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Geographical Constraints and College Decisions: How Does For-Profit College Play in Student's Choice?

Daewoo Lee[1] · **Maureen Pirog**[2]

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Abstract

Geography of opportunity research has identified places with few or no college options: so-called "education deserts." This study extends this geography of opportunity research, exploring how geographical constraints affect students' choices, particularly the choice to attend a for-profit college. Using the Education Longitudinal Study 2002 (ELS: 2002) and the Integrated Postsecondary Education Data System (IPEDS), we measure the number of college options within students' commuting zones in the United States. When there are any for-profit colleges in a commuting zone, students are more likely to attend them and less likely to attend community colleges. Additionally, when there are any public two-year colleges in a commuting zone, there is a negligible impact on enrollment in for-profit colleges. This finding shows evidence of public-private competition and crowd-out in post-secondary education. Also, the presence of community colleges within education deserts makes community colleges a more favorable choice over for-profit colleges.

Keywords Higher education · For-profit colleges · College choice · Geography of opportunity · ELS

According to studies, students attending for-profit colleges tend to have lower graduation rates and higher default rates on federal student loans (Deming et al., 2012;

✉ Daewoo Lee
lee_daewoo@columbusstate.edu

Maureen Pirog
pirog@indiana.edu

[1] Department of Politics, Philosophy, and Public Administration, Columbus State University, 4225 University Avenue, Shannon Hall 301, 31909 Columbus, GA, USA

[2] Paul H. O'Neill School of Public and Environmental Affairs, Indiana University, 1315 East Tenth Street, 47405 Bloomington, IN, USA

Cellini & Darolia, 2015). In 2015, Corinthian Colleges, one of the largest for-profit colleges in the U.S., filed for bankruptcy and shut down operations amid widespread charges of unlawful practices (Morgenson, 2016). Most recently, ITT Educational Services, another large network of for-profit colleges that operated for more than 50 years, ended its operations due to federal restrictions on access to student loans and grants (Douglas-Gabriel, 2016).

Proponents of for-profit colleges argue that these institutions provide valuable options for students by helping them navigate entry to postsecondary education and subsequent labor market participation (Rosen, 2011; Tierney & Hentschke, 2007). In this article, we do not focus on whether or not for-profit colleges succeed in retaining their students, providing quality instruction, or contributing to labor market success. Instead, we look at one potential factor that could drive students to select for-profit colleges over other college options: a geographical access advantage. In particular, we examine how the geographic availability of for-profit colleges over other options can influence the college choices of students. Throughout this article, we use the term "college" to refer to any institution of higher education.

Over the past several decades, researchers have found that the proximity between home and college is an essential factor when students consider college options (Alm & Winters, 2009; Card, 1995; Dache-Gerbino, 2016; González Canché, 2018; Jones & Kauffman, 1994; Leppel, 1993; Long, 2004; Niu & Tienda, 2008; Rouse, 1995; Turley, 2009; Skinner, 2019). The proximity of a college is likely to be even more important for low-income college-goers, students of color, or non-traditional students (e.g., 25 years or older with family responsibilities). For example, community college students who work full-time prefer attending colleges with convenient locations given their commuting patterns (Dache-Gerbino, 2016). Students with both work and family responsibilities tend to choose colleges that are closer and which offer classes on certain days or times (Iloh & Tierney, 2014; Jepsen & Montgomery, 2009) find that among non-traditional adult students who try to return to college, distance is a statistically significant factor in deciding whether or not to enroll in community college. Staying close to family can help students save money on housing and food, as well as lessening travel time to college. Students can also pay cheaper tuition when attending in-state or community colleges. For low-income students, students of color, or non-traditional students who juggle work, family, and school, it may be a financially necessary decision to stay local when it comes to attending colleges (Briscoe & De Oliver, 2006; Dache-Gerbino, 2016; Dache-Gerbino et al., 2018; De Oliver, 1998; Hillman, 2016; Niu, 2015; Ovink & Kalogrides, 2015).

Given that college choice is highly likely to be based on local availability for these students, what if there are few options around them? Hillman (2016) raised this question and identified the pattern of spatial constraints faced by students. He defined communities with limited college options as "education deserts," which have only a few nearby college options. Students living in education deserts, he argued, have a different opportunity structure for college choice, and this disproportionately impacts minority and low-income students. For example, communities with large Hispanic populations and low educational attainment have the fewest number of local colleges while white and Asian communities tend to have more options (Hillman, 2016).

