Financial Aid and For-Profit Colleges: Does Aid Encourage Entry?

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ABSTRACT

Concerns over rising college tuition and slow economic growth have brought renewed attention to the role of federal and state financial aid programs in opening access to education. Despite a large body of literature examining the effects of grant aid on four-year and public two-year college enrollment, for-profit colleges—particularly the vast majority that offer two-year degrees and certificates—have largely been ignored. Using panel data methods and a new administrative data set of for-profit colleges operating in California between 1989 and 2003, I assess the impact of the federal Pell Grant program, the G.I. Bill, and California's Cal Grant program on the net number of for-profit colleges per county.

The results suggest that for both Pell and Cal Grants, increases in the per-student maximum award encourage for-profit entry. This relationship is particularly strong in counties with high adult poverty levels, where more students are eligible for aid. Further, these gains in the private sector do not appear to come at the expense of the public sector. Rather, public community colleges also experience enrollment gains as the generosity of Pell and Cal Grants increase, though this reaction appears to be weaker than the reaction of for-profits.

INTRODUCTION

Over the past decade, steep increases in college tuition have brought renewed attention to the role of federal and state financial aid programs in opening access to education. The current recession has sparked further interest in the Pell Grant and other federal aid programs as high unemployment, declining college endowments, and state budget crises have forced policymakers to carefully consider the effectiveness of aid programs in promoting college-going and economic growth.

A large body of literature focuses on the impact of grant aid on student access to four-year colleges.[1] A handful of these studies also examine the impact on public two-year community college students.[2] But what all of these studies fail to account for is a large and growing sector of the postsecondary education market—for-profit colleges.

This article begins to address the gap in scholarly research on these colleges, exploring the relationship between federal and state financial aid programs and for-profit colleges. The few numbers available suggest that financial aid may be a lifeline for at least some for-profit colleges and their students. The federal government estimates that 95 percent of students in eligible for-profit institutions receive federal Pell Grants, compared to just 27 percent of students in public community colleges (U.S. Department of Education, 2002). Qualitative research and anecdotal evidence confirms the importance of financial aid programs for these institutions (Moore, 1995; Field, 2008) and allegations of fraud and abuse of aid programs have surfaced in numerous high-profile cases across the country (Arenson, 2005; Hefftor, 2007).

In this paper, I draw on a unique administrative data set of California's for-profit colleges that offer two-year degrees and certificates. Using panel data methods to exploit varying levels of student aid eligibility within counties, I asses the correlation between changes in federal and state financial aid programs—notably, the Pell Grant, the G.I. Bill, and California's Cal Grant—and for-profit college supply. I explore the entry and exit of for-profit colleges in local markets and compare these results to

changes in enrollments in public community colleges, assessing the extent of student overlap between sectors and the differing incentives that financial aid programs create for public and private institutions.

The results suggest that for both Pell and Cal Grants, an increase in the per-student maximum award does indeed encourage for-profit entry. This relationship is particularly strong in counties with high adult poverty levels where more students are eligible for aid. Public community college enrollments also react positively to changes in financial aid awards, although the relationship is generally weaker than the private sector for all types of aid. For-profits appear to rely on these programs to a much greater degree than their public counterparts, yet I find no evidence that the generosity of grant aid programs cause students to switch from the public to the private sector. Rather, the Pell and Cal Grants encourage college-going in both sectors, leading to an overall increase in sub-baccalaureate enrollment.

The paper is organized as follows: the second section provides background on for-profits, community colleges, and financial aid; the third section describes the data; the fourth section presents the conceptual framework; the fifth section lays out the estimation strategy; the sixth section reports the results of the analysis; and the final section discusses several possible explanations for the empirical findings and potential policy implications.

BACKGROUND

Although for-profit colleges have a long history in the United States (Honick, 1995), until recently they were largely ignored by quantitative researchers in the social sciences. The reasons are two-fold. First, no publicly available national- or state-level data set claims to have a random sample—much less the entire universe of these schools—making research on these institutions difficult at best. Second, the studies that do exist are forced to rely on the Integrated Postsecondary Education Data System

(IPEDS) and its related student surveys (for example, Apling, 1993; Bailey, Badway, & Gumport, 2001; Turner, 2006; Rosenbaum, Deil-Amen, & Person, 2006), that draw on a non-random sample of schools. As shown in Cellini (2005), the IPEDS severely undercounts the number of for-profit institutions and students, leading many researchers to dismiss these schools as too small a segment of the market to be relevant.[3]

Recent quantitative work by Turner (2005, 2006) and Cellini (2009) pushes further on for-profit colleges, drawing on new data to shed light on these schools. Turner (2006) points out that for-profits award a disproportionate share of two-year associates' degrees and less-than-two-year certificates. Cellini (2009) finds that public community colleges offer similar degrees and certificates to those found in for-profits, but that the private sector tends to dominate the market in the fastest-growing vocational fields such as computers and real estate, making these institutions particularly important for low- and middle-wage workers. In one of the only quantitative studies to address the relationship between financial aid and for-profits, Turner (2005) shows that Pell Grant recipients are more likely to enroll in for-profit institutions than public and non-profit institutions in response to cyclical labor market fluctuations. Specifically, she finds that as unemployment rates and public tuition rise, enrollments of Pell Grant recipients in for-profits rise, while enrollments decline with increases in state appropriations. This study builds on Turner's work by assessing the effect of the Pell Grant and other forms of aid on for-profits more directly, drawing on new county-level data on for-profits to examine whether changes in the generosity of aid programs impacts the number of colleges in a market.

Due to the nature of the data, I focus on the vast majority of for-profit colleges that offer degrees and certificates lasting 2 years or less, though they may also offer more advanced degrees. With this definition, I follow the classification of proprietary schools used by California's Bureau of Private Postsecondary and Vocational Education (BPPVE), the department charged with licensing

these institutions and the primary source of data for this study.[4] It is worth noting, however, that my data do not include a handful of four-year for-profits that are accredited by the major regional four-year university accrediting bodies (for example, the Western Association of Schools and Colleges), as data on these schools are not collected by the BPPVE.

What do we know about these schools? We know that the number of for-profit colleges in California has surged over the last 2 decades, rising 30 percent between 1989 and 2003. With the exception of a slight dip in the early 1990s, the number of colleges has grown steadily over this period, reaching 3,142 in 2003.[5] Despite the large number of institutions, however, most colleges are very small, with an average enrollment of just 350 students (Cellini, 2005). This figure pales in comparison to California's public community colleges, averaging around 10,000 students. Moreover, tuition at for-profits is typically at least an order of magnitude greater than California's public community colleges, with charges for a full-time full-year student generally running between $3,000 and $10,000 per year (Cellini, 2005), compared to just $550 in a California community college in 2003 (California Postsecondary Education Commission [CPEC], 2008).

