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Effects of Exposure to Part-time Faculty on Community College Transfer

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Abstract Over the past several decades, one of the most significant changes in the delivery of postsecondary education involves the dramatic increase in the use of contingent or part-time faculty. Although the increased use of part-time faculty within higher education makes sense from an administrative point of view, its use does not come without criticism. With community colleges representing a more convenient, affordable, and flexible educational option for a number of students, particularly those from disadvantaged backgrounds, examining how exposure to part-time faculty relates to students' academic goals represents an important area of inquiry. This study draws from social and human capital frameworks and uses hierarchical generalized linear modeling (HGLM) to examine how exposure to part-time faculty relates to community college students' likelihood of transferring to a four-year college or university. Findings suggest that students tend to be significantly less likely to transfer as their exposure to part-time faculty increases.

Keywords Part-time faculty · Community colleges · Transfer · Hierarchical generalized linear modeling · Social capital · Human capital

Introduction

Colleges and universities in the U.S. emphasize access to higher education for all individuals. Initially begun as a system of education for the elite, U.S. higher education has transitioned into a structure designed to educate the masses (Cohen 1998). Community colleges primarily have served the role of increasing access to postsecondary education, and these institutions often represent the first step for many individuals who pursue a college degree (Quigley and Bailey 2003). Community colleges feature substantial

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diversity in mission, student body, and faculty composition. These institutions have multiple purposes, serve a variety of populations, particularly disadvantaged individuals, and employ a significant proportion of part-time or contingent faculty (Cataldi et al. 2005; Cohen and Brawer 2003). With such mission complexity, community colleges face a number of challenges, including adequately staffing their diverse curricular offerings. Consequently, employment of part-time faculty by community colleges has become increasingly more common in efforts to improve institutional economic efficiency.

This paper examines recent research on the community college context, characteristics of part-time faculty, the relationship between part-time faculty and student outcomes, and community college student transfer. Framed by prior research and theories of social and human capital, the analyses utilize hierarchical generalized linear modeling to examine data from a large state system of community colleges. The analyses examine whether increased exposure to part-time faculty instruction has a negative association with community college students' likelihood of transferring to a four-year institution. The results of the study frame possible implications, such as the types of courses taught by community college instructors and the role these instructors should play in the classroom.

Significance

The transfer function of community colleges represents an important yet challenging area of research. Challenges arise when identifying those students most likely to transfer, as community colleges serve a large cross-section of the population, which has differing goals, intentions, and educational paths (Cohen and Brawer 2003). Furthermore, because many students' patterns of attendance at community colleges vary, tracking students from initial enrollment through transfer to a four-year institution has proven difficult (Adelman 2005). As Adelman (2005) indicates, information on transfer rates within individual community colleges or within community college systems often presents misleading statistics and generally underestimates the percentage of community college students who transfer to four-year institutions. Reports of transfer rates may range from 10% to 40%, depending on how scholars, institutional researchers, or other administrators decide to calculate the rate (Adelman 2005).

With these concerns in mind, researchers, administrators, and, in particular, policymakers need to garner a better understanding of the factors associated with students' likelihood of transferring from two-year to four-year institutions. Considering that higher education is seen as an avenue for social mobility, particularly for disadvantaged individuals (Bowen 1996), and that community colleges educate nearly 40% of the nation's students enrolled in higher education (National Center for Education Statistics 2007), identifying facilitators of and barriers to transferring from two-year to four-year institutions has important implications for policymakers and administrators. This study aims to offer community college stakeholders with important information regarding the relationship between part-time faculty and students' likelihood of transferring to a four-year institution by identifying transfer likely students and following them longitudinally for five years after their initial enrollment in a community college.

Literature Review

Four key areas of literature frame this study. First, any study on community colleges and their students must consider the context of these institutions and how they differ from four-

year colleges and universities. Second, an important aspect of community colleges remains their heavy reliance on part-time faculty employment; therefore, this section presents literature that provides a depiction of the part-time faculty workforce in the U.S. Third, recent studies have focused on the relationship between part-time faculty and student outcomes. Though limited research has examined specifically this relationship in community colleges, studies conducted at both four- and two-year institutions provide insight for the present study. Finally, the review concludes with an examination of the literature related to community college transfer.

The Community College Context

Characteristics of most community colleges include low tuition, flexible scheduling, comprehensive missions, and convenient locations (Cohen and Brawer 2003; Phillippe 2000). Because of these elements, community colleges represent an attractive pathway for pursuing postsecondary education for all types of students but particularly among single parents, economically and educationally disadvantaged students, and individuals who work full-time (Choy 2002; Cohen and Brawer 2003; Grubb et al. 2003). Individuals from these backgrounds and others enroll in community colleges to earn an associate's degree, accumulate academic credits that will facilitate transfer to four-year institutions, become certified in a variety of technical and vocational fields, and learn new skills through lifelong learning programs (Cohen and Brawer 2003).

Community colleges at their inception had a much stronger focus on the transfer function (Dougherty 1994). In addition to having community colleges that served as branch campuses to four-year institutions and focused on pre-baccalaureate studies, initially most states also created separate technical and vocational colleges (Bailey and Averianova 1999; Cohen 1998). Community colleges today serve an increasingly diverse student body through pre-baccalaureate studies, vocational and technical training, developmental education as well as lifelong learning programs.