In this study, we examine how the local availability of postsecondary institutions relates to students' college choices. In particular, we focus on how the geographical constraints of colleges influence students' probabilities of attending for-profit colleges. It is an important question because for-profit colleges have higher drop-out rates (Deming et al., 2012), which means that many students will not secure the labor market benefits of a college diploma (Cellini & Chaudhary, 2014; Cellini & Turner, 2019; Denice, 2015; Lang & Weinstein, 2013). Furthermore, more students attending for-profit institutions took out loans in the AY2011-2012 than students attending any other type of college (Cellini & Darolia, 2017). From a benevolent perspective, we may view for-profit colleges as filling a void in the higher education market by providing flexible schedules, online courses, and classes held in convenient locations, even if these advantages come at the expense of higher tuitions compared to broad-access institutions. Less generous interpretations might view for-profit colleges as misleading prospective students about the costs of attending college, targeting weaker students and those with fewer options (Dache-Gerbino et al., 2018; Holland & DeLuca, 2016; Kutz, 2010; Iloh & Tierney 2014; Iloh, 2016).

We find that the local availability of postsecondary institutions matters for college choice. In particular, the more for-profit colleges within education deserts, the higher the probability that students will choose a for-profit college. Given the disproportionately higher use of online education by for-profit universities (Guzman et al., 2019), we might not have expected the local availability of colleges to matter as much for for-profit institutions, although it may well matter for student recruitment efforts. For-profit colleges have focused on recruitment and marketing, recognizing that supplies of postsecondary education do not match students' demands in education deserts (Dache-Gerbino et al., 2018; Iloh & Tierney, 2014; Kutz, 2010). If the number of public broad-access institutions are limited in education deserts, for-profit colleges could appeal to students as alternatives.

Background

Related literature on choice of for-profit Colleges

A relatively small number of studies examine students' choices to attend for-profit colleges. Chung's (2012) study focuses on students' choices of for-profit colleges, finding that students' socio-economic background and parental involvement have a significant correlation with their decision to attend for-profit colleges. She also finds that students look at the relative costs of attending a for-profit or two-year public college. In other words, she suggests that for-profit and two-year public colleges may substitute for one another, and students are sensitive to tuition prices in making their choices. Cellini (2009) presents similar results, providing evidence that for-profit and two-year public colleges compete for students in California.

A few qualitative studies also examine student choices to attend for-profit rather than two-year public colleges. First, for-profit colleges provide more customer-oriented information (and service) to potential students than community colleges. Iloh and Tierney (2013) report that prospective students for two-year public colleges

encountered institutional difficulties, such as bureaucratic hurdles to finding answers to inquiries or limited availability of college counselors. Conversely, prospective students of for-profit colleges found friendlier and more engaging representatives to provide information on enrollment and transition to the job market after graduation (Iloh & Tierney, 2013). The authors speculate that this difference would be critical for students' choices as many of them rely on specific information - financial aid, fees, and job prospect – in their decision-making processes.

Similarly, Iloh and Tierney (2014) conducted case studies related to students' choices to attend for-profit colleges. They report that students choose for-profit colleges based on what they perceive to be a long-term benefit in the job market, taking the risk of accruing high tuition costs upfront. They believe that high tuition represents the quality of education; thus, they chose the higher cost option as a strategic investment. Conversely, the choice of a two-year public college is based on the immediate benefits, such as the lower costs upfront or multiple educational pathways through transfer options. While cost may be one of the critical factors, exclusive focus on vocational training of for-profit colleges versus the more diverse paths and goals of community college could also be a difference-maker in decision making.

College Proximity and College Choices

Previous research has identified students' distance to nearest college as a critical determinant of college choice. Notably, Card (1995) argues that the cost of attending college should decrease with proximity because students can live at home and save money on room and board. Rouse (1995) also finds that when students live closer to local two-year public colleges, they are likely to increase their total years of schooling, after controlling for individual ability and family background. Jones and Kauffman (1994) examine the impact of distance on college attendance, calculating the distance from the center point of each county in Texas to the nearest in-state comprehensive public universities. They find that the impact of proximity on college attendance is particularly strong among minority students, who are often located in low-income counties and far from in-state universities. Other studies suggest that proximity is a particularly important factor for Hispanic students, originating from strong family ties that provide support for students pursuing higher education (Dache-Gerbino, 2016; Dache-Gerbino et al., 2018; Núñez & Bowers, 2011; Perez & McDonough, 2008; Oseguera & Malagon 2011; Ovink, 2014).

In recent decades, a number of authors have noted the importance of proximity specifically for students attending for-profit colleges (Cellini, 2009; Chung, 2012; Dache-Gerbino et al., 2018; Holland & DeLuca, 2016; Iloh & Tierney, 2014; Iloh, 2016; Kutz, 2010; Soliz 2018). Using qualitative approaches, most of these authors note the importance of proximity. Only Soliz (2018), Cellini (2009), and Chung (2012) use a proximity measure in their analyses related to for-profit colleges. Among those studies of for-profit colleges that use a measure of proximity, Soliz (2018) measures the distance between newly opened for-profit colleges and nearby community colleges from 2001 to 2012 to assess impacts on total enrollment at community colleges. She concludes that new for-profit colleges do not impact college enrollment at community colleges – a result that seems to stand in stark contrast to this study's

findings at the national-level as well as findings specifically from California (Cellini, 2009) – although neither our nor Cellini's studies focus exclusively on for-profit colleges *newly opened* between 2001 and 2012.

