social context variables. The loss of half of the independent regressor makes this model so structurally different that it would be inappropriate to compare the College Fixed Effects Panel Model to the Base Panel Model. Regardless, observations were worth making to encourage future research on student success outcomes and institutional level variables using College Fixed Effects Panel Modeling.

College Fixed Effects Panel Model - FTPT Retention FTFT Student Transfer

The loss of so many regressors was troubling as the variance captured by the eliminated variables, if not captured by the college fixed effects, can be picked up by the remaining independent regressors or by the regression error term. However, two regressions in this model, FTPT retention and FTFT student transfer, had no statistically significant explanatory variables, excluding the college fixed effects variables. The lack of statistical significance in the remaining regressors may indicate that the College Fixed Effects Panel Modeling may provide added insight to institutional level modeling of student success outcomes. Though not statistically significant, part time faculty to all faculty was negative with respect to part time retention and FTFT student transfer.

College Fixed Effects Panel Model – FTFT Retention And FTFT Graduation

The FTFT retention regression in the College Fixed Effects Panel Model had two significant variables; certificates granted to all awards with a negative association

and statistically significant at the ($p \leq .01$) level, and in county tuition and fees with a positive association, statistically significant at the ($p \leq .05$) level. The study variable, part time faculty to all faculty, was not significant but maintained a positive association as found in the Base Panel and Time Effects Panel Models. The change in the model structure of the College Fixed Effects Panel Model and the potential effect it may have on the estimated coefficients may be seen by part time faculty to all faculty not being statically significant relative to FTFT retention, or the college fixed effects may capture individual college variances that were inappropriately attributed to the ratio of part time instruction to all instruction. On the other hand, the graduation regression had one study variable that was not statistically significant, and 13 of the college fixed effects variables were statistically significant. The variable being studied, the ratio of part time faculty, was positively associated with FTFT student graduation and statistically significant at the ($p \leq .001$) level.

The estimates of all four regressions in the College Fixed Effects Panel Model led to many questions concerning the model's integrity, which is not to be examined in this dissertation. Suffice to say that the dissertation's limited sample size does not allow all the study's independent variables to be adequately explored in the College Fixed Effects Model due to severe multicollinearity problems. Future research may be merited using the College Fixed Effects Panel Model as more data points become available with time.

Chapter 5

Analysis and Discussion

This dissertation investigated the ratio of part time faculty to all faculty in relation to student success outcomes at New Jersey Community Colleges from the institutional perspective. The part-time faculty ratio was examined relative to FTFT and FTPT student retention, FTFT graduation, and FTFT transfer while employing control variables to account for other theoretical influences on the student success outcomes. I used Tinto's Model of Institutional Departure (Tinto, 1975; 1993) to organize the explanatory variables into a modified academic and social context structure to estimate the model regressions and capture the influences that may be attributable to the ratio of part time faculty to all faculty on the student success outcomes.

The academic context explanatory variables include part time faculty to all faculty, instructional expenditures, and certificates granted to all awards. The social context variables were divided into institutional, student, and county groups. The institutional explanatory variables were academic service expenditures, student service expenditures, in-county tuition and fees, and total fall enrollment. Student explanatory variables were Black and Hispanic students to all students, women students to all students, and FTFT federal grant recipients to the entering cohort. The county explanatory variables were the county unemployment rate and total college enrollment to the county population.

Three panel models were used: The Base Panel Model, the Time Fixed Effects Panel Model, and the College Fixed Effects Panel Model. The three model approaches were used to estimate equations for FTFT student retention, FTPT student retention,

FTFT student graduation net of transfer, and FTFT student transfer without a degree or certificate to answer the dissertation's four research questions:

1) Is the ratio of part time faculty at New Jersey community colleges associated with FTFT and FTPT student fall to fall retention rates?

2) Is FTFT student retention a statistically significant independent variable when regressing the ratio of part time faculty against FTFT student three year graduation rates net of transfer students?

3) Is the ratio of part time faculty associated with FTFT student graduation rates when retention rate is included as an independent variable?

4) Is the ratio of part time faculty associated with FTFT student three year transfer rates without receiving a degree or certificate?

I will examine the outcomes of all three models, but in the event the models differ I will prefer the results of the College Fixed Effects Model over the other two models. This decision is predicated on the Base Panel Model being a random effects model that does not account for time invariant events and phenomena not captured by the independent variables. The Time Fixed Effects Model attempts to account for time invariant shocks in the data field. The College Fixed Effects Model attempts to control time-invariant characteristics of each community college such as campus location and culture, business practices, and other difficult to measure and quantity aspects germane to each institution that could bias the coefficient estimates of the independent variables and thereby provide erroneous results (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). In summary, the College Fixed Effects Model is preferable to the other models as it attempts to capture seen and unseen differences between the 19

community colleges thereby allowing less biased coefficient estimates for the independent variables (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012).

Discussion Of Part Time Faculty To All Faculty And Student Success Outcomes

Ftft & Ftpt Retention

The ratio of part time faculty to all faculty is examined in finer detail, as it is the research focus. The ratio of part time faculty to FTFT retention is positively related in the Base Panel Model, the Time Fixed Effects Model, and the College Fixed Effects Model, with p values of p=.008, p=.019, and p=.182, respectively. The p values indicate statistical significance at the .01, .05, and .2 levels. While the Base Panel and Time Fixed Effects Models attain levels of statistical significance commonly used in the social sciences, the College Fixed Effects Model does not. The magnitude of the relationship between part time faculty and full time retention is consistent among the three models. An increase of ten percentage points in the ratio of part time faculty is associated with an increase of 2.1 percentage points in FTFT retention in the Base Panel Model, 2.0 percentage points in the Time Fixed Effects Model, and 1.5 percentage points in College Fixed Effects Model. These outcomes are in contrast to the research that expounded on the inherent weaknesses of part time faculty in higher education such as institutional integration and pedagogy (Benjamin, 2003a, 2003b; CCCSE, 2014; Cross & Goldenberg, 2003; Elman, 2003; Schuster, 2003; Thompson, 2003; Townsend, 2003) or intregration and making connections with students in outside the classroom that assist the learning process (Astin, 1993; Cole & Griffin, 2013; Danley-Scott & Scott, 2014; Eagan, Jaeger & Grantham, 2015; Felten et al., 2016; Gantt, 2010; Kezar & Maxey, 2014; Kuh, 2003; Kuh & Hu, 2001; Pascarella & Terenzini, 2005; Schreiner et al., 2011; Tinto, 2006).

In contrast and in concurrence with previous literature, the ratio of part time faculty is negatively related and not statistically significant to FTPT retention in the three models, with p values between p=.419 to p=.652. The magnitude of the association between the ratio of part time faculty and FTPT retention is consistent in all three models, with a ten percentage point increase in the ratio of part time faculty associated with less than a 1% decrease in FTPT retention. The change in statistical significance and relationship between FTFT retention and FTPT retention indicates differences in the population cohorts and the dynamics between the ratio of part time faculty and FTFT & FTPT retention, corresponding to Gabovitch (2014) findings that the quality of instruction and teaching was critically important for FTPT student success in community colleges.