Research on Part-time Faculty

As community colleges have expanded their mission complexity and diverse educational offerings, they have continued to rely heavily on employment of part-time faculty (Cohen 1998). Part-time faculty provide institutions with the ability to be more economically efficient in managing their financial resources, as part-time faculty generally are cheaper to employ than their full-time counterparts and offer greater flexibility to institutions (Bettinger and Long 2006; Gappa 1984; Leslie 1998; Liu and Zhang 2007; Schuster and Finkelstein 2006). Thus, many higher education institutions have begun hiring more part-time faculty to improve economic efficiency. Part-time faculty comprised 46.3% of all faculty appointments nationwide in 2003 (American Association of University Professors 2006). Among community colleges across the U.S. in 2003, part-time faculty held 66.7% of all faculty appointments (Cataldi et al. 2005). Comparatively, part-time faculty comprised just 27% of the total number of faculty in community colleges in 1969, and that proportion increased to 52% by 1987 (Schuster and Finkelstein 2006).

While providing an avenue for greater economic efficiency, the increased employment of part-time faculty throughout U.S. higher education institutions has drawn significant criticism from scholars, as part-time faculty are seen as threats to the level of quality in academic programs (Haeger 1998). Part of this perceived threat stems from the fact that part-time faculty generally have fewer educational credentials compared to their full-time

counterparts. Specifically, part-time faculty are more likely to have master's degrees whereas more full-time faculty tend to have their doctorates (Anderson 2002). In his analysis of faculty characteristics at all types of institutions across the U.S., Anderson (2002) found that less than 20% of part-time faculty had earned a doctorate compared to more than 65% of full-time faculty in 1998; however, Anderson did not focus specifically on community college faculty in his study. It is important to note educational differences between part-time and full-time faculty at community colleges are less substantial; 8.6% of part-time faculty and 17.9% of full-time faculty teaching at community colleges in 2004 held a doctoral degree (Eagan 2007).

As the hiring of part-time faculty has increased across all higher education institutions, particularly among community colleges, scholars have examined more closely the characteristics associated with part-time instructors at two-year colleges. Levin et al. (2006) concluded that part-time community college faculty felt a significant sense of detachment from their affiliated institution, as they generally lacked office space and remained largely uninvolved in institutional governance. In his descriptive analysis of part-time and full-time community college faculty, Eagan (2007) noted a high level of dissatisfaction with job security and employment benefits among part-time faculty, as part-timers' short-term contracts offer them little confidence for negotiating subsequent years of employment with the institution (Rhoades 1996).

Part-time Faculty and Student Outcomes

In addition to providing insight into the characteristics of part-time faculty, scholars also offer findings that illustrate how exposure to part-time faculty affects student outcomes. Much of this research, however, has focused almost entirely on students at four-year institutions and has paid little attention to individuals pursuing postsecondary education at two-year colleges. Using students as the unit of analysis, Harrington and Schibik (2004) found that students who had greater amounts of exposure to part-time faculty had a significantly reduced likelihood of persisting to the second semester. Jaeger and Hinz (2008) replicated this study at a research extensive institution and found that new students had more than 25% of their academic credits with part-time faculty. The effects of part-time faculty were consistent and negative across both studies. These research efforts focused on single institutions and utilized restrictive definitions of persistence, as the outcome measure included term-to-term persistence.

Along the same lines, Ronco and Cahill's (2004) single-institution study concluded that students with the highest level of exposure to part-time faculty were significantly less likely to persist into their second year of enrollment. Although part-time faculty exposure represented a significant and negative predictor of student retention, student background characteristics had the greatest explanatory power in predicting students' likelihood to persist (Ronco and Cahill 2004). In an analysis of institutional data, Ehrenberg and Zhang (2004) found that higher proportions of part-time faculty employed by institutions negatively affected those institutions' graduation rates.

As studies focusing on the relationship between part-time faculty exposure and student outcomes at four-year institutions continue to emerge, few researchers have examined this same phenomenon at community college. Calcagno et al. (in press) used data from the National Education Longitudinal Study of 1988 (NELS: 88) and the Integrated Postsecondary Education Data System (IPEDS) to determine the effect of institutional reliance on part-time faculty on community college students' graduation rates. Controlling for aggregated student characteristics, the authors found that the percentage of part-time

faculty employed at a community college corresponded to a reduction in that institution's graduation rate.

In a similar study, Jacoby (2006) analyzed how employment of part-time faculty affects degree completion rates at public community colleges in the U.S. Jacoby utilized data from the 2001 IPEDS database and found a significant negative relationship between the percentage of part-time faculty at community colleges and institutional graduation rates. Jacoby did not control for aggregated individual characteristics; however, his study provided controls for state-level effects on institutions' graduation rates. His use of single-level statistical techniques for multi-level data may have inappropriately biased his results, as such methods for clustered data provide less robust findings than more advanced statistical techniques (Raudenbush and Bryk 2002). Although Jacoby addressed an important gap in the literature, his research drew from institution-level data, which does not allow for meaningful interpretation regarding how exposure to part-time faculty affects students on an individual level.

Community College Transfer

No study has considered how exposure to part-time faculty affects community college students' likelihood of transferring to a four-year institution; however, a number of studies have examined other factors affecting transfer likelihood among community college students. One of the more challenging aspects of research on community college transfer is identifying the population to study (Cohen 1991), as students enrolled at a community college have varying goals, aspirations, and purposes for enrolling. Adelman (2005) used three indicators to identify transfer likely students. Adelman (2005) identified transfer likely students as individuals who were between the ages of 18 and 24, whose first post-secondary institution was a community college, and who had completed at least 10 credits at a single community college. Significant positive factors predicting transfer included the number of credits a student completed in college-level math, the number of summer-term credits a student completed, and the maintenance of continuous enrollment (Adelman 2005). Adelman concluded that students who had withdrawn from more than 20% of their attempted units or had more than 20% repeat grades were significantly less likely to transfer to a four-year institution. Entering a community college directly from high school, educational expectations, socioeconomic status, and the ratio of occupational credits to all undergraduate credits were not significant predictors of transferring to a four-year institution (Adelman 1999, 2005).