Method

Data

We use data from the Education Longitudinal Study of 2002 (ELS: 2002), the postsecondary longitudinal survey conducted by the National Center for Education Statistics (NCES) of the U.S. Department of Education. This survey tracked a nationally representative sample of 16,197 students who were in tenth grade in 2002 and followed students' secondary and postsecondary years for a decade, using three follow-up surveys in 2004, 2006, and 2012. The ELS: 2002 provides a wealth of information from multiple sources including, for example, students' college choices, standardized test scores in a range of subjects (i.e., reading and mathematics), and surveys of students' parents, teachers, and school administrators. In particular, we obtained restricted data from the ELS: 2002 to approximate where each student lived when they made their college choice. We also used data from the Integrated Postsecondary Education Data System (IPEDS)'s institutional files. IPEDS provides various information on colleges, including their postal addresses. We used colleges' addresses from 2002 to 2012 IPEDS, the same time periods as ELS: 2002. In the end, our analytic sample included students who enrolled in their first college in the first follow-up in 2004 through the third follow-up in 2012.

Measures

To conceptualize college availability and education deserts, we generated a measure of local college availability using the number of colleges located within a student's Commuting Zone (CZ), following the example of Hillman's (2016) work. Developed by the U.S. Department of Agriculture (USDA), the CZ accounts for the area where people both live and work, using Census journey-to-work data to measure the county-to-county flow of economic activities. The critical rationale for using CZs in our analysis is that the flow of people between counties defines CZs. Therefore, it explores commuting patterns and measures the economic activities of rural counties more accurately (Tolbert & Sizer, 1996). The size of a CZ is also roughly proportional to the level of economic development within the area, capturing the density of college options around students. The CZ measure has been used by higher education researchers to reflect students' commuting patterns across state and county lines, as well as local economic activities in rural areas (Hillman, 2016; Kienzl et al., 2007; Klasik et al., 2018).

In our study, we first tracked each student's residential zip code available from the baseline (2002) and three follow-up surveys (2004, 2006, and 2012) in the restricted-use data of the ELS: 2002. The restricted-use data also contains information about the year and month when a student first attended college. Combining the two pieces

of information, we identified students' zip codes when they made their first college choice. We note the challenge here that some students enrolled in their first college in a survey wave different from the one we used to identify their residence. Our solution for those students was to use their residential zip codes from the prior survey wave. The data shows that the most significant portion of students (46.49%) in our sample enrolled in colleges at the first follow-up survey (2004). It also shows that 68.18% of students finished their first enrollments by the second follow-up survey (2006). By 2008, two years after the second follow-up, 79.46% of students made their first college choice. Based on these numbers, we believe our solution reasonably captures students' residences when they enroll in colleges.

In a separate process, we found the postal addresses of U.S. colleges in the IPEDS data from 2002 to 2012. Then, we merged them into the pre-defined 741 CZs, matching colleges' zip codes within each CZ. Next, because the boundaries of the CZs include a cluster of counties, we matched colleges' zip codes to counties within CZs. Finally, information on the number of colleges within CZs is merged into the ELS: 2002 information on students' zip codes. As a result, we generated a measure of local college availability within each student's CZ, which becomes our independent variable of college proximity: how many for-profit, public two-year, public four-year, and private four-year colleges are located within each CZ.

The dependent variable is a student's choice of college. In modeling college choice, we assume that the student could select among the following four institutional choices: a for-profit college, a public two-year college, a public four-year college, or a private four-year college. In the model, ordering a student's choice may not be appropriate, considering institutional differences (Hilmer, 2001). With no clear ordering of the dependent variable, the multinomial logit model is the preferred specification because it does not require an arbitrary structure on the student's choice (Long & Freese, 2014). In this model, we follow the conventions of previous research on college choice, holding no postsecondary education as the reference group (Chung, 2012).

We included a handful of controls at both the student- and CZ-level. We first control for a group of socio-demographic variables including age, gender, race, parental education, and family income. We also included a control for students' academic backgrounds from high school, including GPA and standardized math and reading scores. A student's course-taking pattern in high school is also included. This is a publicly available variable that indicates whether a student took an academic and/or occupational concentration requirement in high school. Finally, we include a series of measure for the population, socio-economic, and labor market characteristics of each CZ. Appendix A provides descriptive statistics of all CZ-level variables used in the analysis.

Analytical Strategy

The model used here for students' college choices follows previous studies, based on the assumption that the student makes a postsecondary choice to maximize their utility (see Chung 2012; Manski & Wise, 1983; Nguyen & Taylor, 2003; Ordovensky,

1995; Rouse, 1994). The model assumes that student's choice is a function of his or her individual characteristics and other associated factors.