Ftft Graduation

The ratio of part time faculty to FTFT graduation is positively associated in the Base Panel Model and the College Fixed Effects Model with p values of p=.037 and $p\leq$.001, respectively. The p values indicate statistical significance at the .05 and .001 levels. The magnitude of the relationship between part time faculty and FTFT graduation is different between the Base Panel Model and the College Fixed Effects Model, with coefficient estimates of .171 and .511, respectively; a magnitude difference of a power of three. An increase of ten percentage points in the ratio of part time faculty is associated with an increase of 1.7 percentage points in FTFT graduation in the Base Panel Model and 5.1 percentage points in the College Fixed Effects Model. This difference in magnitude may be due to the elimination of six independent regressors in the College Fixed Effects model to mitigate multicollinearity, thereby allowing the regressor, the

ratio of part time faculty, to capture variance previously addressed by the eliminated regressors.

The ratio of part time faculty to FTFT graduation is negatively associated and not statistically significant in the Time Fixed Effects Panel Model, with p values of p=.568. An increase of ten percentage points in the ratio of part time faculty is associated with a decrease of .4 percentage points in FTFT graduation. Though not statistically significant by any standard, the negative relationship of the ratio of part time faculty to FTFT graduation contrasts with the Base Panel and College Fixed Effects Models, which display statistically significant positive relationships. Some phenomena may be captured by the yearly fixed effects, thereby changing the coefficient estimate and significance of the ratio of part time faculty to FTFT graduation. To check on the consistency of these results, the mediation variable FTFT retention was removed as an independent regressor, and the models were rerun with no substantive change in the results or significance findings.

The findings above are in contrast to nationwide studies of two-year colleges which found that as the percentage of part time faculty rises, graduation rates fall (Jacoby, 2005). Jaeger and Eagan (2009) calculate that a 10% increase in exposure to adjunct instructors resulted in a 1% decrease in graduation rates. My dissertation found in two of the three models run that the ratio of part time faculty has a positive and statistically significant impact on graduation, while existing research concluded that greater utilization of part time faculty reduces community college graduation rates (Ehrenberg & Zhang, 2004; Jacoby, 2006; Jaeger & Eagan, 2009).

Ftft Transfer

The ratio of part time faculty to FTFT transfer is negatively associated in the Base Panel Model, the Time Fixed Effects Model, and the College Fixed Effects Model, with p values of p=.318, p=.424, and p=.092 respectively, and so the relationship is not significant. The p values indicate statistical significance at the .1 level for the College Fixed Effects Model. An increase of ten percentage points in the ratio of part time faculty is associated with a decrease of .6 percentage points in FTFT transfer in the Base Panel Model, .5 percentage points in the Time Fixed Effects Model, and 1.4 percentage points in College Fixed Effects Model. The magnitude of the relationship between part time faculty and FTFT transfer is consistent between the Base Panel Model and Time Fixed Effect College Fixed Effects Models with coefficient estimates of -.055 and -.048, respectively, but compared to the college fixed effects model estimate of -.135 there is a magnitude difference of approximately 2.5 times. Once again, this difference in magnitude may be due to the elimination of six independent regressors in the College Fixed Effects model to mitigate multicollinearity, thereby allowing the regressor, the ratio of part time faculty, to capture variance previously attributed to the eliminated regressors.

The findings are difficult to interpret using the existing literature. Calcagno et al. (2008) found that the proportion of part time faculty had a statistically significant and negative impact on transfer to four-year colleges, yet other research found that bachelor's degree graduation was depressed by students who transferred without first receiving an associate degree or certificate (Cejda & Kaylor, 2001; Hoachlander, Sikora & Horn, 2003; Quigley & Bailey, 2003; Rendon, 1993; Rendon, 1994). So part time faculty

decreasing the rate of transfer before receiving a community college credential may be seen a bad outcome Calcagno et al. (2008), or a good outcome (Cejda & Kaylor, 2001; Hoachlander, Sikora & Horn, 2003; Quigley & Bailey, 2003; Rendon, 1993; Rendon,1994). Additionally, IPEDS does not require reporting where the student transferred to before graduation, and the transfer could be to a technical school, other community college or senior institution. My dissertation found that the ratio of part time faculty does depress student transfer before receiving a community college credential.

Discussion Of Findings And Research Questions

The following table helps to organize and provide an overview of the findings from the three models in relation to the research questions. The College Fixed Effects Panel Model required the elimination of six independent variables to reduce severe multicollinearity problems, thereby changing the structure of the model and making comparisons difficult, if not impossible. Regardless, discussion of the College Fixed Effects Model regarding the ratio of part time faculty to the student success outcomes is addressed in an attempt to capture college specific variances not addressed by the Base and Time Fixed Effects Panel Models.

Table 9

Results of All Models

	Base Panel Model	Time Fixed Effects Panel Model	College Fixed Effects Panel Model
Ratio of Part Time Faculty and FTFT Student Retention	(p=.008) Significant Positive Relationship	(p=.019) Significant Positive Relationship	(p=.182) Not Significant Positive Relationship
Ratio of Part Time Faculty and FTPT Student Retention	(p=.475) Not Significant Negative Relationship	(p=.654) Not Significant Negative Relationship	(p=.419) Not Significant Negative Relationship
Significance of FTFT Retention as an IV for Estimating FTFT Graduation Rates	($p\leq$.001) FTFT Retention Significant Positive Relationship w/ Graduation Rates	($p\leq$.001) FTFT Retention Significant Positive Relationship w/ Graduation Rates	($p\leq$.001) FTFT Retention Significant Positive Relationship w/ Graduation Rates
Ratio of Part Time Faculty and FTFT Student Graduation	(p=.037) Positive Significant Relationship	(p=.568) Not Significant Negative Relationship	(p<.001) Positive Significant Relationship
Ratio of Part Time Faculty and FTFT Student Transfer	(p=.318) Not Significant Negative Relationship	(p=.424) Not Significant Negative Relationship	(p=.092) Not Significant Negative Relationship

Two out of three models had a significant positive relationship between the ratio of part time faculty to all faculty and FTFT student retention, the exception being the College Fixed Effects, which was positive in relationship but significant at the ($p\leq$.2) level. Two of the three models found a significant positive relationship between part time faculty and FTFT student graduation. No statistically significant relationship was found

across the three models between the ratio of part time faculty and FTPT student retention or FTFT student transfer, though all six regressions exhibited negative relationships between part time faculty and the dependent regressors.

Base Panel Regression

The Base Panel model found that higher ratios of part time faculty were significantly and positively associated with higher rates of FTFT student retention and graduation. Even with FTFT retention included as an independent variable in the graduation regression, the ratio of part time faculty was significantly and positively associated with FTFT student graduation in the model. A positive relationship between part time faculty and graduation has been found in a limited number of research studies (Keniston, 2016; Yu, 2015). The significance of FTFT retention at the ($p \leq .001$) level demonstrates the importance of retention to graduation. FTFT retention as an independent regressor to FTFT Graduation was significant at the ($p \leq .001$) level in all three models, a relationship well supported in academic theory and research (Attewell, Heil, & Reisel, 2012; Adelman, 1999; Astin, 1993, 1997; Bailey, Crosta, & Jenkins, 2007; Denning, 2017; Gallet, 2007; Horn, 2009). The ratio of part time faculty to all faculty had no statistical significance with FTPT student retention or FTFT student transfer in the Base Panel Model, though the relationship in both cases is negative.