In contrast to Adelman's (2005) study, Dougherty and Kienzl (2006) found that socioeconomic status was a significant, positive predictor of transferring from a two- to a four-year institution. Dougherty and Kienzl utilized data from the Beginning Postsecondary Students database from 1990 to 1994 and the National Education Longitudinal Study of 1998–2000. Their findings suggested that high school math scores and educational aspirations were significantly and positively related to transfer, which support findings from earlier research (Cabrera et al. 2001; Lee and Frank 1990). Similarly, students without children and individuals who worked fewer than 40 hours per week were significantly more likely to transfer to four-year institutions.

Other research on community college students' transfer likelihood has focused on individuals' curricular choices and collegiate experiences. Kraemer (1995) found that students with greater levels of academic success had a stronger inclination to transfer than students who performed poorly in the classroom. Similarly, scholars have debated the role of taking remedial courses in facilitating community college student transfer. Merisotis and

Phipps (2000) emphasized the need to have remedial programs that assist the academic development of underprepared students.

Results from Cabrera et al. (2005) research suggest remedial course completion has mixed results on students' likelihood of transferring from a community college to a four-year institution. Cabrera et al. found that students who enrolled in remedial math courses were 4% more likely to transfer to a four-year college or university; however, students taking remedial reading courses reduced their transfer likelihood by 4%. Remedial reading had an even stronger negative effect for students in the lowest socioeconomic bracket, as taking remedial reading courses reduced these students' likelihood of transferring by 24%.

In addition to curricular choices, scholars have identified satisfaction and several college experiences as significant predictors of transferring from a community college to a four-year institution. Students who indicate greater satisfaction with both academic and nonacademic life at the community college tend to have a higher likelihood of transferring to a four-year institution (Nora and Rendon 1990). Lanaan (2007) concluded that community college students who successfully transferred to a four-year institution were better socially adjusted if they had joined clubs or organizations or chosen to participate in other out-of-class activities while enrolled in community college. Although Lanaan's (2007) work lends important understanding to the types of adjustments transfer students make once arriving at a four-year institution, the cross-sectional design of the study and the focus on students who have already successfully transferred do not advance our understanding of significant out-of-class predictors of transfer.

In a study looking more specifically at significant predictors of community college student transfer and degree completion, Cabrera et al. (2005) found a modest positive correlation between out-of-class experiences and students' transfer likelihood; however, the authors did not elaborate upon their measure of out-of-class experiences. Cabrera et al. also concluded that students who encountered quality instruction and interacted with counselors on campus were significantly more likely to transfer. With these factors in mind, however, Cabrera et al. concluded that students' decisions about their curriculum and their ability to find academic success represented the strongest predictors of their likelihood to transfer from a community college to a four-year institution.

Conceptual Framework

With prior literature informing this study, two theoretical perspectives also provide important insight into understanding factors that affect students' likelihood of transferring from two-year to four-year institutions. The first perspective involves social capital and students' ability to generate and utilize social capital during their time at a community college. Coleman (1988) defines social capital as the production function of social connections, as actors utilize closed network systems to generate trust, reciprocity, and information channels among other actors within the social network. The concept of social capital merges sociological and economic perspectives on social action (Coleman 1988). Sociologists posit that social norms direct individuals' behavior; in contrast, economists suggest that actors pursue self-interests and their behavior remains independent of social structures (Coleman 1988). Coleman's (1988) conception of social capital suggests that actors not only pursue self-interests but also have their interests and behaviors shaped by their surrounding social structures and norms. In essence, social capital exists within individuals' relationships and connections to other actors within a social system (Portes 1998).

While the concept of social capital implies access to trust and reciprocity, information and knowledge, and norms and sanctions, this study specifically addresses how the generation of social capital facilitates networks of information and knowledge. Although some studies have linked social capital and access to information to family networks (Perna 2004; Perna and Titus 2004), other studies have considered how students can generate social capital through their connections with institutional agents (Stanton-Salazar and Dornbusch 1995). For example, in a study of Mexican-origin high school students' access to information about college, Stanton-Salazar and Dornbusch (1995) found that students' access to information significantly improved when they developed and maintained meaningful relationships with their counselors and teachers.

In a similar manner, this study focuses on how community college students increase social capital by connecting with institutional agents. Berger and Malaney (2003) note that successful transfer decisions are directly related to how well students have been prepared for the transfer process. Community college students who develop relationships with key institutional agents, such as with academic advisors and full-time faculty, may gain access to important information about the transfer process. For instance, academic advisors and full-time faculty familiar with articulation agreements or general transferable courses may assist in guiding community college students toward transferring to four-year institutions. In contrast, students at two-year colleges who do not connect with academic advisors or are predominantly exposed to part-time, adjunct faculty may not establish networks of information that facilitate the transfer process, given that part-time faculty generally have less knowledge about and remain more disconnected from their employing institution (Schuster 2003).

Coupled with the framework of social capital is human capital theory, which posits that individuals are likely to invest in human capital development when potential benefits outweigh perceived costs (Becker 1993). Economists suggest that individuals' anticipated private return on investment in education has the strongest influence on their college-going behavior (Douglass 1997; Perna 2003). Students increase their levels of educational attainment when they anticipate that future benefits will exceed direct and opportunity costs (Douglass 1997). Oftentimes, students conceptualize these benefits in the form of future earnings, but other returns on investment may include additional skills, competencies, and intangible emotions and accomplishments often achieved during the college years (Douglass 1997).