Financial Aid

In light of the high cost of tuition, student financial aid is an important source of funding for for-profit college students and owners alike. Lacking the subsidies provided to public colleges, tuition charges at for-profits must be greater than or equal to the cost of education. In fact, an estimated 81 percent of proprietary schools' current fund revenues are generated by student tuition payments and financial aid (National Center for Education Statistics [NCES], 2003), a stark contrast to the 7.5 percent covered by California community college student fees (CPEC, 2003).

Although student loans are an important source of funding for many two-year college students, this study focuses specifically on grant programs. Unlike loans, grants are not repaid by the student and are therefore likely to have a greater impact on student and school behavior than loan programs.

Linsenmeier, Rosen, and Rouse (2006) support this contention, finding that one university's switch from loans to grants has a weak but positive impact on the enrollment of low-income students. A number of other studies also assess the effectiveness of grant programs in encouraging college-going in four-year colleges with generally positive results. Summaries of the literature reveal that a $1,000 reduction in college costs, through reduced tuition or grant aid, typically results in a 4 percentage point increase in student enrollment (Dynarski, 2002; Kane, 2003). However, this figure may vary considerably depending on the structure of the grant program, student demographics, and institution-type (see for example, Cornwell, Mustard, & Sridhar 2006; Dynarski 2000, 2002, 2003; Ehrenberg & Sherman 1984; Kane 1995, 2003, Linsenmeier, Rosen, & Rouse 2006; Seftor & Turner 2002; Van der Klaauw, 2002; Curs, Singell, & Waddell 2007).

Although no study has, to my knowledge, assessed the impact of grant aid on the institutional behavior of for-profit colleges, anecdotal evidence suggests that the most important source of revenue for proprietary schools may be the federal Pell Grant program (Moore, 1995). The program provides grants for students who demonstrate financial need to attend a Title IV-eligible school of their choosing,[6] and it is by far the largest grant aid program in the country. In 2003, the program provided over $12 billion in grants—$2 billion of which went to students in for-profits (U.S. Department of Education, 2004a). Of the federal financial aid programs, it reaches the greatest number of students and offers the largest average grant amounts. Interestingly, research on the Pell Grant reveals much more mixed results than other forms of aid. Hansen (1983) and Kane (1995) find no effect of the program on college enrollment among low-income students overall. However, Kane finds limited evidence of enrollment growth among low-income students in public two-year colleges. In a more recent study, Curs, Singell, and Waddell (2007) find that conditional on the decision to enroll, low-income students may switch to more selective and expensive institutions with an increase in the Pell Grant maximum. Seftor and Turner (2002) find that a decrease in the generosity of the Pell Grant causes a decrease in

enrollment among older, non-traditional college students. If for-profits have more non-traditional students and higher tuition that other types of institutions, the Pell Grant may have a particularly strong effect on for-profit colleges.

According to the federal government's enrollment counts, and noted previously, 95 percent of students in Title IV-eligible for-profit colleges received Pell Grants in 2001. This number is particularly striking considering that just 27 percent of public community college students receive the grants (U.S. Department of Education, 2002; NCES, 2003).[7] Proprietary school students also receive larger awards than their counterparts in public institutions. In 2002, Pell Grant recipients in California community colleges received an average grant of $2,224 (California Community Colleges Chancellor's Office [CCCCO], 2005) compared to $2,467 for for-profit college students in the state (U.S. Department of Education, 2004a).

The differences in Pell Grant receipt are largely due to the design of the program. Because a student's eligibility and award size are determined by comparing the maximum award amount ($4,050 in 2003-04) to a student's cost of attendance (including tuition, fees, books, and sometimes room and board), minus an expected family contribution, all else equal, students attending more expensive private schools receive larger benefits than students in public institutions. For the 70 percent of sub-baccalaureate students attending part-time (NCES, 2003), the cost of attendance calculation particularly favors for-profit colleges: Room and board allowances are prorated based on students' hours of attendance and left out of the calculation completely for students attending less than half-time (U.S. Department of Education, 2003a). Under these rules, tuition charges are an important determinant of a student's eligibility and the size of his or her award. At least for part-time students, the cost of attendance becomes binding and the Pell Grant reduces the public-private price differential.

But a reduction in the relative price of a for-profit education is not the only mechanism through which the generosity of the Pell Grant may influence student decisionmaking. The increase in grant aid

may also cause colleges to raise their tuition in an effort to capture more federal aid—a concern first raised by former Secretary of Education, William J. Bennett in the late 1980s. Studies investigating the so-called Bennett hypothesis suggest significant differences in institutional reactions to financial aid by college type. Rizzo and Ehrenberg (2003), Long (2004), and Singell and Stone (2007) find no effect of federal and state financial aid on in-state tuition at public universities. However, Long and Singell and Stone both report large effects of grant aid on private four-year college tuition. Singell and Stone suggest that these institutions raise tuition as much as $863 for every $1,000 increase in the average Pell Grant. Long reports a smaller, but still significant tuition hike in response to Georgia's HOPE scholarship program. Coupled with offsetting declines in institutional aid, private colleges appear to recoup roughly $300 for every $1,000 in state aid. If for-profit two-year colleges react similarly, rising tuition and reduced institutional aid may offset any changes in the public-private price differential.

In addition to the Pell Grant, two other grant programs—the G.I. Bill and California's Cal Grant program—may also play important roles in making two-year college education affordable for students and profitable for owners.

The G.I. Bill provides grants for education and training to military veterans. Although eligibility rules vary slightly for different groups, generally speaking, those who have been on active duty for 2 years or longer are entitled to education and training benefits totaling up to $1,075 per month for 9 months a year, up to 4 years (U.S. Department of Veterans Affairs, 2008). Under the G.I. Bill, veterans may use their benefits for a wide range of education and training programs including what the Department of Veteran Affairs terms, "non-college degree training" at "diploma vocational schools." They even go so far as to list heating-ventilating-air conditioning (HVAC) certification, truck driving, emergency medical technician (EMT) certification, and barber/beautician schools as specific examples on their website (U.S. Department of Veterans Affairs, 2008). Correspondence courses, distance learning, and internet training also qualify for benefits, suggesting that for-profits stand to

gain substantially from G.I. Bill benefits. A historical analysis by Honick (1995) reports that the number of proprietary schools surged after the introduction of the G.I. Bill in 1944 and Turner and Bound (2003) find that the majority of veterans using the G.I. Bill after WWII chose to use their benefits in these types of non-collegiate and on-the-job-training programs. Added to this, research on the enrollment effects of the G.I. Bill generally find positive effects of the program (see for example, Angrist, 1993; Bound & Turner, 2002; Stanley, 2003; Turner & Bound, 2003), suggesting that the G.I. Bill may indeed be an important determinant of for-profit entry.