The Time Fixed Effects Panel Regression

Allowing the year intercepts to account for time invariant fluctuations results in a statistically significant and positive relationship between part time faculty and FTFT student retention. Unlike the Base Panel Model, there was no statistical relationship between the ratio of part time faculty and FTFT student graduation. Additionally, the

relationship between the part time faculty and FTFT graduation was negative. As with the previous models, there was no statistical relationship between the ratio of part time faculty and part time retention or FTFT student transfer though both relationships were negative (Calcagno et al., 2008; Gabovitch; 2014).

The College Fixed Effects Panel Regression

The College Fixed Effects Panel Model Regression was unlike the first two models, as six independent regressors had to be removed from the model to address severe multicollinearity problems. Part time faculty to all faculty displayed a VIF score in the high range, too high for my dissertation multicollinearity tolerance. However, since this variable is my research focus, I retained it in the regression. The ratio of part time faculty was positively associated but not statistically significant with full time student retention. Part time faculty was statistically significant ($p \leq .001$) and positive with FTFT student graduation rates, similar to the Base Panel Model, and had no statistical significance with part time retention and FTFT student transfer rates but the relationship was negative like the Base Panel Model and the Time Fixed Effects Panel Model (Calcagno et al., 2008; Gabovitch; 2014; Keniston, 2016; Yu, 2015).

Discussions Concerning The Research Questions

Research question one, "Is the ratio of part time faculty to all faculty at New Jersey community colleges associated with FTFT and FTPT student fall to fall retention rates?" The Base Panel and Time Fixed Effects Panel Models show statistically significant and positive relationships between the ratio of part time faculty and FTFT student retention. The College Fixed Effects Model is not statistically significant but also positive in relationship between part time faculty and FTFT student retention. According

to the three models, raising the ratio of part time faculty by ten percentage points will increase FTFT retention by approximately one-and-a-half to two percentage points. That a higher ratio of part time instructors may be beneficial to student retention is surprising, but Tinto (1993) believes academic integration, not specific to part-time or full-time faculty, is critical to retaining students. Perhaps adjuncts bring a new bearing to the classroom, potentially stemming from the everyday community experiences between instructors and students. Perhaps adjuncts are more eager and familiar with the material, especially when applying real world applications. Regardless, part time instructors benefit student retention, as do academic expenditures, which will be discussed later in the chapter.

The three models show no statistically significant relationship between the ratio of part time faculty and FTPT student retention. However, the coefficients were negative in all three cases, which was in accordance with most of the existing literature research concerning part time faculty and student retention (Calcagno et al., 2008; Cotton & Wilson, 2006; Eagan & Jaeger, 2008a; 2008b; Jacoby, 2006; Jaeger & Eagan, 2009; Jaeger & Eagan, 2011; Jaeger & Hinz, 2009; Kezar & Lester, 2009; Kuh, Kinzie, Schuh, & Whitt, 2005; Milem & Berger, 1997; Schuster, 2003, 2007). The negative relationship between part time faculty and FTPT retention makes sense as part time enrollment is an established pathway for nontraditional and marginalized student cohorts to attain an academic credential (Gabovitch, 2014).

Research question two is, "Is FTFT student fall to fall retention a statistically significant independent variable when examining the relationship of part time faculty to FTFT student three year graduation rates net of transfer students?" This dissertation

found in all three graduation regressions that the independent variable FTFT retention was significant ($p \leq .001$) and positively related to graduation, as overwhelmingly documented in the literature (Attewell, Heil, & Reisel, 2012; Astin, 1997; Calcagno et al., 2007; DesJardins, Ahlburg & McCall, 1999; Bailey, Crosta, & Jenkins, 2007; Tinto, 1993; 1997; 2004). A student must be retained to graduate. The models' FTFT student retention coefficient estimates indicate that a 5% increase in retention results in approximately a 1% to 1.5% increase in the FTFT student graduation rates across all three models.

For the third research question, "Is the ratio of part time faculty to all faculty associated with FTFT student graduation rates net of transfer students when FTFT retention rates were included as an independent variable?" the modeling was inconsistent concerning this question. The Base Panel Model was significant ($p \leq .05$) and positive. The Time Fixed Effects Panel Model was not significant and negative. The College Fixed Effects Panel Model was significant ($p \leq .001$) and positive. The signs of the estimated coefficients and significance levels were different between models. One inference that may be drawn is that part time faculty does not have a significant negative relationship with FTFT student graduation, an inference that has minimal support in the research literature (Allison & Beyers, 2011; Ehrenberg & Zang, 2005). However, with two of the three models providing statistically significant and positive outcomes, a more substantial possibility exists that the ratio of part time faculty is positively associated with student graduation rates.

The New Jersey Community College sector is not representative of the United States community college sector, but arguably, New Jersey part time faculty may not

negatively influence FTFT graduation rates as many studies have suggested (Ehrenberg & Zhang, 2004; Jacoby, 2006; Jaeger & Eagan, 2009). New Jersey is very different from the United States. New Jersey is the most densely populated state in the nation: 1,263 people per square mile verse 93.7 for the nation (Census, 2021). New Jersey is more diverse than the county, with a diversity index of 65.8% to 61.1% (Census, 2021). The state boasts 11 public colleges and universities, 19 public community colleges, 16 private colleges and universities, and 10 proprietary institutions, in addition to scores of colleges and institutions across the rivers in Philadelphia and New York City (NJIPEDS, 2021). The characteristics of the New Jersey community college system and its operating environment are very different from the United States community college sector. The results for the ratio of part time instruction and graduation outcomes must be viewed in the light of this differing environmental context.

The fourth research question, “Is the ratio of part time faculty to all faculty at New Jersey community colleges associated with FTFT student three year transfer rates without receiving an associate degree or certificate?” I found no significant relationship between the ratio of part time faculty and FTFT transfer across all three models. Interestingly, all three regression coefficient estimates were negative, indicating that higher ratios of part time faculty may lead to lower FTFT student transfer before graduation. It is a question from the institutions' or students' perspective if decreasing student transfer before graduation is a good or bad outcome. Potentially, the ratio of part time faculty’s inverse relationship with transfer may be due to part time instruction encouraging the retention of students until graduation. Conversely, some researchers recognize transfer before graduation as a positive outcome (Adelman, 1999), and part

time faculty may be inhibiting this outcome, potentially impeding students from achieving their intended goals.