In the community college context, students decide to transfer to a four-year college or university when they determine that the various costs of extending their educational career will provide them with substantial benefits. Students' initial degree aspirations when entering college, particularly at a two-year institution, typically do not represent a valid measure in examining their likelihood of fulfilling those degree goals (Cohen 1998). Generally, students' initial aspirations and intentions suffer from misguided expectations and poor information about the costs and benefits of pursuing a four-year degree (Cohen and Brawer 2003). To the extent that community college students tend to come from more economically depressed backgrounds and generally have less accurate information about the costs of obtaining a four-year degree (Cohen and Brawer 2003), they may demonstrate a reduced likelihood of transferring to a four-year institution to earn a baccalaureate degree. Indeed, without accurate information regarding the actual costs and potential benefits of earning a four-year degree, community college students' cost-benefit analyses may actually deter them from transferring to a four-year institution.

The interaction of social capital theory with human capital theory provides insight into how the level of exposure to part-time faculty may have a direct effect on the likelihood

that students will transfer to a four-year institution. As students experience the collegiate environment and develop their social capital through networks with faculty and staff, they may become more likely to ascertain a better understanding of the potential benefits of obtaining a four-year degree. With a more realistic idea of the potential benefits as well as the actual costs of transferring, students may be more inclined to continue their educational path by transferring to a four-year college or university. However, the utility of social capital is only as good as the information available in the social networks that students establish with institutional agents (Coleman 1998). To the extent that part-time faculty are more detached from the community college environment (Levin et al. 2006) or have limited knowledge about the transfer process at the particular institution, increased exposure to part-time faculty may inhibit community college students' access to accurate and useful information.

Methods

Research Question

Drawing from social and human capital frameworks and previous research, this study seeks to address the following research question: controlling for background characteristics, does exposure to part-time faculty in community colleges negatively relate to students' likelihood of transferring to a four-year college or university? It is hypothesized that, as students' exposure to part-time faculty increases, their likelihood of transferring decreases. A secondary research question asks: controlling for student-level characteristics, does the percent of part-time faculty employed by an institution negatively relate to institutions' average transfer rates?

Data and Sample

This study utilizes student transcript, faculty employment, and institutional data from the California community college system. This particular community college system provides postsecondary education to more than 1.5 million students each year. Drawing from two cohorts of first-time, credit-seeking students in 2000 and 2001, this study tracks the college-going behavior of the system's students over five years. The initial sample of students includes more than 700,000 cases within each cohort, which translates into an initial overall sample of nearly 1.5 million students in 107 community colleges.

Because this study focuses on transfer, we reduced the sample to reflect those students whose academic behavior indicated an intention to transfer. We limited the sample to those students who had completed at least eight transferable credits at a single institution. Adelman (2005) suggests that students most likely to transfer complete at least 10 academic units while Cohen (1991) posits this threshold is actually 15 academic credits. In a study of California community college transfer, Bahr et al. (2005) identified transfer likely students as those individuals who completed at least 12 transferable units as well as a transferable math or English course. Still another method was used by Wassmer et al. (2004), as the authors set a threshold of 12 units (not necessarily transferrable units) as well as completion of at least one transferable math or English course.

Although we use a lower threshold of academic units than ones used by previous scholars (e.g., Adelman 2005; Bahr et al. 2005; Cohen 1991; Wassmer et al. 2004), we consider only transferable units in our cutoff for students to be considered transfer likely.

Our threshold likely presents a more conservative estimate of transfer likely students, as we restrict our sample to students who earned at least eight transferable units from a *single* institution; in other words, we excluded students who accumulated transferable units at multiple institutions yet failed to achieve the threshold of eight transferable units at a single community college. We use this restriction of meeting this transferable credit threshold at a single institution because of our method of analysis, which we describe in a later section. The final analytic sample for this study included 24,865 students in 107 community colleges.

To supplement the student-level data, we merged institutional data from IPEDS into the institutional dataset. The institutional data provided a deeper understanding of the context of students' college environments. This information provided the basis for learning about the structure of opportunity, institutional size, urbanicity, and overall reliance on part-time faculty.

Variables

The student transcript and enrollment data provided information about students' background characteristics and academic behavior. The dependent variable, transfer, represented a dichotomous variable reflecting whether a student transferred within five years of initially enrolling in the system of community colleges. Demographic characteristics included gender, race/ethnicity, age, and citizenship. We dichotomously coded gender (male as the reference group), race/ethnicity (White as the reference group), and citizenship (non-citizen as the reference group). We included age as a continuous variable in the model.

Other enrollment variables included enrollment status (full-time student as the reference group), academic major, and financial aid information. Because of the dynamic nature of enrollment status, we coded students as "part-time" if they enrolled as a part-time student for at least half of their total terms of enrollment. For academic major, we controlled for undeclared and vocational studies majors with all other majors as the reference group. We measured students' academic program choice at the last term of enrollment. Financial aid information included controls for the average amount of aid students received each year in which they enrolled (continuously coded). All financial aid measures were averaged across students' years of enrollment and rescaled so that a one-unit change corresponded to a \$100 change.

To create the variable representing the percent of part-time faculty exposure each student had during their enrollment, we summed the total number of credits completed with part-time instructors and divided that total by the cumulative number of credits the students completed while enrolled. This quotient, representing students' exposure to part-time faculty, provided the proportion of credits students took with part-time faculty at the institution. The final student-level variable in the analyses controlled for students' first-year GPA.

The analyses also included a number of institution-level variables. We included the proportion of instruction done by part-time faculty at each institution as a key variable in identifying the institutional environment for students. Additionally, in separate analyses, we included the proportion of faculty employed in part-time appointments at each institution. Other institutional variables included the percent of under-represented racial minority students, the urbanicity of the institution, and the percentage of students receiving financial aid.