In modeling college choice, we assume that the student could select among the following four institutional choices: a for-profit college, a public two-year college, a public four-year college, or a private four-year college. Thus, the utility of the student *i* to choose any *j* college is a function of student- and Commuting Zone-level characteristics:

$U_i^j = \alpha_i^j X_i^j + \in_i^j$

where X_i^j include a student's gender, race, age, high school math and reading scores, parental education, family income, number of college options within CZ, and a series of CZ-level characteristics. The $\in_i^j$ is a random error capturing unobserved variation.

Student (i) will choose an alternative (j) to maximize utility, that is:

$U_i^j = \text{Max}\,(U_i^{\text{For-profit college}}, U_i^{\text{public 2-yr college}} U_i^{\text{Public 4-yr college}}, U_i^{\text{Private 4-yr college}})$.

The probability that student (i) chooses a for-profit college is:

$Pr_i^{\text{For-profit}} = Pr_i\,(U_i^{\text{For-profit}} > U_i^j \text{ for all } j \neq \text{for-profit})$

We used maximum likelihood to estimate this probability. The multinomial logit model, where the individual predicted the probability of choosing a for-profit college, is as follows:

$$Pr_i^{For-profit} = \frac{e^{X_i^{For-profit}\beta^{For-profit}}}{\sum_k e^{X_{ij}^k \beta^k}}$$

where k = public two-year, public four-year, and private four-year colleges.

To provide a more intuitive interpretation for the coefficients, we estimate marginal effects. The marginal effect in the multinomial logit model informs us about the change in a predicted probability resulting from a change of one unit in a particular predictor variable. For binary predictor variables, the marginal effect reflects the difference between the predictor variable equaling zero (the reference category) to one. For categorical variables, the marginal effects show the difference in the predicated probabilities in one category relative to an omitted reference category. A marginal effect of continuous variables measures the instantaneous rate of change. We calculate and report average marginal effects, computing the marginal effect of a predictor in each observation at its observed values, and then compute the average of these effects.

Results

Evidence from predicted probabilities

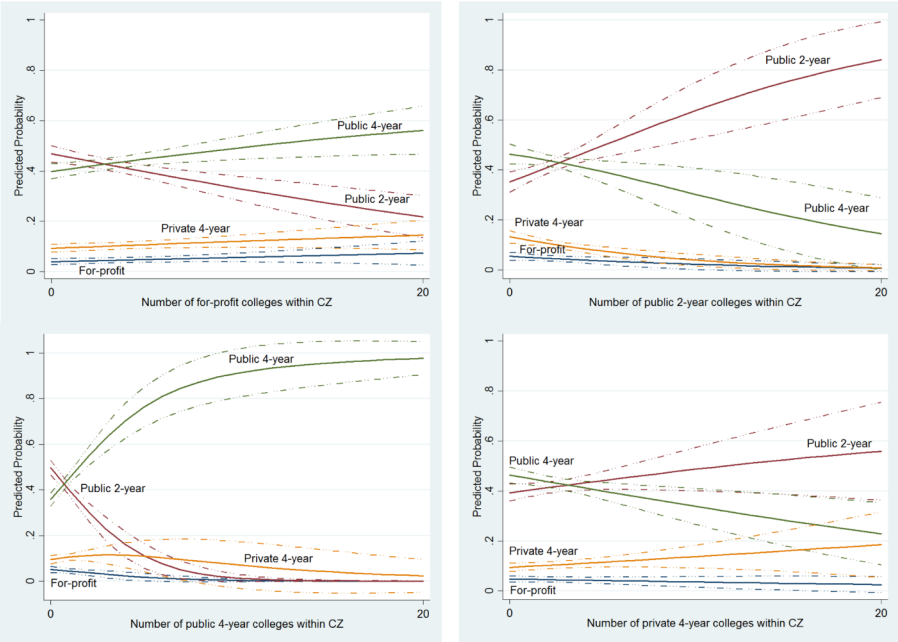
A plot of the predicted probabilities for the college choice categories and the number of college options in a CZ are shown in Fig. 1. A predicted probability plot provides an intuitive way of interpreting the relationship between a predictor and the dependent variables. The top left panel of Fig. 1 shows that the probability of choosing a

for-profit college increases monotonically as the number of for-profit colleges within a CZ increases. Predicted probabilities of choosing public and private four-year colleges generally increase when the number of for-profit colleges within a CZ increase. This is likely to be the case as for-profit colleges seem to be located primarily in areas that are more populous and already have more college choices. On the other hand, the predicted probability of choosing to attend a public two-year college decreases substantially as the number of for-profit colleges within a CZ increase. This may suggest that for-profit colleges and public two-year colleges are competing with one another (Cellini, 2009; Turner, 2006). When looking at the top right panel of Fig. 1, we see that as the number of public two-year colleges in the CZ increases, attendance at those schools increases markedly, and although attendance at for-profit colleges declines, this decrease is modest. That is, attendance at for-profit colleges is less sensitive to the presence of public two-year colleges in the CZ compared to the sensitivity of public two-year colleges to the presence of for-profit colleges.