Discussion Of The Control Variable Coefficient Estimates

The following table assists in the discussion of the control variables used in the models. The control variables allow the relationship between the ratio of part time instruction and student outcomes to be estimated while removing the bias induced by not including other theoretically relevant variables. The College Fixed Effects Panel Model was unlike the Base Panel Model and the Time Fixed Effect Panel Model. Six independent regressors had to be removed from the College Fixed Effects Panel Model to address severe multicollinearity problems. The elimination of half the regressors in the College Fixed Effects Model allows no direct comparison with the Base Panel and Time Fixed Effects Panel Model's control variables. as the remaining control regressors in the College Fixed Effects Model are unduly biased by the loss (Buhai, 2003; Hsiao, 2003; Williams, 2015; Wooldridge, 2012). Consequently, due to these significant differences, control variables from the College Fixed Effects Model will not be addressed.

Table 10

Comparison of the Results of the Base Panel Model and the Time Fixed Effects Panel Models for FTFT Retention and FTPT Retention Outcomes Showing Statistically Significant Coefficient Estimates

Model Location	Independent Variable	Fulltime Retention Significance and Relationship	Part time Retention Significance and Relationship
Academic Context	Part time Faculty to all Faculty	2 of 2 Regressions Positive Relationship	0 of 2 Regressions Negative Relationship
Academic Context	Instructional Expenditures	2 of 2 Regressions Positive Relationship	2 of 2 Regressions Positive Relationship
Social Context -Institutional	In county Tuition and Fees	1 of 2 Regressions Positive Relationship	2 of 2 Regressions Positive Relationship
Social Context – Institutional	Total Fall Enrollment	2 of 2 Regressions Positive Relationship	2 of 2 Regressions Positive Relationship
Social Context - Institutional	Student Services	0 of 2 Regressions Positive Relationship	1 of 2 Regressions Positive Relationship
Social Context – Student	Black and Hispanic Students to all Students	2 of 2 Regressions Negative Relationship	0 of 2 Regressions Negative Relationship
Social Context – County	Total College Enrollment to County Population	0 of 2 Regressions Negative Relationship	2 of 2 Regressions Negative Relationship

FTFT retention and FTPT retention coefficient results exhibit many similarities and differences. The subject of this dissertation, the ratio of part time faculty to all faculty, had statistically significant and positive relationships with FTFT retention but was insignificant and negative with FTPT retention. The ratio of part time instruction's positive relationship to FTFT retention behaved contrary to the academic literature, while the ratio of part time instruction's negative relationship to FTPT student retention was in agreement with the literature (Calcagno et al., 2008; Jacoby, 2006; Jaeger & Eagan,

2011; Ran & Xu, 2018; Umbach, 2007; Xu, 2018). Instructional expenditures, on the other hand, had statistically significant and positively related coefficient estimates for all FTFT and FTPT retention equations. Faculty salaries are a major part of instructional expenditures, and so these expenditures increase with the employment of relatively more expensive full time faculty. The statistically significant and positive relationship between instructional expenditures and FTFT and FTPT student retention concurs with the findings of a large body of academic literature (Astin, 1984, 1993, 1997; Astin & Astin, 2000; Bean, 1983; Bean & Eaton, 2000; Gabovitch, 2014: Kezar & Maxey, 2014; Kuh et al., 2006; Pascarella & Terenzini, 2005; Tinto, 1987; 1993; 2005; 2010).

FTPT student retention appears as sensitive, if not more so, to academic context variables as FTFT retention, perhaps a reflection of FTPT students encompassing a cohort of higher risk and marginalized students due to academic preparation, economic resources, work, family, and a lack of time to complete their college studies (Gabovitch, 2014). While part time faculty and FTPT retention was not statistically significant the negative relationship concurs with the academic literature (Astin, 1984, 1993, 1997; Astin & Astin, 2000; Bean, 1983; Bean & Eaton, 2000; Gabovitch, 2014: Kezar & Maxey, 2014; Kuh et al., 2006; Pascarella & Terenzini, 2005; Tinto, 1987, 1993, 2005, 2010). This may be due to full time faculty having better outcomes with part time populations or that part time instructors were unfamiliar with the finer points of classroom and non-traditional learning resulting in outcomes that do not encourage further academic progression (Gabovitch, 2014). Regardless, part time faculty and its negative and non-significant relationship with FTPT retention starkly contrasts with the positive and statistically significant relationship with FTFT retention.

Total fall enrollment was statistically significant and positively associated with the three FTFT and three FTPT retention regressions. Larger sized institutions may be capable of providing greater resources for investing in student retention strategies and programs to assist students through the critical first year of college attendance (Astin, 1984, 1993, 1997; Astin & Astin, 2000; Bean, 1983; Bean & Eaton, 2000; Kezar & Maxey, 2014; Kuh, 2003; Kuh et al., 2006; Pascarella & Terenzini, 2005; Tinto, 1987, 1993, 2005, 2010). In smaller institutions, the retention burden may be left to classroom instructors with limited institutional resources and support (Bailey, 2005; Bailey et al., 2006; Calcagno et al., 2008; Jacoby, 2006; Pascarella & Terenzini, 2005; Youmans, 2017).

The county tuition and fees were positive and significant in one out of two FTFT retention regressions and two of the FTPT regressions. In each case, tuition and fees were positively associated with retention. This may be due to students reassessing their commitment and capability of successfully navigating college due to the higher cost of attendance, and passing on their earlier enrollment intentions (Denning, 2017; Heller, 1996; 1997; Hemelt & Marcotte, 2008; 2011; Kane, 1995; Leslie & Brinkman, 1987; Rouse, 1994; Shapiro & Yoder, 2021). As the price of tuition and fees increases, students who lack the financial resources to attend higher education may defer or cancel their enrollment plans. These students are overwhelmingly marginalized students (Denning, 1997; 2017; Heller, 1996; 1997; Hemelt & Marcotte, 2008; 2011; Kane 1995; Leslie & Brinkman, 1987; Rouse, 1994). Moreover, since community college caters to higher levels of economically distressed students, higher tuition and fees may financially eliminate these students from attendance at community college (Denning, 2017; Gallet,

2007; Heller, 1996; 1997; Hemelt & Marcotte, 2008; 2011; Kane, 1995; Leslie & Brinkman, 1987; Rouse, 1994; Shapiro & Yoder, 2021).

Disturbingly, African American, Hispanic, and low-income students were more sensitive to tuition changes than White and higher income students, including enrolling, maintaining enrollment, and transferring (Denning, 2017; Heller, 1996, 1997; Hemelt & Marcotte, 2008; 2011; Jackson & Weatherby, 1975; Leslie & Brinkman, 1988; Wiener, Shapiro & Yoder, 2014). Within the community college sector, students were more tuition sensitive than senior postsecondary students, while community college students of color were the most tuition sensitive of all cohorts (Denning, 2017; Gallet, 2007).

Since lower socioeconomic students typically have lower academic skills sets and often must work to pay living expenses, the consequence of raising the cost of attendance may be the loss of these students and a reduction in the number of stop outs and dropouts (Adelman, 1999; Bound, Lovenheim & Turner, 2010; Goldrick-Rab, 2010). On the other hand, higher SES students had a higher probability of being full time students with better academic preparation for higher education and fewer distractions to their studies; therefore, they are more likely to succeed in the postsecondary environment (Adelman, 1999; Bound, Lovenheim & Turner, 2010; Goldrick-Rab, 2010).