Analyses

Because of the clustered, multi-level nature of the data in this study (students nested within institutions), advanced statistical techniques were necessary to account for the complex sample design. The dichotomous outcome variable, transfer, warranted the use of hierarchical generalized linear modeling (HGLM) (Raudenbush and Bryk 2002). HGLM provides an efficient method to consider the interactive effects of institution- and student-level variables. HGLM takes into account the dichotomous nature of the outcome variable as well as the multi-level, clustered design of the data. Using single-level regression techniques, such as standard logistic regression, for analysis of multi-level data provides less robust results by underestimating the standard errors of parameters, which may result in a Type I statistical error by erroneously concluding a parameter is significant (Raudenbush and Bryk 2002).

Generally, to justify the use of advanced statistical analyses, the outcome variable must significantly vary across institutions (Raudenbush and Bryk 2002). Researchers can determine the extent of this variation by examining the intra-class correlation (ICC), which shows the amount of variance in the outcome variable that can be attributed to institutional differences. Because the outcome variable in this study was dichotomous, the variance of the outcome variable was heteroscedastic at the student level; therefore, the ICC was not an informative means of justifying the use of HGLM. Instead, we followed the recommendations of Raudenbush and Bryk (2002) and the example of several scholars (e.g., Hurtado et al. 2008; Rumberger and Thomas 2000; Titus 2004) by examining box plots of estimates of Empirical Bayes (EB) residuals to determine whether the transfer rates varied across institutions. These plots suggested variation across institutions in students' average likelihood of transferring; thus, we proceeded with the use of HGLM statistical analyses.

In using HGLM, we needed to give consideration to how we centered variables. Centering variables in various ways affects the interpretation of the intercept. For the analyses, we centered all variables around their grand mean, which means the intercept can be translated as the average likelihood of transferring for students with the average characteristics of the sample (Raudenbush and Bryk 2002).

Limitations

This study has several important limitations. The first limitation to this study exists in the potential lack of consistency in data collection methods across the 107 institutions in the sample. Despite the system office's efforts to standardize individual institutions' data collection methods, definitions and methods may continue to vary across institutions. Second, although HGLM provides a more robust analysis of the multi-level data in this sample, the use of HGLM has at least one constraint. Any form of regression, including HGLM, requires a substantial number of cases for every variable included in the model; Raudenbush and Bryk (2002) recommend at least 10 cases for every variable. While more than 24,000 students in the student-level sample provided for the possibility of an excessively large level-1 model, the 107 institutions constrain the level-2 model in HGLM to just 10 variables. This limitation required careful consideration of the factors included in the institutional model.

Third, as with any secondary data analysis, this study is restricted by the variables and definitions included in the community college system and IPEDS datasets. Because we primarily focused on analysis of transcript data, we were unable to control for other important predictors of community college student transfer. Our data did not offer controls for students' out-of-class experiences and engagement (Cabrera et al. 2005; Driscoll 2007;

Lanaan 2007) or students' satisfaction with the institutional environment (Nora and Rendon 1990). Likewise, transcript data did not allow us to control explicitly for students' level of social capital; instead, we suggest that students' level of exposure to part-time faculty serves as a proxy measure for social capital. We suggest that as students spend more time with part-time faculty, their ability to establish meaningful connections with their institution diminishes.

Fourth, in addition to the constraints of the dataset, our research design does not support cause-effect conclusions between exposure to part-time faculty and students' likelihood to transfer to a four-year institution. We acknowledge that we lack controls for students' course completion ratio (Calcagno et al. 2007), remedial course-taking behavior (Cabrera et al. 2005), and highest level of math completed (Adelman 1999, 2005; Calcagno et al. 2007). Although our study offers new insight into several of the issues that relate to students' likelihood to transfer, we do not presume that we have accounted for all of the complexities affecting this phenomenon.

Finally, the identification of the students included in the analytic sample features a certain level of subjectivity. This method of identifying the analytic sample may lead to a certain bias in the analyses by excluding some students who transferred but did not meet the threshold to be considered "transfer likely." While we recognize this as a limitation, we believe that having an exclusion bias provides more realistic results than having an inclusion bias, which would occur had we included all of the students in the initial population.

Results

Descriptive Statistics

Table 1 presents descriptive statistics for the student and institution-level variables included in the analyses. On average, students had 38% of their academic credits with part-time faculty during the time in which they were enrolled at their home institution. Some students in the sample had no credits with part-time faculty whereas others had all of their credits taught by part-time faculty. Students had an average first-year GPA of 3.10, and their cumulative GPA averaged 3.14.

Women composed 54% of the analytic sample, which resembles the larger population of community colleges in this state system. Asian American and Pacific Islander students accounted for 14% and 4% of the analytic sample, respectively. These percentages indicate a slight overrepresentation of Asian Americans and Pacific Islanders in the analytic sample compared to their actual proportion (13%, combined) of the entire community college population in this system of institutions. White students constituted 44% of the sample, which is slightly less than the percentage of White students enrolled in this system (46%). Comparatively, Latino and Black students made up 23% and 5% of the analytic sample, respectively.

The average age of students in the analytic sample was 24.80, which is significantly lower than the average age (28 years old) of students enrolled throughout the system. This statistic suggests that younger students may be more likely to demonstrate transfer likely behavior whereas older individuals may have other goals in mind, such as vocational retraining or lifelong learning, when they first enroll. Nearly 60% of students enrolled part-time. Approximately 38% of students in our sample did not declare a major, and 7% of students majored in vocational studies programs. The balance of students studied a variety of fields, ranging from liberal arts and humanities to science and technology.