The predicted probabilities shown in Fig. 1 are consistent with the notion that for-profit colleges and public two-year colleges compete with one another. Other researchers (Turner, 2006; Cellini, 2009; Chung, 2012) have suggested that both for-profit and public two-year colleges offer similar degrees or certificate programs and compete for students. Cellini (2009) found evidence that increased funding for local public two-year colleges crowded out for-profit colleges in California. In other words, while increased public funding for public two-year colleges increased their enrollment, it also decreased entry into for-profit colleges, pushing them out of the local college market. In addition, students are sensitive to tuition price differentials between for-profit and public two-year colleges (Cellini, 2009; Chung, 2012). Furthermore, Turner (2006) notes that economic conditions moderate the competition between for-profit and public two-year colleges. Turner argues that for-profit and community colleges are likely to compete for unemployed students, who are looking for skill development that will help their chances in the job market. Because for-profit colleges are primarily funded by tuition revenue, they may have greater access to resources in recessions, allowing them to offer more skill-based education compared to public two-year colleges. Public two-year colleges derive a substantial portion of their operating expenses from state and local governments, which are also sensitive to economic downturns.

Average marginal Effects

We also obtained average marginal effects from multinomial logit models of college choice, which are shown in Table 1. We first show the effect of discrete changes in college options within CZs. The first row of results in Table 1 gives the changes in the probabilities of choosing to attend a for-profit college, public two-year college, public four-year college or private four-year college as the number of for-profit colleges in the CZ changes from zero to one or more. The next set of results repeats the same analysis as the number of public two-year colleges increases from zero to one or more. Note that we also show the effect of one-unit changes in college options within a CZ. The Y(delta)/X(delta) rows provide results for continuous changes in college options within CZ. In Table 1, these results are shown separately for all students



Notes. Figure illustrates the probability of choosing each college option as number of colleges within commuting zone increases. Estimations also control for student- and CZ-level characteristics.

Fig. 1 Predicted probabilities of college choices. Dashed lines dignify 95% confidence intervals

(Panel A) and for students living in education deserts (Panel B). We define education deserts (Panel B) as CZs with no more than one public two-year college.

In Panel A, we find that the availability of for-profit colleges (one or more) within students' CZs increases the probability of choosing a public four-year college by 6% points, holding all other variables at their mean values. Meanwhile, it decreases the probability of choosing a public two-year college by 5.7% points. These results are statistically significant. The results indicate that compared to students who do not have for-profit colleges at all within their CZs, students who have any for-profit colleges are more likely to choose public four-year colleges and less likely to choose public two-year colleges. The negative effect on students' choice of public two-year colleges suggests that some students may see for-profit and public two-year colleges as substitutes (Turner, 2006; Cellini, 2009). While the competition with for-profit colleges may negatively affect enrollment in public two-year colleges, it may pose a less competitive threat to public four-year colleges. In fact, Deming et al. (2012) documented that during the rapid growth of for-profit colleges, public four-year institutions also accepted more students who pursue degrees through online education. Our findings are possibly aligned with this trend of enrollment growth of online programs and its impact on for-profit and public four-year colleges between 2000 and 2010 (Deming et al., 2012).

Our results in Panel A also show that the presence of public 4-year colleges negatively impacts the enrollment of public 2-year options while increasing the probability of choosing public 4-year options. We note that this finding is also consistent with

Table 1 Average marginal eEffects of college choice

Panel A: All students (N = 8,610)					
	Marginal change	For-profit	Public 2-year	Public 4-year	Private 4-year
# of for-profit colleges within CZ	(1 or more) vs. (0)	0.001 (0.011)	-0.057** (0.019)	0.06** (0.019)	-0.004 (0.015)
	YΔ/XΔ	0.001 (0.000)	-0.003** (0.001)	0.002 (0.001)	0.001 (0.001)
# of public 2-yr colleges within CZ	(1 or more) vs. (0)	-0.008 (0.015)	0.126*** (0.025)	-0.093** (0.033)	-0.041 (0.026)
	YΔ/XΔ	-0.003** (0.001)	0.008*** (0.002)	-0.001 (0.002)	-0.004** (0.001)
# of public 4-yr colleges within CZ	(1 or more) vs. (0)	-0.01 (0.013)	-0.07*** (0.021)	0.099*** (0.020)	-0.018 (0.017)
	YΔ/XΔ	0.001 (0.002)	-0.008** (0.003)	0.007* (0.003)	0.000 (0.002)
# of private 4-yr colleges within CZ	(1 or more) vs. (0)	-0.036* (0.016)	0.012 (0.021)	-0.023 (0.022)	0.046* (0.016)
	YΔ/XΔ	0.000 (0.000)	0.001 (0.001)	-0.003*** (0.001)	0.002*** (0.001)
Panel B: Students from education deserts (N = 3,640)					
	Marginal change	For-profit	Public 2-year	Public 4-year	Private 4-year
# of for-profit colleges within CZ	(1 or more) vs. (0)	-0.001 (0.011)	0.002 (0.020)	0.008 (0.021)	-0.008 (0.015)
	YΔ/XΔ	-0.001 (0.001)	-0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
# of public 2-yr colleges within CZ	(1 or more) vs. (0)	0.004 (0.015)	0.143*** (0.028)	-0.115** (0.032)	-0.032 (0.023)
	YΔ/XΔ	-0.002 (0.003)	0.02*** (0.006)	-0.005 (0.006)	-0.012** (0.004)
# of public 4-yr colleges within CZ	(1 or more) vs. (0)	-0.007 (0.013)	-0.045* (0.022)	0.086*** (0.023)	-0.034 (0.018)
	YΔ/XΔ	-0.008 (0.008)	-0.043*** (0.013)	0.054*** (0.013)	-0.003 (0.009)
# of private 4-yr colleges within CZ	(1 or more) vs. (0)	-0.02 (0.012)	0.012 (0.021)	-0.03 (0.022)	0.037** (0.015)
	YΔ/XΔ	0.001 (0.002)	0.008 (0.004)	-0.008 (0.004)	0.000 (0.003)