In contrast to the federal programs discussed above, the Cal Grant program is California's own financial aid program for low-income students. The program has three parts known as Cal Grants A, B, and C. Cal Grant A is the most generous, but also the most restrictive.[8] In addition to meeting minimum high school grade point average requirements and income eligibility thresholds, students must be enrolled in a four-year or two-year degree program. Cal Grant A awards up to the full cost of tuition (referred to as fees in California) at a public college ($6,636 for a University California campus, $2,772 at a California State, or $690 for a community college), with greater potential benefits for students attending private institutions, awarding up to $9,708 per year for tuition (Cal Grants website, 2008).

The slightly less restrictive Cal Grant B allows students to enroll in any kind of vocational or academic coursework lasting at least 1 year and has a lower GPA eligibility threshold than part A. On the other hand, it is more restrictive in that the income eligibility ceilings are lower. Under this program, students receive only $1,551 of "access costs" for books and living expenses in their first year. However, if they continue their education, they receive the same benefits as a Cal Grant A along with access costs for up to 3 additional years of study.

Perhaps the program that is most relevant to for-profits is the Cal Grant C. The program is specifically designed to aid students attending occupational or career colleges in programs lasting 4

months or longer, with aid available for up to 2 years. It provides $576 per year for books and supplies, as well as an additional $2,592 for tuition that is only available if a student attends a school *other than* a California Community College (Cal Grants website, 2008).

Research on the Cal Grant program by Kane (2003) finds positive enrollment effects of the Cal Grant Part A on any type of college enrollment, although his sample does not include the majority of students attending for-profit two-year colleges. Moreover, these effects are generally weaker than those found in the literature for other types of aid—around a 1.2 percentage point increase in enrollment for a $1,000 increase in aid. Further, among four-year college students, the program has strong effects in influencing attendance at private, as opposed to public institutions, suggesting that the structure of all three parts of the Cal Grant program may exert an influence on private institutions at the two-year college level.

DATA

This study draws on a unique data set of all legally-operating for-profit colleges in California from 1989 to 2003 to estimate the effects of public subsidies on the market for sub-baccalaureate education. I obtained the data from California's Bureau of Private Postsecondary and Vocational Education (BPPVE), an arm of the Bureau of Consumer Affairs charged with registering all private postsecondary institutions that offer degrees or certificates lasting 2 years or less. The data include detailed information on each institution's opening (the date it received initial approval to operate), closing, location, accreditations, and programs offered, as well as information on religious and non-profit exemptions. Although these schools may be part of national chains, each branch must file a separate license to operate in California. I therefore treat each branch as a separate institution in the analysis that follows. Data on community college enrollment are available only from 1991 onward, from the California Community Colleges Chancellor's Office.[9]

I obtained Pell Grant data from the U.S. Department of Education's Office of Postsecondary Education and G.I. Bill data from the U.S. Department of Veterans Affairs. The California Postsecondary Education Commission provided information on the Cal Grant. Population, age, race, and employment data are taken from the Rand Corporation's California Statistics. The California Department of Finance's Statistical Abstract provided data on per capita income and median home price. Finally, poverty data are extracted from the U.S. Census Bureau, Small Area Estimates.

[Table 1 about here]

Table 1 displays summary statistics of the data. On average there are 46 for-profit two-year colleges per county and almost 15,000 students enrolled in community colleges. The per-student maximum Pell Grant ranges from $2,856 to $4,091 in 2003 dollars over the period studied—a range similar to the Cal Grant C. Cal Grants A and B and the G.I. Bill show substantially more variation. My estimation strategy, detailed below, relies on adult poverty levels and military employment as proxies for program eligibility. Panel B of Table 1 provides summary statistics for these variables and other controls. Finally, panel C of Table 1 presents summary statistics for interactions between grant aid and the eligibility predictors. I discuss these further in the estimation section.

Defining the Market

In considering student demand and college supply it is useful to identify the relevant product and geographic markets. Cellini (2009) provides evidence that for-profits and community colleges operate in the same, or at least overlapping, product markets. Descriptive evidence on program offerings and coursework suggests that community colleges and proprietary schools offer similar certificates and degrees, and causal evidence shows that these schools compete for students. Public funding for community colleges appears to bring new students in to the public sector, while crowding-out for-profit colleges.

Although the product market is easily defined, determining the geographic market for two-year college education is more elusive. For simplicity and because of the nature of the data, I follow Cellini (2009) in assuming that each county constitutes a separate geographical market. This introduces some measurement error because students may well attend a school outside of their county, especially if they live near a county border. However, data from the 2000 National Postsecondary Student Aid Study (NPSAS) indicate that at the median, public community college students attend schools just 9 miles from home. Students attending private for-profit institutions typically travel a bit farther, but remain on average 14 miles from home (NPSAS 2000).[10] Moreover, changes that impact local sub-baccalaureate markets will undoubtedly spillover to neighboring counties. To the extent that spillovers occur, the effects will bias my estimates toward zero, underestimating the impact of any changes.

CONCEPTUAL FRAMEWORK

Student Demand

I begin by assuming that potential consumers of two-year college education are distributed according to some function $f(j)$ across any number of student types j. For the purposes of exposition and without loss of generality, I assume that there are just two types of students. For example, let students of "type 1" be those with a low probability of pursuing education in proprietary schools and students of "type 2" be those with high probability of pursuing their education in these institutions. As long as there are some students, of any type, who can pursue their education at both community colleges and for-profit two-year colleges, then the following conceptual framework applies.

Potential consumers of sub-baccalaureate education have three basic choices. They can enroll in a community college (denoted CC), enroll in a for-profit (denoted FP), or choose not to pursue a two-year college education (hereafter I refer to this choice as "non-attendance" and note it as NON).[11] These individuals sort themselves across both the extensive margin—between attendance and non-

attendance—and the intensive margin—between the private and public sector—according to the relative costs and benefits of each choice. Characteristics of the individual and the market (represented by the vector X) largely determine these costs and benefits, but student financial aid (denoted $FinAid$) plays an important role in affecting the out-of-pocket cost of the educational options. Students determine which option to pursue by comparing the net present value (denoted NPV) of each alternative. The net present value of community college enrollment for student i of type j is

$\text{NPV}_{\text{CC}_{ij}} = \sum_{t=0}^{T} \frac{\text{Benefit}_{\text{CC}}(X)_{ijt} - \text{Cost}_{\text{CC}}(FinAid, X)_{ijt}}{(1+r_{ij})^t}$, where r_{ij} is a student-specific discount rate and $t = 0,1,...,T$ indexes each year of an individual's life. Similarly, the net present value of attending a for-profit is $\text{NPV}_{\text{FP}_{ij}} = \sum_{t=0}^{T} \frac{\text{Benefit}_{\text{FP}}(X)_{ijt} - \text{Cost}_{\text{FP}}(FinAid, X)_{ij}}{(1+r_{ij})^t}$. For non-attendance, $\text{NPV}_{\text{Non}_{ij}} = \sum_{t=0}^{T} \frac{\text{Benefit}_{\text{Non}}(X)_{ijt} - \text{Cost}_{\text{Non}}(X)_{ijt}}{(1+r_{ij})^t}$. Individuals will pursue the option with the highest net present value.[12] Note that although costs are affected by financial aid for both the for-profit and community college options, the effects of aid need not be the same for each sector, a point I return to below.