Table 1 Descriptive statistics

	Mean	S.D.	Min.	Max.
Dependent variable				
Transferred to a four-year institution	0.36	0.48	0.00	1.00
Independent student-level variables				
Female	0.54	0.50	0.00	1.00
Black	0.05	0.34	0.00	1.00
Asian American	0.14	0.22	0.00	1.00
Pacific Islander	0.04	0.21	0.00	1.00
Latino/a	0.23	0.42	0.00	1.00
Other	0.07	0.15	0.00	1.00
White	0.44	0.50	0.00	1.00
Citizenship	0.80	0.40	0.00	1.00
Age	24.80	10.07	16.00	70.00
Vocational studies major	0.07	0.25	0.00	1.00
Undeclared major	0.38	0.49	0.00	1.00
Average loans across all years of enrollment (100)	0.16	1.75	0.00	64.36
Average grants across all years of enrollment (100)	2.80	5.98	0.00	59.53
Average fee remissions across all years of enrollment (100)	2.08	2.69	0.00	31.52
Average work study aid across all years of enrollment (100)	0.26	1.79	0.00	33.04
Average scholarships across all years of enrollment (100)	0.22	1.50	0.00	45.00
Exposure to part-time faculty (10%)	3.81	2.33	0.00	10.00
Parent income (log transformed)	2.53	4.39	0.00	12.94
Student income (log transformed)	3.42	4.43	0.00	13.64
First-Year GPA	3.10	0.73	1.00	4.00
Total GPA	3.14	0.52	1.00	4.21
Earned an associate's degree	0.26	0.44	0.00	1.00
Does not have a high school diploma	0.15	0.36	0.00	1.00
Has a high school diploma	0.78	0.42	0.00	1.00
Has a college degree	0.07	0.25	0.00	1.00
Part-time student	0.58	0.49	0.00	1.00
Independent institution-level variables				
Proportion of total faculty in part-time appointments	0.64	0.08	0.33	0.85
FTE student (hundreds)	65.48	37.55	5.63	177.41
Proportion of instruction done by part-time faculty	0.49	0.08	0.28	0.77
Percentage of students majoring in vocational studies	5.74	4.12	0.00	28.51
Urbanicity: City	0.44	0.50	0.00	1.00
Urbanicity: Suburban	0.31	0.46	0.00	1.00
Urbanicity: Rural	0.25	0.44	0.00	1.00
Percent of students receiving financial aid	0.51	0.14	0.22	0.86
Percent of students identified as URM	3.33	1.77	0.77	9.33

Among the institutional variables, part-time faculty constituted 64% of all faculty across all the institutions in the system in 2003. The average proportion of instruction offered by part-time faculty was 49%. Though the mean FTE enrollment at community colleges

within the system was 6,548 students, this variable ranged from 563 to 17,741 students. Approximately 44% of institutions were located in urban areas compared to 31% in suburban and 25% rural.

HGLM Analyses

Table 2 presents the results of the HGLM analyses on students' likelihood to transfer to a four-year institution. We include the log-odds of transfer as well as delta-p statistics. Delta-p statistics represent the change in probability of transfer associated with a one-unit change in the predictor variable. We used the method recommended by Petersen (1985) to calculate the delta-p statistics.

The findings indicate a significant and negative association between students' transfer likelihood and their exposure to part-time faculty instruction. Indeed, for every 10% increase in students' exposure to part-time faculty instruction, students tended to become almost 2% less likely to transfer. Although the strength of this association may seem small, the average student in this sample had almost 40% of his or her academic credits with part-time faculty members, which translates into being, on average, about 8% less likely to transfer compared to peers who had no exposure to part-time faculty members. Additionally, students who had all of their credits taught by part-time faculty were nearly 20% less likely to transfer than their peers who had only full-time faculty instruction. In this sample, 342 students had all of their credits with part-time faculty members while almost 2,500 had no exposure to part-time faculty instruction. Although our methodology precludes us from concluding a causal relationship between exposure to part-time faculty and students' transfer likelihood, the results suggest a significant negative association between these two variables.

The results for other academic variables in the model suggest more positive outcomes for students, as the analyses indicate that earning a higher GPA in the first year of enrollment and completing an associate's degree significantly improve students' chances of transferring to a four-year college or university. Students who earned an associate's degree increased their likelihood of transferring to a four-year college or university by almost 24% compared to their classmates who did not complete an associate's degree. Additionally, for every one-point increase in first-year GPA, students' chances of transferring to a four-year institution increased by about 7%. We ran other models, not shown in this paper, with cumulative GPA in the analysis and found similar results. Models including cumulative, rather than first-year, GPA suggested that a one-point increase in cumulative GPA improved students' chances of transferring to a four-year institution by 7.25%.

Attending part-time and majoring in vocational studies appear to have significant negative effects on transferring from a community college to a four-year institution. Vocational studies majors were 16% less likely to transfer compared to students majoring in more traditional academic disciplines. Additionally, enrolling in community colleges on a part-time basis decreased students' chances of transferring by almost 12% compared to their full-time peers. Not declaring a major appears to have no significant effect on students' likelihood of transferring.

Among the institutional characteristics, only two variables in the model emerged as significant. Students enrolled at rural institutions were 4% less likely to transfer compared to students attending suburban campuses. Attending an institution located in an urban area had no significant effect on students' likelihood to transfer. Also, the percent of students at an institution receiving financial aid had a significant negative effect on transfer. Every 10-point increase in the proportion of students at an institution receiving financial aid made students at that institution almost 2% less likely to transfer.