Black and Hispanic students to all students are significantly and negatively associated with retention, which is in agreement with an extensive body of academic literature on this topic (Allen, 1992; Amelink, 2005; Anaya & Cole, 2001; Bailey, 2005; Bailey et al., 2006; Calcagno et al., 2008; Jacoby, 2006; Ladd, Muschkin & Vigdor, 2012; Youmans, 2017). Interestingly, Black and Hispanic students to all students are not significant in regard to part time retention. FTPT students are often older, working, and

raising families (Carroll, 1989; Chen, 2007; Maggio & Attewell, 2020; McCormick, Geis, Vergun, & Carroll, 1995). Through part-time enrollment, non-traditional students more often attain their education goals (Carroll, 1989; Chen, 2007; Maggio & Attewell, 2020; McCormick, Geis, Vergun, & Carroll, 1995). So Black and Hispanic students in this group may not stand out as they were more like the students within this cohort than different (Allen, 1992; Amelink, 2005; Anaya & Cole, 2001; Bailey, 2005; Bailey et al., 2006; Calcagno et al., 2008; Gabovitch, 2014; Jacoby, 2006; Youmans, 2017).

Table 11

Comparison of the Results of the Base Panel Model and the Time Fixed Effects Panel Model for FTFT Graduation and FTFT Transfer Outcomes Showing Statistically Significant Coefficient Estimates

Model Location	Independent Variable	Graduation Significance and Relationship	Transfer Significance and Relationship
Academic Context	Part time Faculty to all Faculty	1 of 2 Regressions Neg & Pos Relationship	0 of 2 Regressions Negative Relationship
Academic Context	Instructional Expenditures	1 of 2 Regressions Negative Relationship	0 of 2 Regressions Positive Relationship
Social Context - Institutional	In county Tuition and Fees	1 of 2 Regressions Positive Relationship	1 of 2 Regressions Positive Relationship
Social Context - Institutional	Total Fall Enrollment	2 of 2 Regressions Negative Relationship	0 of 2 Regressions Negative Relationship
Social Context – Institutional	Academic Services Expenditures	0 of 2 Regressions Positive Relationship	1 of 2 Regressions Negative Relationship
Social Context - Student	Black and Hispanic Students to all Students	2 of 2 Regressions Negative Relationship	2 of 2 Regressions Negative Relationship
Social Context - Student	FT Women Students to all FT Students	0 of 2 Regressions Negative Relationship	1 of 2 Regressions Negative Relationship
Social Context - Student	Federal Grant Recipients to Total Entering Cohort	1 of 2 Regressions Neg & Pos Relationship	1 of 2 Regressions Negative Relationship
Social Context - County	Total College Enrollment to County Population	0 of 2 Regressions Negative Relationship	1 of 2 Regressions Positive Relationship

The academic context variables of part time faculty and instructional expenditures were not statistically significant with FTFT student transfer. In the social context variables, Black and Hispanic students were statistically significant and negatively related to FTFT student graduation and transfer. Total fall enrollment was statically significant and negatively related to FTFT student graduation but not significant with FTFT student transfer. Academic services expenditures were not statistically significant with FTFT student graduation but were statistically significant and negatively related to FTFT student transfer. A more thoughtful model and investigation of student transfer from an institutional perspective would be a good use of a future doctoral candidate's dissertation proposal.

Further Discussion Of The Modelling

When examining the results of FTFT and FTPT student retention, FTFT student graduation, and FTFT student transfer before graduation regressions, it is essential to remember that Tinto's Model of Institutional Departure was utilized in this dissertation to organize the explanatory variables into an academic and social context structure to explore the relationship of part time instruction on student success outcomes (Tinto, 1987; 1993). The IPEDS data gathered and this dissertation modeling were focused on exploring FTFT student retention and graduation. FTPT student retention and FTFT student transfer data were secondary objectives of both IPEDS and this dissertation. Consequently, the data and modeling do a good job of capturing variance in FTFT student retention and graduation outcomes, and not as well with the FTPT retention and FTFT transfer. Additional work is necessary to flesh out FTPT retention and FTFT student transfer outcomes from an institutional perspective, especially in building and

testing models constructed to specifically explore these outcomes. Additional data gathering is a time consuming and expensive endeavor for education institutions and the US Department of Education. However, as student unit record data collection, storage and analysis become less expensive, standardized, and built into institutional practices, additional information may be readily collected and made available to help move academic research and practice to the next level relative to expanded student success outcomes.

Discussion Of Findings And Future Research

Academic Context Variables

In my opinion, the academic context variables, which include the ratio of part time faculty to all faculty and instructional expenditures influence student retention and graduation. Community colleges can increase retention and graduation through thoughtful action in this area. According to Jacoby (2006), there may be an optimum combination of full and part time faculty that can help maintain financial integrity while limiting the adverse effects on student graduation.

Potentially, class sizes and student to teacher ratios may have a significant role in community college student success and warrant future research in conjunction with the numbers and percentages of part time and full time instruction (Ake-Little, von der Embse & Dawson, 2020; Bettinger & Long, 2018; Diette & Raghav, 2015; Edmonds, 2021; Johnson, 2011; Maringe & Sing, 2014; Millea et al., 2018; Taft, Keston, El-Banna, 2019; Wright, Bergom & Bartholomew, 2019). Bettinger and Long (2018) examined 60,000 university students and found that larger class sizes increased dropout rates and reduced on time degree completion, findings supported by Millea et al., (2018).

Additional research found that first year students and students with weaker academic credentials and backgrounds were impacted more negatively by larger class sizes (Ake-Little, von der Embse & Dawson, 2020; Diette & Raghav, 2015); the very populations commonly served by the community college sector.

The potential effect of class size in my dissertation may be inferred by the repeated statistical significances and positive coefficients estimates of part time instruction to all instruction and instructional expenditures, sometimes in tandem with one another. Where academic integration (Tinto, 1993) is vital in the community college system, perhaps classroom atmosphere and class size is just as important, if not more so, than the tradeoff between faculty employment status (Ake-Little, von der Embse & Dawson 2020; Bettinger & Long, 2018; Diette & Raghav, 2015; Edmonds, 2021; Johnson, 2011; Maringe & Sing, 2014; Millea et al., 2018; Taft, Keston, El-Banna, 2019; Wright, Bergom & Bartholomew, 2019). Future research is warranted on class size in tandem with the ratio of part time instruction and academic expenditures. All three may be considered critical components of student academic integration formula (Tinto, 1993).