Students for whom $\text{NPV}_{FP_{ij}} > \text{NPV}_{\text{CC}_{ij}}, \text{NPV}_{\text{Non}_{ij}}$ will choose to attend a proprietary school. Market demand for for-profit education is then the sum over the indicator function:

$$Q(FinAid, X) = \sum_{j=1}^{2} \sum_{i=1}^{I_j} [\mathbf{1}\left(\text{NPV}_{FP_{ij}} > \text{NPV}_{\text{CC}_{ij}}, \text{NPV}_{\text{Non}_{ij}}\right)], \quad (1)$$

where $i = 1,2,...,I_j$ for students of types $j = 1,2$ and $I_1 + I_2 = I$ represents the total pool of sub-baccalaureate students.

College Supply

Student choices across the extensive and intensive margins will have a much greater influence on the supply of for-profit colleges than public community colleges. Indeed, the supply of California community colleges is not likely to respond to short-term fluctuations in enrollment at all, because the creation of a new college must be planned more than 5 years in advance. The process requires the agreement of state voters, legislators, the California Department of Education, and the Board of Governors, making the addition of a new college rare (California State Department of Education, 1960).[13]

In contrast, student choices between the private and public sectors and between attendance and non-attendance are likely to have a profound influence on the profit functions of proprietary schools, as these small profit-maximizing schools are relatively unencumbered by bureaucratic red tape.[14] Because the true student demand for proprietary schools (Q) is not known to potential market entrants, proprietary school entrepreneurs calculate the expectation of market demand,

$$\begin{aligned} E(Q) &= E\left[\sum_{j=1}^{2}\sum_{i=1}^{I}\left[\mathbf{1}\left(\mathrm{NPV}_{FP_{ij}} > \mathrm{NPV}_{\mathrm{CC}_{ij}}, \mathrm{NPV}_{\mathrm{Non}_{ij}}\right)\right]\right] \\ &= \sum_{j=1}^{2}\sum_{i=1}^{I}E\left[\mathbf{1}\left(\mathrm{NPV}_{FP_{ij}} > \mathrm{NPV}_{\mathrm{CC}_{ij}}, \mathrm{NPV}_{\mathrm{Non}_{ij}}\right)\right] \\ &= E(Q_1) + E(Q_2), \end{aligned} \tag{2}$$

where Q_1 and Q_2 are market demands of students of type 1 and type 2, respectively. Drawing loosely on work by Bresnahan and Reiss (1987, 1991), potential market entrants calculate the expected market demand of each student type according to

$$E(Q_j) = S_j(M)d_j(FinAid, X) \tag{3}$$

where $d_j(FinAid, X)$ is the demand function of representative consumer of type j. $S_j(M)$ represents what the firm perceives to be number of consumers of for-profit education of each type in the population, as the size and composition of the pool of sub-baccalaureate students is unknown to the firm. M is a vector of variables that predict the number of consumers in the market, such as county

population and the number of consumers eligible for grants. It follows that potential market entrants estimate total market demand according to

$$E(Q) = E(Q_1) + E(Q_2) = S_1(M)d_1(F, X) + S_2(M)d_2(FinAid, X), \quad (4)$$

where the total number of consumers is $S_1(M) + S_2(M) = S(M)$. In equilibrium, the firm's expectation of market size equals the true market size.

With market demand specified, costs remain to be accounted for in the profit function of a proprietary school. Assuming constant marginal cost,[15] the total costs of the N^{th} firm are

$$TC_N = MC_N(W)q + F_N(W) = AVC_N(W) + F_N(W), \quad (5)$$

where $F(W) =$ fixed costs, $MC(W)$ = marginal costs, $AVC(q,W)$ = average variable costs, $q =$ firm output, and W is a vector of exogenous variables affecting the costs of the firm. Calculating profits for the N^{th} firm yields

$$\prod_N = [P - AVC_N(q,W)][E(Q(FinAid, X))] - F_N(W). \quad (6)$$

Under free entry, if we observe N proprietary schools in a competitive equilibrium, it must be the case that the N^{th} entrant into the market makes zero economic profits, and the $N+1^{st}$ school would make negative profits. The number of for-profit colleges observed in each market (N) can therefore be represented as a function of $FinAid, M, X, W, P$, and q.

The Role of Financial Aid

There are at least three potential mechanisms through which the generosity of grant aid may affect student demand and the number of for-profit colleges. First, the out-of-pocket cost of both public and private colleges may decrease with a more generous award. As most grant aid programs take into account room and board, as described above, the lowest income students are likely to find that more generous grant aid can make either type of institution more affordable. Students on the extensive margin, who would have previously chosen non-attendance, may now choose to attend two-year

colleges. Students of type 1 on the margin of non-attendance and community college attendance ($NPV_{CC_{ij}} \approx NPV_{Non_{ij}} > NPV_{FP_{ij}}$) will enter the public sector, while students of type 2 for whom $NPV_{FP_{ij}} \approx NPV_{Non_{ij}} > NPV_{CC_{ij}}$ will enter for-profits as grant awards become more generous. Considering the structure of the various programs evaluated, the Cal Grants parts A and B should generate a larger impact on students of type 1 and community college enrollments than other types of aid, as these programs are designed to be used in community colleges and are particularly relevant for students who plan to transfer to four-year colleges. Cal Grant Part C should have a much greater impact on students of type 2, who find their needs better met in for-profit colleges, as the program emphasizes that the bulk of the award may not be used in a California community college.

Second, increases in the maximum award may reduce the public-private price differential for many students. For students on the intensive margin, the net present value of the private and public sectors are approximately equal (and greater than NPV_{Non}). That is, $NPV_{FP_{ij}} \approx NPV_{CC_{ij}} > NPV_{Non_{ij}}$. These students are roughly indifferent between the two types of institutions and would attend some type of two-year college regardless of changes in aid. However, as described in previous sections, the maximum award amount under both the Pell and Cal Grant is more likely to be binding for for-profit college students, due to the very low tuition in California's community colleges, and the fact that room and board is not factored into the cost of attendance for part-time students. As a consequence, if the federal government increases the maximum per-student award, for example raising the Pell Grant maximum award from $4,050 to $4,500, the change should lower the cost of attending a for-profit college but have little effect on the cost of a community college education for at least some students. If students are indeed drawn away from community colleges at this intensive margin, then community college enrollment should decrease in response to increased aid. As for the supply of for-profits, the increase in aid signals an increase in demand for proprietary schools among certain types of

consumers—particularly students of type 2—and greater profitability according to equation (6), prompting firms to enter the market.