Notes. Standard errors in parentheses. Estimations also control for student- and CZ-level characteristics. Data are weighted by the panel weight. This weight provided us with information to reflect the U.S. population as a whole.

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

previous studies. Research makes the case that when colleges spend more resources on outreach, teaching, and advising, they are likely to improve student success, such as graduation and time to finish a degree (Bound et al., 2010, 2012). Our finding may reflect the resource advantage public 4-year colleges have over public 2-year ones, likely to alter students' enrollment behaviors. Moreover, negative enrollment of public 4-year colleges in the presence of private 4-year options, as shown in our evidence

in Panel A, suggests that private colleges' financial resources may hold great promise of sustained enrollment advantages.

Our plotted predicted probabilities of college choice in Fig. 1 show that the number of public two-year colleges within a CZ are positively associated with students' choosing them as their college option. Indeed, the average marginal effects show the same evidence. Our findings in Table 1 show that the availability of public two-year colleges within students' CZs increases the probability of choosing them by 12.6% points. In other words, compared to students who have no public two-year college in their CZ, students with at least one public two-year college in their CZ are 12.6% points more likely to choose a public two-year college. Among students in the education deserts (Panel B), the marginal effects increase to 14.3% points. Both results are statistically significant at the 0.1% level.

In terms of a one-unit change, we also find clear evidence of competition between for-profit and public two-year colleges. In panel A, a one-unit increase in for-profit colleges increases the probability of choosing a for-profit or private four-year college by 0.1% points, holding other variables at their mean values. However, it decreases the probability of choosing a public two-year college by 0.3% points. At the same time, one unit increase in public two-year colleges increases the probability of students' choosing them by 0.8% points and decreases the probability of choosing for-profit colleges by 0.3% points. Although the effect sizes are small, the marginal effects of adding for-profit (or public two-year colleges) still display a consistent line of evidence: two institutions compete with each other.

The results show a similar pattern in education deserts. In Panel B, a one-unit increase of public two-year colleges within students' CZs is associated with increasing the probability of choosing a public two-year college by 2% points. Although it is not statistically significant, the marginal effect of adding one more for-profit college decreases the probability that a student will choose a public two-year college by 0.1% points among students in education desert. Between for-profit and public two-year colleges, the availability of one option in a CZ decreases the likelihood of choosing another option.

So far, our evidence shows that the availability of for-profit colleges within students' commuting zones has a positive effect on their choice of for-profit colleges and a negative effect on their choice of public two-year colleges. We may explain this evidence in a variety of ways. For example, the demand for higher education is typically countercyclical as the opportunity costs of attending college decline. Previous research show that this effect is even larger for the career and technical training typically provided by for-profit colleges (Barr & Turner, 2013). Furthermore, during the first decade of the twenty-first century, the overall budget situation for public and nonprofit colleges was dire. State appropriations to higher education declined markedly during the Great Recession, so public and nonprofit colleges had to increase tuition and fees (Delaney & Doyle, 2011, 2014). In many states, the increased costs of college, particularly notable in public and nonprofit colleges, likely increased the probability that students would matriculate to for-profit colleges where they could find specialized vocational training during the recession. For-profit colleges also heavily promoted students' eligibility for federal Title IV financial aid programs to attract students (Deming et al., 2012). For-profit colleges additionally had more insti-

tutional flexibility than public two-year colleges, allowing year-long open admissions and offering student-friendly administrative support to facilitate students' progress (Turner, 2006; Iloh & Tierney, 2014; Iloh, 2016). Taken together, these events help to explain the increase in for-profit college attendance (Cellini, 2009).