Regardless, in this model, part time faculty continues to show a statistically significant and positive relationship with FTFT student retention and, to a lesser degree, FTFT student graduation. As stated, the student success accounted for by an increasing number of adjunct faculty may be due to greater numbers of full and part time faculty on campus, lower student to faculty ratios and smaller class sizes. Yet, part time faculty showed consistently negative though not statistically significant relationships with FTPT student outcomes, bringing forth questions of part time faculty's effectiveness serving this non-traditional population (Gabovitch, 2014). In contrast, The positive influence that

instruction expenditures play on FTPT student retention is an area that requires further investigation for insight, as FTPT students are often comprised of at-risk populations. The FTPT student cohort receives limited attention in academic research (Gabovitch, 2014). Part time enrollment is a common pathway for nontraditional student cohorts to realize the dream of an academic credential, yet this cohort receives little attention in the literature (Gabovitch, 2014).

Social Context Variables

The degree and consistency with which Black and Hispanic students were significantly and negatively related to student success outcomes, excluding part time retention, is highly concerning. Though beyond the scope of this dissertation, I believe it is likely that many of the issues that impact students of color are better understood by a more profound examination and study of students who matriculate part time to community colleges. The lack of statistical significance between part time retention and Black and Hispanic students may help provide insight relative to the Black and Hispanic student success outcomes. Many Black and Hispanic students pursue part time enrollment in pursuit of an associate degree, and this educational track may be most familiar and comfortable with this cohort.

Additional topics for future research include the seemingly contradictory influence total fall enrollment had on FTFT student retention and graduation. A statistically significant positive association with FTFT student retention and a statistically significant negative association with FTFT student graduation calls for greater insight and explanation. Also, the possibility that higher county tuition and fees are a barrier to lower socioeconomic students enrolling in higher education requires additional research

(Denning, 2017; Heller, 1996; 1997; Hemelt & Marcotte, 2008; 2011; Kane, 1995; Leslie & Brinkman, 1987; Rouse, 1994; Shapiro & Yoder, 2021). Most concerning is that community college students are the most tuition sensitive cohort in higher education. Within the community college sector, students of color were the most price sensitive of all groups in higher education (Denning, 2017; Gallet, 2007). Based on these results, colleges may raise their tuition and fees to sift out the lower socioeconomic students and improve their student retention and graduation rates. This line of reasoning reignites the debate between student access and student success as policy considerations and how to reconcile the two in day-to-day practice. Present and future research concerning student access, equity, and success outcomes is more important than ever.

Reflection On Tinto's Model Of Institution Of Departure

I divided my independent variables into academic and social variables using Tinto's (1975; 1993) Model of Institutional Departure. The academic variables include the ratio of part time faculty to all faculty, instructional expenditures, and certificates granted to all awards. The ratio of part time faculty and instructional expenditures are the direct institutional investment in the classroom. Certificates granted to all awards represent the institution's orientation in providing academic and two-year vocational degrees relative to less than two-year certificates.

The social variables tied to direct institutional action include academic services expenditures, student services expenditures, in county tuition and fees, and total fall enrollment (Tinto, 1975; 1993). Academic support expenditures include money spent on libraries, support services for instruction, audiovisual, academic administration, academic, personal development, and course and curriculum development. Social

services expenditures include admissions, registrar activities, student activities, cultural events, student newspapers, intramural athletics, student organizations, supplemental instruction, and student records. Academic support and student services expenditures are the institutional outlays supporting students entering both college and the classroom. In county tuition and fees and total fall enrollment are institutional characteristics and environment within which students attend classes and participate at the college.

As Tinto (1975; 1993) theorized, instructional expenditures are positively related to full and part time retention at the .05 level of significance in the Base Panel and Time Fixed Effects Models. An increase of ten percentage points in instruction expenditures results in an approximate five percentage point increase in FTFT retention and a six percentage point increase in FTPT retention in the Base Panel and Time Fixed Effects Models, which concurs with Tinto's academic integration theory (Tinto, 1975; 1993). Paradoxically, both models' instruction expenditures are negatively related with FTFT graduation but are not statistically significant, while instructional expenditures are positively related and not statistically significant with FTFT transfer. Some researchers view transfer before or after receiving a degree to be a function of community colleges (Brint & Karabel, 1989; Grubb, 1991; Townsend, Bragg & Rudd, 2009; Wellman, 2002) and should be a measure of community college student success regardless of receiving a degree (Adelman, 1999).

From a social integration perspective, academic service expenditures have a positive relationship with FTFT retention, FTPT retention, and FTFT graduation but are not statistically significant, with a one to two percentage point increase in these outcomes for a ten percentage point increase in academic service expenditures. Academic service

expenditures have a negative relationship with FTFT transfer that is statistically significant at the .001 level with a four to seven percentage point increase for a ten percentage point increase in academic service expenditures.

The social context variable student support expenditures have a positive relationship with FTPT retention that is statistically significant at the .05 to .01 level with a five percentage point increase in FTPT retention for a ten percentage point increase in student support expenditures. Student support expenditures have a positive relationship with FTFT retention and FTFT graduation that is not statistically significant, with a one to three percent increase in FTFT retention and graduation for a ten percentage point increase in student support expenditures. Student support expenditures have a negative relationship with FTFT transfer that is not statistically significant, with a one point increase FTFT transfer for every ten percentage point increase in academic service expenditures. Both academic service and student support expenditures appear to positively influence student success but nowhere near the degree or statistical significance of the academic integration variables. Academic integration appears to be much more critical to student success than social integration in the New Jersey Community College sector (Tinto, 1975; 1993), which makes sense given community colleges largely commuter population.

In county tuition and fees are positively correlated with FTFT and FTPT retention and FTFT graduation and transfer in the Base Panel and Time Fixed Effects Panel Models. Six out of eight regressions are, at minimum, statistically significant at the .05 level. Total fall enrollment has a positive relationship with FTFT and FTPT retention and a negative relationship between FTFT graduation and FTFT transfer. All the relationships

but FTFT transfer are significant at the .001 level. Like academic and student support expenditures tuition and fees and total fall enrollment are aspects of the community college environment that influence and shape the student body. In these cases, they do appear to influence student success and must be considered components that drive student integration (Tinto, 1975; 1993).

Ultimately, the academic integration variables, excluding certificates granted to all awards, appears to have greater impact on student retention than student integration variables. In contrast, academic and student service expenditures have a greater influence on FTPT retention and FTFT transfer. However, the most consistent impact on student success outcomes comes from the control variables in county tuition and fees and total fall enrollment variables that are included under the social context variables (Tinto, 1975; 1993).

Once again, the academic context variable appears more important for student success than the social context variables of academic and student service expenditures. However, the social context control variables, in county tuition and fees and total fall enrollment, are statistically significant and must be addressed by leadership when making policy decisions (Tinto, 1975; 1993).

Expanding Student Success Research

Institutional level analysis of student success outcomes and the variables that may drive them has academic research value. It should be explored in greater depth as more robust and definitive information is collected and collated from the US Department of Education. As previously stated, future data collection and research is warranted on class size in tandem with the ratio of part time instruction and academic expenditures

(Ake-Little, von der Embse & Dawson 2020; Bettinger & Long, 2018; Diette & Raghav, 2015; Edmonds, 2021; Johnson, 2011; Maringe & Sing, 2014; Millea et al., 2018; Taft, Keston, El-Banna, 2019; Wright, Bergom & Bartholomew, 2019). All three may be considered critical components of student academic integration and success (Tinto, 1993). Exploring student dropout, stop out, and collecting information beyond the standard three year time frame will be invaluable to understanding student success. Additionally, student populations who begin their academic careers part time should be investigated in greater detail as this cohort is not well studied or understood.