Comparing the different grant aid programs, the effect of the changing public-private price differential should be the most apparent for the Cal Grant A. Under this program, community college students receive just $690 (Cal Grant website, 2008) compared to a maximum of $9,708 at a for-profit—more than a $9,000 difference. However, the grant is also targeted toward the highest achieving students, and these students are less likely to consider two-year college options in the first place, potentially mitigating the effect. For the Pell Grant, the difference in awards for students attending private and public schools is less pronounced than the Cal Grant, but it becomes more relevant for part-time students, as described above. The G.I. Bill treats all education providers equally and is therefore least likely to have a differential impact on the two sectors.

A third mechanism through which financial aid may impact student choices derives from the Bennett hypothesis. If for-profits increase their tuition in response to student aid, changes in the public-private price differential will be mitigated. In the extreme case, if tuition rises one-to-one with financial aid, one would predict no change in student demand for a for-profit education. In contrast, community college enrollments would surge: Public tuition would remain stable and the increased aid to these students would increase the public-private price differential.[16]

Of the grant programs examined, the Pell Grant will likely have the strongest impact on tuition changes in for-profits for two primary reasons. First, the Pell Grant is the highest-visibility federal aid program and anecdotal evidence suggests that the program is a primary source of revenue for many for-profits. Second, many for-profits in California are part of national chains. As such, they are more likely to set their prices based on federal, rather than state, aid programs.

Finally, the timing of the for-profit and community college response deserves mention. For-profits may react quickly to changes in grant aid in anticipation of changing student demand. As noted

above, licensure takes only a few weeks and the fixed costs of starting a school are likely quite modest. National chains may be particularly flexible and quick to open satellite branches in areas of burgeoning demand. Changes to the Pell Grant Program for each academic year (running from July 1 to June 30 of the following year) are announced in the preceding January or February (U.S. Department of Education, 2003b, 2004b), making it possible to see new colleges enter the market in the same calendar year that Pell Grant awards are announced. Similarly, California community colleges operate under an open enrollment policy that requires no application or admission decision. It is therefore possible for students to make their enrollment decisions as quickly as the fall semester of the same calendar year in which the grant award is announced. It is not clear *a priori* whether the effects of an increase in grant aid should weaken or strengthen in subsequent years in response to the change in aid.

ESTIMATION

The model of firm behavior derived above has the advantage of allowing investigation into the factors that determine firm entry in the absence of data on prices and profits. To see this, equation (6) can be rewritten in terms of average variable profits. Letting average variable profits,

$$V_N(FinAid, W, X_1) = [P - AVC(q, W)]d(FinAid, X_1), \quad (7)$$

where $X_1 \subset X$, the profit function in equation (6) can be written as

$$\prod_N = V_N(FinAid, W, X)S(M) - F_N(W). \quad (8)$$

Because firms enter the market until economic profits are zero, the profit equation can be linearized and rearranged to predict the number of proprietary schools observed in equilibrium as follows:

$$N_{c,t+i} = \beta_0(FinAid)_t + \beta_1 M_{ct} + \beta_2 X_{ct} + \beta_3 W_{ct} + \varepsilon_{ct}, \quad (9)$$

where N_{ct} is the number of proprietary schools in county c and year t and i = 0, 1, 2, 3.[17] To avoid introducing endogeneity if financial aid awards are simultaneously determined, I estimate the model

separately for the various types of financial aid, substituting in for *FinAid* the per-student maximum of the Pell Grant award, the G.I. Bill, and Cal Grants part A, B, and C in separate regressions. I use the maximum per-student award, as it is this amount that most likely enters the decisionmaking process of for-profit owners: It represents the largest award that a student is able to obtain in any given year.

Following Bresnahan and Reiss' (1987, 1991) determinants of firm entry, M is a vector of variables that determine market size. These include the population of the county, population growth, and the population of neighboring counties (in this case, the county that shares the largest border), as well as variables predicting the number of grant-eligible adults in the county. These include the number of adults in poverty and the number of military jobs. I discuss these eligibility predictors further below.

X includes county-level demographic and market characteristics such as the unemployment rate, per capita income, percent black, and percent of the population in age groups 0-14, 15-29, and 30-49.

Finally, W represents costs for the for-profit college entrepreneur. Lacking data on rental rates and instructor salaries, I again follow Bresnahan and Reiss (1991) by including the median home price in the county to reflect the price of real property.[18]

The term ε_{ct} contains unobservable characteristics that vary across markets and over time. If these are correlated with the explanatory variables, estimates of the impact of the effects of financial aid on the number of proprietary schools in the market will be biased. Examples of such unobservables include proprietary school profits, local tax codes, or the area's industry mix. Due to this omitted variable bias, cross-county estimates can only provide a measure of the correlation between the number of proprietary schools and the explanatory variables—they cannot prove causation.

To get one step closer to assessing causality, I add county and year fixed effects to the model in equation (9). While this strategy eliminates the bias due to any omitted variables that are common

within counties and over time, it also eliminates the effects of the grants, because the maximum award is set at either the national level (in the case of the Pell Grant and G.I. Bill) or at the state level (in the case of the Cal Grant).

However, it is reasonable to suspect that the impact of financial aid awards will differ within counties over time according to the number of grant-eligible consumers. Pell Grant eligibility varies according to family income, assets, and household size, as these are used to determine the expected family contribution (U.S. Department of Education, 2001), making Pell Grant eligibility thresholds quite similar to poverty thresholds. In fact, in 2002, the average family income of a Pell Grant recipient was $18,333 (U.S. Department of Education, 2003a), a figure remarkably similar to the $18,392 poverty line for a family of four (U.S. Census Bureau, 2002). I therefore use the number of adults in poverty as a proxy for Pell Grant eligibility.[19] If the number of adults in households below the poverty line increases, one would expect the Pell Grant maximum to have a greater impact on student demand and the entry decisions of proprietary schools. For this reason, I include an interaction between the Pell Grant maximum and the adult poverty level in the fixed effects models. I estimate

$$N_{c,t+i} = \beta_0(Pell_t * Poverty_{ct}) + \beta_1 M_{ct} + \beta_2 X_{ct} + \beta_3 W_{ct} + d_c + d_t + \varepsilon_{ct}, \quad (10)$$

where d_c and d_t, represent vectors of county and year fixed effects, respectively, and the adult poverty level is included (as in the cross-sectional estimates) in vector M.[20] The effect of the Pell Grant Program is then identified off of changes over time in the policy and the shifting number of eligible adults within the county.