Discussions

Our research reflects a period of controversy over the role of for-profit colleges in the US higher education system. In recent decades, for-profit colleges have experienced ups and downs. More than two million students were enrolled in Title IV eligible for-profit colleges at their peak in 2010, but by 2016 enrollment had decreased by more than 50% (Arbeit & Horn, 2017). Among the reasons for this decline in attendance at for-profit colleges is their relatively higher tuition as well as the accrual of substantial student debt and student loan defaults within the for-profit student community (Cellini & Darolia, 2017; Looney & Yannelis, 2015). As a reaction to the above issues, the federal government in 2010 proposed a Gainful Employment (GE) regulation concerning college debt-payment to earnings ratios that colleges must meet to maintain Title IV federal student aid eligibility. The GE rules went into effect July 2015, after intense debates and challenges from its opponents.

When the data on the GE rules were collected and made available to the public in 2017, it indicated that more than 800 programs would not meet the new standards—98% of them were for-profit institutions (Arbeit & Horn, 2017). Research also finds evidence that enrollment in for-profit colleges declined (Fountain, 2019) and poor-performing ones were closed (Kelchen & Liu, 2022) in response to the GE rules. As a current status, the U.S. Department of Education has proposed imposing new GE rules in January 2022. Its goals are mainly producing better labor market outcomes for students without high debt burdens, increasing for-profit colleges' accountability, and transparency for taxpayers.

While the proposed new GE rule may curb some of the problems that for-profit colleges pose, an essential question of students' use of information about college choice still arises. Many students enrolled in for-profit colleges may not make fully informed decisions due to confusing GE rules and limited access to information about college loan debt or earnings from the labor market. Information deficiencies are likely prevalent for many prospective students of for-profit colleges, who lack help navigating attendance and subsequent labor market participation (Hoxby & Avery, 2013; Hoxby & Turner, 2015). Tools and policies that increase available information about college options and financial aid, such as the College Scorecard, could lead the student to make a prudent college choice, along with the accountability and transparency framework the GE rule provides.

We can suggest additional implications for policymakers and college administrators from our findings. First, public investment in higher education must take a two-way approach to address students' and institutions' locational obstacles. For students, the financial challenge of attending distance colleges is a critical barrier that delays or prevents pursuing a college education. Supplemental financial aid can help them compensate for additional expenses associated with attending schools far away from

home. At the same time, policymakers could complement students by focusing on the supply of college locations and their capacity to serve their communities. It might not be cheap, but policymakers should aim to supply an education oasis, not a desert (Hillman, 2019).

Second, along with expanding campus locations, community colleges need to build a close partnership with local employers, supplying types of certificates or degrees that match local demands and assist students in the job market. For this option to be successful, a federal-state partnership will be critical. Each state has a legislative code to fund higher education, but state fundings vary because most states do not have a constitutional mandate to fund public colleges and universities. Also, the lion's share of the funding does not flow to community colleges. The federal government needs to step in, incentivizing states to build a sustainable coalition between colleges and local communities that promotes local economy and opportunities. The Workforce Innovation and Opportunity Act (WIOA) or recent stimulus funding from the federal government could be a primary source but also needs to be expanded to incentivize the building of stronger partnerships for the local workforce.

Last, local-, state-, and federal-level policymakers need to strongly consider increasing financial resources for under-funded public two-year colleges, which for-profit colleges outpace. Despite little media and public policy attention and limited financial resources, community colleges contribute to boosting students up the income ladder (Chetty et al., 2020). Given the high tuition and student loan debt for-profit colleges cost, additional funding for community colleges would serve as a more direct and effective way of addressing different opportunity structures for college choice, particularly among students in education desert. Furthermore, with the more proactive engagement of prospective employers in the local labor market, community college's job training programs would increase students' earnings, a good return on public investment (Turner, 2006; Iloh & Tierney, 2014; Iloh, 2016).

Conclusions

In this research, we look at the effects of local college availability on students' choices of postsecondary institutions. We find that *local college availability matters, and some of these effects are more pronounced for students in education deserts*. Additionally, we find that the for-profit sector and public two-year colleges compete with one another, a finding generally supported by prior research (Cellini, 2009; Turner, 2006). However, we additionally find that the presence of a for-profit college in a commuting zone imposes a much more significant decrease in attendance at public two-year colleges than the presence of a public two-year college in the commuting zone imposes on a for-profit college. Given more resources and emphasis on recruiting, admissions, and consultation of future job market activities, we assume that students are more likely to choose for-profit over community colleges when nearby for-profit colleges are present. With limited institutional resources, community colleges' availability in the area could have little or no effect on drawing students from for-profit colleges. As previous studies point out, resources will play an essential role

if for-profit and community colleges plea for students' (or customers') choices (Iloh & Tierney, 2013, 2014).

Our findings also show that students' choice patterns in the presence of for-profit colleges are neither similar nor statistically significant for students living in education deserts. In the presence of community colleges, however, students in education desert strongly prefer community colleges over other options, including public 4-year ones. The pronounced effect of the presence of community colleges may highlight their unique role in education desert. For example, public 2-year colleges operating in education desert may serve the local community's needs, providing students to prospective employers in the local labor market (Hillman, 2019). In addition, its central role in providing multiple higher education paths via transfer option could also be an essential factor. Meanwhile, for-profit or public 4-year colleges may serve audiences more tailored for vocational training (in the case of for-profit colleges) or for broader education (in the case of public 4-year colleges). Therefore, community colleges' presence in education desert may have a more decisive role in students' enrollment decisions.