The future study of institutional based student success in the community college sector would be improved by tracking student dropout, stop out, and retention over extended periods of time rather than the standard one and three year periods. I examined FTFT and FTPT student retention, FTFT student graduation, and FTFT student transfer. The student cohorts not discussed include continued attendance beyond three years, intermittent stop outs, and permanent dropouts. Without meaningful IPEDS information on students who continue to attend, stop out and drop out, the best we can do is infer that these cohorts are different from the graduating and transfer students currently examined in this dissertation. We need to better understand these student cohorts so that policies may be developed to better address higher education student success across all student cohorts and outcomes.

A more robust understanding of these cohorts and outcomes requires more in-depth data collection. Collecting information on students attending and graduating beyond three years would be of the greatest value. The US Department of Education has made some inroads in collecting such information. Information on students who drop out

and stop out during the first year of matriculation would rank next in utility. I recommend that the US Department of Education continue to expand and improve its IPEDS reporting of the groups discussed above to permit more insightful and meaningful research on community college student success.

Implications For Institutional Practitioners

The model outcomes from this dissertation lead to several concerns about using student success measures for determining institutional effectiveness. Does raising the ratio of part time instruction truly enhance student retention, or is this a statistical illusion created by the changing composition of the student body? Does raising tuition and fees provide an unintended benefit of enhancing student success outcomes, probably by pushing more price sensitive students out of community college enrollment? Can we rightfully compare large institutions with small institutions? Is it proper to compare institutions that serve predominantly White students to institutions that serve students of color, especially considering the historically based socioeconomic characteristics that may favor the former over the latter?

From an equity point of view, perhaps the real question is how accountable we should hold the community college sector to student success measures. Indeed, the private and public sectors desire and demand academically successful students and colleges. However, there is evidence in this data that limiting access to students least capable of affording tuition while serving populations who may be better prepared for college level course work raises student success rates. Is this the academic efficiency we seek at the expense of a more equitable higher education system? Do we do away with the proverbial “right to fail” mantra of the community college sector commonly espoused

50 years ago? Perhaps an accommodation somewhere between student success and equity is possible. The most crucial policy recommendation I can offer the practitioner and the researcher is to review the works of Adelman (1999) and consider "out of the box" thinking and measurements to balance our desire for higher education student success within the realm of student and community equity considerations.

Implications For Leadership

These findings suggest that part time faculty does not negatively influence student success as many studies have suggested (Ehrenberg & Zhang, 2004; Jacoby, 2006; Jaeger & Eagan, 2009). Where there is consistency between my dissertation and academic research on the community college sector is the extent and regularity in which the African American and Hispanic student cohort experience negative student success outcomes. Of particular concern, African American and Hispanic students are more sensitive to tuition and fee changes than other student cohorts. Greater tuition sensitivity does impact student enrollment, retention, and transfer behavior (Denning, 2017; Heller, 1996; 1997; Hemelt & Marcotte, 2008; 2011; Jackson & Weatherby, 1975; Leslie & Brinkman, 1988; Shapiro & Yoder, 2021).

I believe that higher tuition and fees exclude price sensitive and low income students, who are typically the least academically prepared and marginalized students in the community college sector (Adelman, 1999; Bers & Schuetz, 2014; Bound, Lovenheim & Turner, 2010; Cohen & Brawer, 2003; Goldrick-Rab, 2010; Horn & Nevill, 2006; Horton, 2015; Kuh et al., 2006; Pascarella & Terenzini, 2005; Wyner, 2014). I do not believe that the leadership and professionals in the community college sector intend to exclude those student cohorts that the sector is expected to prepare for

gainful employment or transfer to senior institutions. However, based on the negative enrollment outcomes of at risk student populations due to increased tuition and fees, the cost of attendance should only be raised as a last resort to achieve financial solvency and only after all other options have been explored and exhausted. Keeping the cost of education affordable for those who can least afford it requires difficult decisions that are the responsibility of academic leadership; consequently, the use of part time instructors is an unavoidable tool in keeping community college doors open to all students.

The academic context variables, specifically the ratio of part time instruction and instructional expenditures, positively influence student retention, enabling institutions to increase retention through actions in these academic areas. According to Jacoby (2006), there may be an optimum combination of full and part time faculty that can help maintain financial integrity while limiting the adverse effects on student graduation. What that ratio maybe is a question that each institution must discover through real world application and iterative decision making using institutional student success information. Additionally, class sizes must be examined as another variable for enhancing student academic integration and, ultimately, success (Ake-Little, von der Embse & Dawson 2020; Bettinger & Long, 2018; Diette & Raghav, 2015; Edmonds, 2021; Johnson, 2011; Maringe & Sing, 2014; Millea et al., 2018; Taft, Keston & El-Banna, 2019; Tinto, 1975; 1993; Wright, Bergom & Bartholomew, 2019).

There is a bias in academia that part time instructors are inferior to full time instructors (Baldwin & Wawrzynski, 2011; Banachowski, 1996; Jacoby, 2006; Kezar & Gehrke, 2013; Umbach, 2007). Concerning my personal bias, I expected the ratio of part time instruction to be a neutral or a non significant variable relative to student success. If

we move beyond the debate of part time instruction versus full time instruction and focus on what is best for the community college student, then consideration of student tuition sensitivity and governmental reluctance to increase monies for higher education must be addressed by community college leadership.

The community college has historically made students and their academic success paramount. We must return to this ideal as a guiding principle of community college operations and recognize that these efforts must be guided by student success information. In September 2015, the American Council on Education/TIAA Institute gathered higher education presidents, provosts, and leaders from all institution levels (Soares, Steele & Wayt, 2016). From this initiative, strategies were discussed to reconcile the students' educational needs with the institutions' financial constraints. A conclusion drawn was that institutional decision making should occur using data transparency, shared governance, and purposely evolving institutional practices to improve student success (Soares, Steele & Wayt, 2016).

For the leadership to place students first, they must encourage ongoing data transparency concerning student success throughout the institution. Institutional resources must be directed to encouraging and fostering student success despite the real financial constraints placed on institutions (Soares, Steele & Wayt, 2016). Developing shared governance involves the whole institution budgeting institutional resources to maximize students' success outcomes (Soares, Steele & Wayt, 2016). Ultimately, the ongoing iterative evolution of institutional practices needs to enhance student success within the confines of available resources.

The broad policy "brush strokes" above will take place in a messy world. According to Schein (1992), the organizational culture made up of and among all employees at the institution must be understood and carefully dealt with to make fundamental institutional change. The organizational culture is a significant barrier to moving an institution in new directions. To overcome this barrier, it may be better for a leader to be new to the college instead of attempting change from the inside, where the culture has previously shaped the leader, and the leader has established personal relationships within the existing organizational culture (Schein, 1992).