An identical strategy is used to assess the impact of the Cal Grant. I again interact the adult poverty rate with the per-student maxima of the various Cal Grant programs:

$$N_{c,t+i} = \beta_0(CalGrant_t * Poverty_{ct}) + \beta_1 M_{ct} + \beta_2 X_{ct} + \beta_3 W_{ct} + d_c + d_t + \varepsilon_{ct}. \quad (11)$$

Although the state did not release any information on the income levels of grant recipients over the time frame of this study,[21] in 2006-07 the average Cal Grant B recipient lived in a family of four with

an average income of $19,979. Again this figure is surprisingly close to the 2006 poverty threshold of a similar family, at $20,444. The income figures for the Cal Grant A were slightly higher, perhaps due to the fact that need is assessed relative to four-year college tuition for many students, and no data were available for Cal Grant C (California Student Aid Commission, 2007). Still, considering that the Cal Grant program draws on the same forms (the Free Application for Federal Student Aid) and a formula similar to that of the Pell Grant based on income and tuition (Cal Grants website, 2008), it is plausible to assume that for-profits rely on adult poverty to assess the level of demand and student eligibility for both programs.

A slight variant of the above strategy is employed with respect to the G.I. Bill: Instead of using adult poverty as a proxy for eligibility, I use military employment in the county,[22] as shown in equation (12):

$$N_{c,t+i} = \beta_0 (GIBill_t * Military_{ct}) + \beta_1 M_{ct} + \beta_2 X_{ct} + \beta_3 W_{ct} + d_c + d_t + \varepsilon_{ct}. \quad (12)$$

Because the G.I. Bill applies only to veterans, fluctuations in the number of military jobs within a county should spark reactions to the G.I. Bill on the part of students and colleges.

As the identification strategy relies on variation in the population of grant-eligible individuals over time within counties, further exploration of these patterns is warranted. Figures 1A and 1B present maps of California counties highlighting changes over time in adult poverty and military employment, respectively. Between 1989 and 2003, more than half of California counties saw poverty levels rise by more than 2,500 adults, with 9 counties gaining over 20,000 impoverished adults over this period. Of course, these patterns map closely to population patterns, with the largest counties experiencing the largest absolute gains. Military employment trended downward over this period, with all but three counties experiencing a net decrease in military employment between 1989 and 2003. The largest effects were felt in counties such as Alameda, Monterey, and San Diego where military bases were located or shut down.

[Figures 1A and 1B about here]

It should be noted that although the fixed effects strategy improves on the cross-sectional estimates, it does not eliminate the bias of the estimates if any time-varying county-specific unobservables are correlated with aid eligibility. It is therefore possible to overestimate the impact of the grant programs if other policy changes occurred at the same time as changes in the grant programs. For example, in the Pell and Cal Grant specifications, if a concurrent housing policy caused rents to decrease in high-poverty counties making it cheaper for for-profits to set up shop, the effects of the grant programs would be overestimated. On the other hand, the coefficient will simultaneously underestimate the impact of the grants, since part of the variation in grant aid is eliminated with the addition of the year dummies.

Finally, I compare the impact of financial aid on the number of for-profit colleges to the impact on community college enrollments. For all of the above specifications, the dependent variable becomes community college enrollments. This comparison allows an assessment of whether student demand is shifting at the intensive margin, between private and public schools, or whether financial aid draws students in from the extensive margin, thereby increasing college-going.

RESULTS

Table 2 displays the results of the cross-sectional estimation, as specified in equation (9). Panel A reports estimates of the correlation between the financial aid awards and the number of for-profit colleges in a county. Although the coefficient on the Pell Grant maximum is large in magnitude in all 4 years, suggesting that a $1,000 increase is associated with roughly 2 to 4 additional schools per county, this effect cannot be shown to be significantly different from zero. The effect of the G.I. Bill appears to strengthen over time, growing from 1 to 3 schools (when rounded to the nearest whole number) between years *t* and *t+3*. Both Cal Grants A and B are associated with more for-profit colleges, and

again the effects of these programs on for-profit colleges grow stronger over time. However, the coefficients are smaller in magnitude than both the Pell Grant and G.I. Bill. As expected, Cal Grant C has the largest impact on the number of for-profits in the years immediately following a change. The program is associated with 9 to 11 new schools per county in the first 3 years.

[Table 2 about here]

Panel B of Table 2 reveals a strong correlation between Cal Grants A and B and public community college enrollment. The Pell Grant, G.I. Bill, and Cal Grant C reveal mostly insignificant relationships. To better compare the reaction of the private and public sectors, I calculate an approximate number of students implied by the for-profit estimates in Panel A. Lacking institution-level data on enrollments, I multiply the number of colleges by 350 students, the average size of a California for-profit as reported in Cellini (2005).[23] I multiply the enrollment estimates in Panel B by 100 to account for the scaling of the coefficients. Comparing the two sets of estimates directly, it is evident that the G.I. Bill and Cal Grant C have a stronger effect on students entering for-profits. The Cal Grants A and B are quite similar for the two sectors, though generally larger for for-profits.

Although the cross-sectional estimates are useful in thinking about general patterns of correlation, the fixed effects estimates are better able to control for omitted unobservable characteristics of counties and time trends. Table 3 displays the results of the fixed effects estimation of the impact of financial aid on for-profit colleges, as specified in equations (10)-(12). In the top row, the effect of the Pell Grant maximum interacted with the adult poverty level is positive and significant at the 5 percent level in every year: The larger the number of poor, the greater the effect of the Pell Grant maximum on the number of proprietary schools in the county. The magnitudes of the coefficients (ranging from 0.119 to 0.208) are more difficult to interpret. I therefore include in Table 3 the marginal effect of a $1,000 increase in the financial aid award (or roughly 30 percent over current levels) on the number of colleges, calculated at the mean poverty level of 47,982 adults. The results

suggest that between 6 and 10 schools enter the market in response to the increase. For a county with the mean number of for-profits (46), this represents an increase of 13-22 percent and represents roughly 2,000-3,400 students, on average.

[Table 3 about here]

For a better understanding of the magnitude of the effects on counties of differing sizes, Table 4 presents marginal effects for year *t* calculated at the median, 10th, 25th, 75th, and 90th percentiles of the poverty distribution. For counties with the lowest number adults in poverty, the estimate drops considerably to just 0.17 schools, while counties at the 90th percentile would see 11 additional schools in year *t* alone—a 25 percent increase.

Estimates of the impact of the G.I. Bill in Table 3 reveal no significant effects in any year and small negative point estimates. Marginal effects of this program are therefore left out of Table 4. The results suggest that the patterns found in the cross-sectional estimation above were likely driven by time trends and large differences across counties in military employment. It could also be that military employment has ambiguous effects on student demand. Whereas high employment suggests an increase in future beneficiaries of the G.I. Bill, it may also mean that fewer veterans have the time or need to enroll in college.

[Table 4 about here]

As in the cross-sectional estimation, Cal Grants A and B continue to show positive impacts on for-profit colleges, although, as expected, the effects are much smaller in magnitude than the Pell Grant. At the mean poverty level, both Cal Grants A and B show similar effects on for-profits, increasing the number of colleges in a county by about 1 per year. Even in the highest poverty counties in year *t*, Cal Grants A and B induce less than 3 schools to enter the county, as shown in Table 4.