Table 2 Results of HGLM analyses

	Log odds	S.E. (Sig.)	Delta-P (%)	VIF	Tol.
Independent student-level variables					
Female	−0.03	0.03		0.96	1.04
Black	0.04	0.07		0.93	1.07
Asian American	0.35	0.05***	8.39	0.79	1.27
Pacific Islander	−0.02	0.07		0.95	1.06
Latino/a	−0.33	0.04***	−7.21	0.81	1.23
Citizenship	0.37	0.04		0.69	1.17
Age	−0.06	0.01***	−1.37	0.98	1.44
Vocational studies major	−0.81	0.07***	−15.99	0.95	1.06
Undeclared major	−0.04	0.03		0.94	1.07
Average loans across all years of enrollment (100)	0.01	0.01		0.97	1.03
Average grants across all years of enrollment (100)	−0.02	0.01*	−0.46	0.68	1.47
Average fee remissions across all years of enrollment (100)	−0.02	0.01*	−0.46	0.35	2.86
Average work study aid across all years of enrollment (100)	0.00	0.01		0.93	1.07
Average scholarships across all years of enrollment (100)	0.01	0.01		0.96	1.04
Exposure to part-time faculty (10%)	−0.08	0.01***	−1.82	0.97	1.03
Parent income (log transformed)	0.03	0.01***	0.69	0.66	1.51
Student income (log transformed)	0.01	0.01		0.46	2.15
First-year GPA	0.30	0.02***	7.16	0.88	1.14
Earned an associate's degree	0.97	0.03***	23.74	0.92	1.09
Does not have a high school diploma	0.11	0.04**	2.57	0.97	1.03
Has a college degree	−0.05	0.07		0.81	1.24
Part-time student	−0.56	0.03***	−11.68	0.89	1.12
Independent institution-level variables					
FTE student (hundreds)	0.00	0.01		0.75	1.33
Proportion of instruction done by part-time faculty	0.00	0.01		0.93	1.07
Percentage of students majoring in vocational studies	−0.01	0.01		0.98	1.02
Urbanicity: City	0.05	0.07		0.72	1.39
Urbanicity: Rural	−0.18	0.08*	−4.03	0.68	1.47
Percent of students receiving financial aid	−0.09	0.02***	−1.75	0.79	1.26
Percent of students identified as URM	−0.01	0.03		0.79	1.26
Model statistics					
Intercept reliability	0.69				
Chi-square	374.26				
Explained variance at level-2	0.30				
Baseline probability of transfer	0.36				

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

In the institutional model, we tested two variables representing the presence of part-time faculty. We examined how the proportion of faculty in part-time appointments, by head-count, related to students' likelihood of transferring, and we also tested whether the

proportion of instruction offered by part-time faculty significantly affect student transfer. Both variables, tested separately, showed no significant association with transfer likelihood.

Finally, Table 2 presents several statistics related to multicollinearity, model fit, and explained variance at the institutional level. With the exception of students' average fee remissions, we found no evidence of multicollinearity among the independent predictors in our model. Regarding model fit, the chi-square statistic associated with the level-2 variance component is 374.26, which suggests a substantial improvement from the same statistic in the fully unconditional model (not shown). The chi-square statistic improved by 103.73 points between the fully unconditional model and the final model reported in Table 2. The high chi-square statistic reported in Table 2 suggests that we have not accounted for the majority of the variance between institutions in students' likelihood to transfer to a four-year college or university. The institutional predictors included in the level-2 model explained approximately 30% of the variation between institutions in students' likelihood of transferring to a four-year college or university. The heteroscedasticity of the level-1 variance precludes us from making a reasonable interpretation of explained variance at level-1.

Discussion and Implications

This study examined the association between exposure to part-time faculty instruction and community college students' likelihood of transferring to a four-year college or university. HGLM analyses of the student- and institution-level data indicate a significant and negative relationship between exposure to part-time faculty instruction and students' chances of transferring. This finding is similar to prior research on the relationship between exposure to part-time faculty and persistence among students at four-year institutions (Harrington and Schibik 2004; Eagan and Jaeger 2008; Jaeger and Hinz 2008; Ronco and Cahill 2004).

Because the effect of exposure to part-time faculty becomes much more pronounced as students spend more time in the classroom with part-timers, administrators and policy-makers need to give careful attention to this issue. Prior research has found that available and engaged faculty members positively contribute to a number of student outcomes (Cejda and Rhodes 2004). At the same time, research suggests that part-time faculty remain less engaged and available (Umbach 2007) and less satisfied (Eagan 2007; Levin et al. 2006) than their full-time colleagues. Part-timers' lack of availability might be attributed to deficient resources, such as office space, provided to part-time faculty as well as poor incentives for part-time faculty to make themselves available to students outside of class. To address issues of availability and satisfaction among part-time faculty, and consequently mitigate the negative relationship between exposure to part-time faculty and students' likelihood of transferring, administrators should consider ways in which to provide incentives for part-timers to engage with the campus as well as spend time with students outside of class.

As suggested by the social and human capital frameworks used to conceptualize this study (Becker 1993; Coleman 1988), stronger connections between students and faculty, either part-time or full-time, may provide students with the information, resources, and encouragement they need to navigate the academic process and ultimately decide to transfer to a four-year institution. As prior research suggests, connecting with faculty

outside of class has a number of positive outcomes for students, such as networking and mentoring opportunities (Cejda and Rhodes 2004; Cotten and Wilson 2006). In fact, Cejda and Rhodes (2004) concluded that increased interactions with faculty positively contributed to Hispanic community college students' likelihood to complete an associate degree. If administrators provide part-timers with the necessary incentives to encourage them to connect with students outside the classroom, the negative relationship between students' likelihood to transfer and exposure to part-time faculty may be mitigated.

In addition to considering how to encourage increased engagement among part-time faculty at community colleges, administrators need to reach out to part-time students. In this study, almost 60% of transfer likely students attended part-time. Cohen and Brawer (2003) suggest that students enroll part-time at community colleges because of competing obligations, as many community college students work full-time, have family commitments, or just prefer to attend part-time. Although not explicitly tested by variables in this study, the negative relationship between enrolling part-time and the likelihood of transferring to a four-year institution may be explained partly by time. Students attending part-time, by the very nature of their part-time status, take longer to accumulate the credits necessary to transfer into a four-year college or university. The length of time it takes to become transfer eligible may discourage part-time students from wanting to continue with their education. Additionally, part-time students may have goals that do not include or do not require earning a four-year college degree.