We should note that there is a challenge for interpretations of our analyses due to data limitations. It is hard to accurately locate the addresses of each branch of a large, multi-campus, for-profit college using IPEDS data. Furthermore, some for-profit colleges offer primarily online programs. This makes it challenging to identify the for-profit colleges existing as a local option with a physical presence. Unfortunately, neither the years of our IPEDS data nor the ELS: 2002 data indicate whether or not students chose exclusively online for-profit colleges. Therefore, while our results speak to the possible influence of a local for-profit college presence on students' choices, they do not extend to students who enrolled in exclusively online colleges, particularly those who live in education desert. However, evidence shows that students in education desert also lack access to broadband internet, limiting online college programs (Rosenboom & Blagg, 2018). Online education could be a viable option but may not be the ultimate one. Nevertheless, excluding those students are likely to bias our estimate downwards.

In conclusion, our research also has recommendations for future research. Studies on college choice should continue to expand understanding of how geography shapes students' choices and broader educational opportunities. A growing number of studies point out that place matters for college choice (Hillman, 2016, 2019; Klasik et al., 2018). However, there is still more to learn about the lasting consequences of spatial inequality, such as labor market outcomes or student loans. Going forward, scholars need to add new dimensions of findings that help policymakers gain a more thorough picture that may produce meaningful solutions.

Appendix A

Descriptive Statistics of Commuting Zones between 2002 and 2012 (N = 741)

	Education desert only				All			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Number of for-profit colleges	3.234	6.905	0	68	2.100	5.729	0	68
Number of public 2-yr colleges	2.175	3.221	0	46	1.529	2.731	0	46
Number of public 4-yr colleges	0.832	1.856	0	22	0.837	1.587	0	22
Number of private 4-yr colleges	1.289	1.660	0	9	2.123	6.647	0	71
Percent Black (%)	9.070	12.674	0.061	65.833	7.782	12.222	0.000	65.833
Percent Hispanic (%)	8.730	16.993	0.186	95.012	7.616	13.428	0.186	95.012
Fraction with Com-	0.587	0.135	0.263	0.945	0.457	0.143	0.156	0.945
Mean Household Income ($)		4,617.59				5,750.70		
Gini Index (Within Bottom 99%)	0.424	0.072	0.268	0.684	0.406	0.081	0.202	0.847
Labor Force Participation (%)	0.605	0.069	0.364	0.816	0.616	0.060	0.364	0.816
Share Working in Manufacturing (%)	0.103	0.094	0.002	0.449	0.140	0.084	0.002	0.449
Unemployment Rate (%)	0.051	0.021	0.016	0.177	0.050	0.017	0.016	0.177

Descriptive Statistics of Commuting Zones between 2002 and 2012 (N = 741)

	Education desert only				All			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Median House Value ($)		79,395.0						
Percent of Foreign Born (%)	0.043	0.051	0.004	0.397	0.041	0.050	0.000	0.397
Population (100,000)	378.85	202.82	15.000	721.000	369.727	213.445	1.000	739.000
Poverty Rate (%)	0.153	0.062	0.062	0.385	0.146	0.057	0.055	0.460
Percent College Graduate (%)	15.252	5.509	4.900	41.421	17.963	6.274	4.900	43.134

Notes. Data from *Opportunity Insights*. All data are available at https://opportunityinsights.org/data/.

Percent Black (%): Number of individuals who are Black alone divided by total population

Percent Hispanic (%): Number of individuals who are Hispanic divided by total population

Fraction with Commute < 15 min (%): Number of workers that commute less than 15 min to work divided by total number of workers. Sample restricted to workers that are 16 or older and not working at home.

Mean Household Income ($): Aggregate household income divided by the number of people aged 16–64

Gini Index: Gini coefficient minus top 1% income share

Labor Force Participation (%): Fraction of people at least 16 years old that are in the labor force

Share Working in Manufacturing (%): Fraction of employed persons 16 and older working in manufacturing

Unemployment Rate (%): Unemployed population 16 years and over divided by labor force population

Median House Value ($): Median value of housing units at the county level

Percent of Foreign Born (%): Fraction of CZ residents born outside the United States

Population: CZ population in 2000 Census

Poverty Rate (%): Fraction of population below the poverty line

Percent College Graduate (%): Percent of people at least 25 years old that have a bachelor's degree

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Daewoo Lee is an Associate Professor in the Department of Politics, Philosophy, and Public Administration at Columbus State University.

Maureen A. Pirog is Rudy Professor Emerita of Policy Analysis at Paul H. O'Neill School of Public and Environmental Affairs, Indiana University–Bloomington.