The Cal Grant C appears to have a particularly strong impact on for-profit colleges in the first 3 years after an increase. This relationship makes sense in light of the fact that the Cal Grant C is

designed to target students attending exactly these types of private trade schools. The marginal effects at the mean in Table 3 reveal results similar to those for the Pell Grant, with increases between 2 and 10 colleges. Interestingly, the timing of the for-profit reaction seems to be reversed for these two grant programs: The impact of the Pell Grant becomes stronger over the subsequent 4 years, while the impact of the Cal Grant C diminishes. In year *t* in Table 4, the Cal Grant C shows the strongest effects of any program, leading to a net gain of 19 new colleges in counties with the largest number of poor adults.

All of the figures reported above describe the impact of a $1,000 increase in grant aid to allow a clear comparison between grant programs and straightforward policy implications. However, this increase is largely outside the bounds of the data for several of the programs I examine. A standard deviation increase in the Pell Grant is just $390 and $333 for the Cal Grant C. The other three programs reveal much higher standard deviations: about $1,500, as reported in Table 1. To compare results from an alternate perspective, Table 4 includes the elasticity of supply of for-profits with respect to financial aid for each aid program and poverty level in year *t*. Most estimates reveal a very inelastic supply of for-profits, with the Cal Grants A and B least elastic and the Pell Grant and Cal Grant C as the most elastic, particularly in the poorest counties.

[Table 5 about here]

Table 5 tests whether the patterns found in the private sector hold in the public sector, or whether the students entering for-profit colleges would have otherwise attended community colleges. The effect of the Pell Grant on enrollment is significant and positive in the first 2 years, suggesting an increase of 1,460 and 891 students in the first and second years, respectively, at the mean poverty level. Although these effects are quite large, they are smaller than those found in Table 3 for for-profit colleges. Using the average of 350 students per college, for-profits would gain 1,990 in the first year and 2,217 in the second, reaching as high as 3,491 in the fourth year. Additional calculations of

marginal effects at the median, 10th, 25th, 75th, and 90th percentiles of the poverty level are provided in Table 6. In the poorest counties, the number of students increases by nearly 20 percent.

[Table 6 about here]

Results for the G.I. Bill are similar for for-profits and community college enrollment: No effects are significant and all coefficients are small and negative. The effects of both Cal Grant A and B on community college enrollment are sizable and significant in all 4 years. The marginal effects range from 314 to 938 students at the mean, nearly identical to those found in the private sector. Table 6 reveals a 0.8 percent increase in enrollment for the median poverty county in year *t* and a range that is consistent with Kane's (1995) findings on the Cal Grant A.

Cal Grants A and B are remarkably similar for the public and private sectors, but the Cal Grant Part C has a much greater effect on for-profits than community college students, as expected given its design. In years *t+1* and *t+2* the effect on community college enrollment is not significant and in year *t*, in Table 6, the implied number of students entering for-profits at the median (885) is more than double the number of students entering the public sector (338).

Considered together, the results reveal that for-profit two-year colleges generally respond more strongly to changes in financial aid than enrollments in the public sector. The differences between the sectors are particularly pronounced for the Pell Grant and the Cal Grant, Part C. Although these two programs have less impact on the public-private price differential than Cal Grants A and B, the Pell is more visible at the national level, and the Cal Grant C is targeted toward for-profits, making these programs more likely to influence for-profit college supply. Reaction to Cal Grants A and B are almost identical in the public and private sector. This similarity may be because only a small number of students take advantage of these programs at the two-year college level, as both require minimum high school grade point averages for eligibility. The G.I. Bill has negligible impacts in both types of institutions. Again, this may be due to the small number of eligible students in the average county.

Despite these differences across grant programs, all of the Pell and Cal Grant programs appear to have a greater influence on students at the extensive margin between attendance and non-attendance, than at the intensive margin between sectors: I find no evidence of offsetting effects in the public and private sectors. Some switching between sectors may still occur among students on the intensive margin due to the declining public-private price differential, but it is not enough to outweigh the positive enrollment effect observed in the public sector. According to the model developed in previous sections, students for whom $\text{NPV}_{FP_{ij}} \approx \text{NPV}_{\text{Non}_{ij}} \geq \text{NPV}_{\text{CC}_{ij}}$ appear to enter the private sector when the Pell and Cal grants become more generous, while students for whom $\text{NPV}_{CC_{ij}} \approx \text{NPV}_{\text{Non}_{ij}} \geq \text{NPV}_{FP_{ij}}$ enter the public sector. The result is a clear net gain in the number of sub-baccalaureate students.

The results further suggest that the most extreme version of the Bennett hypothesis does not hold: For-profits do not raise tuition enough to fully offset the increase in grant aid. If for-profits enter the market in response to student demand, we would expect to see no change in the number of institutions if students experienced no net reduction in the cost of attendance. Limited tuition hikes in the private sector cannot be ruled out, however. The sizable increase in community college enrollment may be a sign that the public-private price differential increased slightly with the generosity of aid programs, while at the same time both institutions became more affordable.

DISCUSSION AND CONCLUSIONS

This paper draws on a unique data set of California's for-profit colleges to assess the impact of five federal and state financial aid programs on the market for two-year college education. The results suggest that, for all but the G.I. Bill, grant aid programs encourage entry among for-profit colleges. Increases in the maximum student award under the Pell Grant and Cal Grants Parts A, B, and C all appear to have a strong influence on the net number of for-profit colleges in a county. This effect is

particularly strong in counties with larger numbers of low-income adults, where more potential consumers are eligible for aid. For a county at the mean adult poverty level, a $1,000 increase in the per-student maximum Pell Grant results in roughly 6 new colleges in the year the increase is announced, with up to 10 new colleges in the county 3 years later. The Cal Grant, Part C—a program targeted at students in private vocational schools—reveals effects of a similar magnitude. Cal Grants A and B—targeted toward high-achieving students enrolled in programs lasting at least 1 year and up to 4—both result in just one additional school per year in the average county.

The reaction of for-profit colleges, when measured in terms of average student enrollment is stronger than the enrollment response of public community college students for the Pell Grant and Cal Grant C and virtually identical for Cal Grants A and B. The positive effects found in both sectors suggest that, rather than simply diverting students from public to private colleges, these grant aid programs expand access to education in both sectors.

While previous research has found significant overlap between the functions and students in the for-profit and public two-year colleges, it has also found some important differences. The findings presented here further highlight the distinctions between the two types of colleges and support the idea that some students may find their needs are better met in one sector than the other. Students pursuing training in rapidly evolving or newly emerging fields, such as information technology, may find that only for-profit colleges offer the skills they are looking for. Cellini (2009) reports that in the average county, for-profits offer significantly more degree and certificate programs in real estate and computer-related fields than local community colleges. As Heckman (2000) and Turner (2006) point out, for-profits are likely to react quickly to changing demands for skill, while it may take months or years for the public sector to offer a similar degree program. Similarly, some highly-specialized certificate programs are offered only by a few select private institutions. For example, a student wishing to obtain the Le Cordon Bleu Patisserie and Baking Diploma has only two schools to choose from in California

(College and University Net, 2005). An increase in the maximum amount of financial aid available might make these types of programs affordable enough to outweigh the opportunity costs associated with attendance.