A new president of a community college is akin to a new president of the United States. The new president lays out the agenda and asks the college community to work together in tandem to realize the agenda; but like the President of the United States, there is a finite time to make the agenda a reality. Conversely, the organizational culture often stands in the way of realizing the goals of the new agenda (Schein, 1992). Every college has seen presidents come and go. Muting the presidential vision is expected and, in some cases, actively pursued by employees who feel they are the institutions' identity keeper (Schein, 1992).

A newly hired president needs to be transformational in their leadership style (Burns, 1978; 2003). To establish student success as the institution's primary objective, the whole institution must unite behind realizing this noble goal. The institution must change its formal and underlying actions and systems to improve student success (Burns, 2003). Some institution members will eagerly follow to realize the student success vision. Others will not. For some, a transformational - transactional leadership style will be

required, including actively promoting and recognizing those who work toward the student success outcomes agenda and goals (Burns, 1978; 2003).

A radical organizational culture and structure change will not occur without the leader sharing information and decision making with the college community. In the end, many traditional leadership prerogatives must be shared, starting with true data transparency throughout the institution (Soares, Steele & Wayt, 2016). The two significant areas for data transparency are student enrollment and success outcomes, and the second is institutional financials. The college community must know that the shift in the organizational culture is not a ploy by leadership but a change in the organizational approach to benefit student success utilizing available information. True transparency of information will enable greater shared governance. This governance should drive community buy in and, ultimately, a change in institutional culture, processes, and habits. Ultimately, this institutional transformation will enable servant leadership by the president, senior staff, administrators, and faculty, including both part and full time instructors (Greenleaf, 2002). Servant leadership on the part of senior leadership enables all levels of the organization to accomplish their job responsibilities using the authority pushed down from the top with full knowledge of institutional performance and resources by all levels of the institution (Greenleaf, 2002).

According to Soares, Steele, and Wayt (2016), the practices that made American higher education the best in the world need to evolve. There must be transparency in all data and institutional decision making to empower the college employees working directly with students. Higher education is under tremendous financial pressure to educate students from all backgrounds and skill levels, often with reduced resources.

Concurrently, higher education is pressured to develop new pedagogies, delivery methods, and innovative curricula (Soares, Steele, & Wayt, 2016). However, the increasing cost of higher education discourages student applications and attendance (Soares, Steele & Wayt, 2016). As this dissertation suggests, these price sensitive and discouraged students are financially and educationally on the margin of society. The loss of these students from higher education hurts all of society economically, politically, and socially. New Jersey community colleges need to rethink how they operate and do what needs to be done to restrain raising tuition and fees, thereby enabling greater access to all students, especially the student cohorts that have been historically marginalized. If an optimum balance can be found in the ratio of part time to full time instruction, it needs to be done in the interest of student success for all cohorts. If institutional initiatives that provide data transparency and shared governance thereby driving institutional practices resulting in higher levels of student access and success, then embracing such a platform may be one of the nobler goals to which a leader may aspire.

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Appendix

List of Variables and Abbreviations

LONG NAME	SHORT NAME	Definition
Full time Retention	FT_Retent	First time full time (FTFT) retention was defined as the ratio of students from the FTFT cohort retained from the fall of matriculation to the following fall semester.
Part time Retention	PT_Retent	First time part time (FTPT) retention was defined as the ratio of students from the FTPT cohort retained from the fall of matriculation to the following fall semester.
3 Year Graduation Rate	Grad_Rate_WO_Trans	First time full time (FTFT) graduation was defined as the ratio of FTFT students who graduate with a degree or certificate within three years of the fall of the cohort's matriculation.
Transfer Rate before Graduation	Trans_Rate	First time full time (FTFT) transfer was defined as the ratio of FTFT students who transfer without a degree or certificate within three years of the fall of the cohorts' matriculation.
Part time Faculty to all Faculty	PTFac/TotFac	Part time faculty was defined as the ratio of part time faculty to all faculty in the Spring term of each student cohort's academic year of matriculation.
Instructional Expenditures	Instruct_Exp	Instructional expenditures were defined as the academic, remedial, occupational, vocational instruction, and non-credit expenditures (IPEDS) for each student cohort's matriculation year. Instructional expenditures were divided by total academic year credit hours, deflated by the CPI deflator, and transformed using the natural log. The total instructional expenditures per credit hour rendered may also act as a rough proxy for student class sizes and resources provided in the classroom.
Certificates Granted to all Awards	Certs/Complet	Certificates granted to all awards were defined as the ratio of certificate recipients to all degrees and certificate recipients conferred in the year of each student cohort's matriculation.

Academic Services Expenditures	Acadserv_Exp	Academic support expenditures were for libraries, support services to academic instruction, audiovisual services, academic administration, academic personnel development, and course and curriculum development for each academic year. Academic support expenditures were divided by total academic year credit hours, deflated by the CPI deflator, and transformed using the natural log.
Student Services Expenditures	Studserv_Exp	Student services were the expenditures for admissions, registrar activities, student activities, cultural events, student newspapers, intramural athletics, student organizations, supplemental instruction outside the normal administration, and student records. Student services expenditures were divided by total academic year credit hours, deflated by the CPI deflator, and transformed using the natural log.
In County Tuition and Fees	Tuit&Fees	In county tuition and fees were calculated by taking full time student in-county tuition and fees in the fall of matriculation for each FTFT student cohort, deflated by the CPI, and transformed by the natural log.
Total Fall Enrollment	Fall_Enroll	The total number of undergraduate students was calculated by adding full and part time students (IPEDS) enrolled in courses in the fall term receiving academic, occupational, or vocational credits leading to a degree or certificate and transformed using the natural log.
Black and Hispanic Students to all Students	BLK&HISP	African American and Hispanic students were defined as the ratio of all African American and Hispanic to all students enrolled at the institution in the fall of each cohort's matriculation.
Full time Women students to all full time Students	Women/FTenrol	The full time women variable was defined as all full time women as a ratio of all full time students in the fall of the student cohorts' matriculation.
Part time Women students to all part time Students	Women/PTenrol	The part time women variable was defined as all part time women as a ratio of all part time students in the fall of the student cohorts' matriculation.
Federal Grant Recipients to Total Entering Cohort	Fedgrnt_FTenrol	Federal grant recipients were all FTFT federal grant recipients to all FTFT students in the fall of matriculation.

County Unemployment Rate	Unemploy	The county unemployment rate was defined as the ratio of workers 16 years of age and older who were actively seeking work divided by workers 16 years of age and older who were actively seeking work or were working in each county during the year of each cohort's fall of matriculation.
Total College Enrollment to County Population	Enroll/County_Pop	The college enrollment to county population was defined as the total fall college enrollment ratio to the total county population as of July 1 of the calendar year of FTFT and FTPT student cohort matriculation. Taken from IPEDS, the total number of undergraduate students includes full, and part time students enrolled in courses receiving academic, occupational, or vocational credits that lead to a degree or certificate in the fall of the student cohorts' matriculation. The annual county population was drawn from the United States Census Bureau.