Future research needs to examine these issues in greater depth. In cases where part-time students have an ambition to transfer, however, community college faculty and staff need to work with them to make sure they have the information necessary to navigate the transfer process. Because part-time students spend less time on campus than their full-time counterparts, they likely have fewer opportunities to connect with their peers as well as their faculty to develop information networks. If both part-time and full-time faculty as well as staff members time to reach out to these students to talk with them about the transfer process, part-time students' inclination toward transfer may become stronger.

In addition to the findings on part-time faculty and part-time students, the results suggest that students with higher first-year GPAs have significantly greater chances of transferring to four-year institutions. This finding corresponds to other research that links first-year GPA and persistence and degree completion (Eagan and Jaeger 2008; Titus 2004). Student success in the first year of college may be critical to how they view the prospect of later transferring from a community college to a four-year institution.

One finding from this study seems to contradict earlier research that examined the connection between part-time faculty and student outcomes. Using institutional data only, Jacoby (2006) concluded that the proportion of part-time faculty employed by the institution negatively affected the institutions' associate degree completion rate. While our study was distinct from Jacoby's work in sample, methodology, and the outcome of interest, our findings suggest that the negative effects associated with employment of part-time faculty actually occur more at the individual level rather than the institutional level. Our models revealed that neither the proportion of faculty employed in part-time appointments nor the proportion of instruction completed by part-time faculty had a significant relationship with students' likelihood of transferring to a four-year institution. These findings suggest that students respond less to contextual effects of their institution and more to individual factors affecting their experience. The individual effects on students of part-time faculty employment underscore the importance for individual faculty to connect with students. Additionally, this finding emphasizes the importance of institutions to consider best to utilize the part-time faculty whom they employ.

Future Research

The limitations from our study as well as its findings provide a number of opportunities and directions for future research. First, future studies should consider alternative definitions for transfer likely students. Our study restricted the sample of transfer likely students to those individuals who completed at least eight transferable units at a single institution. This restriction likely did not account for students who enroll at and earn transferable credits from multiple community colleges. Future work could use a higher threshold of transferable units but consider units cumulative across institutions; such a selection strategy may significantly increase the sample size of transfer likely students. Our data did not offer control for students' out-of-class experiences and engagement (Cabrera et al. 2005; Driscoll 2007; Lanaan 2007), students' satisfaction with the institutional environment (Nora and Rendon 1990), or a means to measure social capital. Additional research could explore these items in addition to key variables relating to exposure to part-time faculty.

Considering that students may attend more than one community college, future analyses might also use cross-classified hierarchical linear modeling (CCHGLM). CCHGLM takes into account multiple contexts, such as multiple institutions, that may affect an outcome (Raudenbush and Bryk 2002). Because of the swirling effect of community college students (de los Santos and Wright 1989), where many students simultaneously enroll and take courses at multiple institutions, students are exposed to multiple institutional contexts. These different contexts might influence their ability to navigate the transfer process.

In addition to using advanced analyses to account for this swirling effect of enrolling at more than one institution, future studies should disaggregate the data by enrollment status. In our study, part-time students were almost 12% less likely to transfer to a four-year institution than their classmates who enrolled full-time. Because this study focused specifically on the effects of exposure to part-time faculty on community college students' likelihood to transfer to a four-year college or university, examining differences between part- and full-time students was beyond the scope of this research. At the same time, by not conducting separate analyses on full- and part-time students, we may not have provided an accurate depiction of the experiences of these two distinct types of students.

Just as future research should disaggregate by enrollment status, scholars may consider providing for more specific controls for student major. Our study examined differences in undeclared and vocational studies majors compared to students in traditional academic disciplines. Thus, we were unable to determine whether students' experiences with part-time faculty are significantly different in science and mathematics fields compared to those in the humanities. More detailed analyses might provide community college administrators and policymakers with more specific information about the relationship between exposure to part-time faculty and students' likelihood of transferring.

Finally, limited research has provided community college administrators and policymakers with a cost-benefit analysis of employing part-time faculty. Research has shown part-time faculty save institutions on labor costs (Bettinger and Long 2006). At the same time, our results, as well as the findings from other research, suggests a negative relationship between exposure to part-time faculty and student outcomes. Future research might consider using econometric techniques, such as stochastic frontier analysis, to determine the extent to which community colleges become more cost efficient by relying heavily on part-time faculty employment. At the same time, such research may show how increasing employment of part-time faculty affects institutions' production efficiency, as measured in terms of community colleges' ability to produce certificates and associate degrees as well as transfer students to four-year institutions. Such analyses may provide

administrators with information on how best to utilize the skills and talents of part-time faculty so as to constrain costs while continuing to maintain or even improve their efficiency in producing well-educated individuals.

Conclusion

Anticipated expansion in enrollments within the U.S. higher education system likely will place further strain on the community college sector (Martinez 2004). At the same time, states continue to reduce appropriations to higher education institutions, and such reductions have forced institutions to identify innovative revenue-generating and cost-saving strategies. Among community colleges, increased employment of part-time faculty appears to be one of the more popular solutions to constrain costs. Thus, the trend of increasing employment of part-time faculty likely will continue for years to come; therefore, community colleges must learn to work within the system that they have perpetuated by identifying ways to tap into the talents offered by part-time faculty members. Finding ways in which to encourage part-timers to make time for students outside of class, such as by providing part-time faculty with office space or additional money to compensate them for holding office hours, may mitigate the negative relationship between part-time faculty exposure and students' likelihood to transfer. At minimum, and given our findings, policymakers and community college administrators must begin to consider the effects of increased use of part-time faculty.

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