But community colleges are not without their own specializations, perhaps drawing in a wholly different set of students than the for-profits as financial aid programs become more generous. Most notably, these students may be hoping to transfer to a four-year college. California's community colleges are known for having articulation agreements with both the California State University (CSU) and University of California (UC) systems, making the transfer of credits between institutions transparent. They also offer many more programs in the humanities and arts than their for-profit counterparts (Cellini, 2009). On the other hand, only 4 percent of California community college students actually transfer to a CSU or UC institution (CPEC, 2005), suggesting that although many students may have the intention of transferring, they may later find their interests changing or their grades too low for admission to their preferred university.

For-profits and community colleges may also attract different types of students because of differences in the environment and services that they offer. Rosenbaum, Deil-Amen, and Person (2006) find that, in contrast to public community colleges, the 7 exemplary for-profit occupational colleges they study provide students with extensive job placement services as well as frequent and mandatory advising. These colleges also engage in substantial outreach to build long-term relationships with local employers and teach "soft skills" to students in preparation for the workplace. Data from the IPEDS reported in Cellini (2005) corroborate this evidence, though again, the data do not represent the universe of for-profit colleges. Nonetheless, Cellini finds that for-profits spend $2,600 more per student on student services than their public counterparts. Community colleges spend roughly $2,000 less per student overall, but they manage to spend $600 more per student on instruction.

In addition to revealing patterns of student demand, the results reported above can also shed light on the Bennett hypothesis—the allegation that for-profits respond to financial aid maxima by raising tuition above the cost of education to extract greater profits at the expense of the federal government. Without tuition data it is difficult to test this hypothesis directly, but if one assumes that the number of for-profit colleges is driven purely by student demand, the strong reaction of for-profit colleges suggests that these institutions do not raise tuition enough to match the full value of the increase in the grant award. However, a partial tuition hike is entirely possible. In fact, such an explanation may account for rising community college enrollment: The public-private price differential could increase, driving some students into the public sector who would otherwise have enrolled in the private.

Increases in student demand may be the most natural explanations for the observed patterns in the for-profit and public sectors, yet, in the case of for-profits, the focus is on the number of schools rather than students. An alternative explanation for strong reactions of for-profit colleges may be that rather than responding to expected demand or enrollment per se, for-profit colleges may instead respond to changes in the grant programs more directly. With more money available through the Pell or Cal Grant, entrepreneurs open schools—particularly in low-income areas—then actively recruit eligible students, essentially generating their own demand. Considering the remarkably quick response of for-profit colleges to changes in financial aid and the high proportion of for-profit students obtaining Pell Grants, this interpretation is certainly plausible. Anecdotal evidence provides further support for this contention (Moore, 1995; Arenson, 2006).

If the market for two-year college education is perfectly competitive and students have full information about their educational options, this type of pre-emptive response by for-profits and the active recruitment of low-income students might be desirable from a policy perspective. On the other hand, in the presence of asymmetric information or widespread fraud, it is also possible that for-profits

are taking advantage of low-income students and taxpayer dollars. More than a few for-profits have been caught misrepresenting graduation rates, average time-to-degree, and average salaries of graduates, while others have been caught falsifying student information to maximize eligibility for aid programs (Arenson, 2005, 2006). The results reported here can neither dismiss nor confirm allegations of financial aid fraud and abuse in the for-profit sector, but they can suggest that need-based financial aid programs, as they are currently designed, provide important incentives for for-profit entry. Much more research is needed before we can determine exactly which mechanisms drive these results.

Finally, in both the for-profit and public sectors, the Pell and Cal Grants appear to be effective in opening access to education for low-income students, but the welfare implications of expanding grant programs are less clear. Calculations based on the enrollment figures above suggest that the Pell Grant and Cal Grant C are the most cost-effective, at roughly $1 per new enrollee in either sector in the median poverty county: Cal Grants A and B cost more than four times that amount for each new student attending a two-year college.[24] Still, because the Pell and Cal Grant C have a disproportionate effect on for-profits, it is not clear whether the expansion of these programs is efficient from a societal perspective.

Essential to judging the efficiency of each program is the question of the quality of a for-profit education. No studies to date have assessed the labor market returns to for-profit training, and it is unclear whether students attending these institutions complete degrees at similar rates, obtain similar jobs, and earn the same wages as their counterparts in the public sector. Without this crucial information, assessments of the social welfare implications of policies designed to expand for-profit enrollment are impossible.

Also central to the effective design of financial aid programs are questions as to whether grant aid reduces dependence on debt, whether students have access to accurate information on two-year colleges, and the extent of for-profit fraud and abuse. Much more research and data are needed before

we can answer these questions. This study takes the first step in investigating the relationship between for-profit colleges and federal and state financial aid programs. The evidence presented here reveals that for-profit colleges react strongly to the generosity of grant aid programs, and suggests that policymakers should carefully consider the incentives that financial aid programs create in the two-year college market.

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[1] See for example, Cornwell, Mustard, and Sridhar (2006); Curs, Singell, and Waddell (2007); Dynarski (2000, 2002, 2003); Ehrenberg and Sherman (1984); Hansen (1983); Kane (1995, 2003); Linsenmeier, Rosen, and Rouse (2006); Long (2004); Manski and Wise (1983); McPherson and Schapiro (1991); Seftor and Turner (2002); and Van der Klaauw (2002).
[2] See for example, Curs, Singell, and Waddell (2007); Manski and Wise (1983); and Kane (1995).
[3] In addition to the quantitative analyses described here, there are several qualitative studies of for-profit colleges in the sociology and education literature. Most recently, Rosenbaum, Deil-Amen, and Person (2006) provide excellent case studies of several high-performing for-profit occupational colleges (which they define as accredited colleges offering associate's degrees) in Illinois. These case studies are informative, but they represent only a small portion of the colleges studied here. I describe the data in further in the third section.
[4] To focus specifically on for-profit colleges, I drop 836 colleges that were classified as non-profit or religious exemptions by the BPPVE. These schools are tax exempt organizations with additional reporting requirements under the BPPVE. They account for roughly 8.5 percent of all institutions in the data. The results reported below are robust to the inclusion of these colleges and are available upon request.
[5] This figure is reflected and confirmed by California's Postsecondary Education Commission (2007, 2008). The BPPVE ended its computerized data collection in 2004 due to budget cuts. Then, in 2007, the California legislature allowed the legislation authorizing the BPPVE to expire, terminating the agency. As a result, licenses are no longer required to start a for-profit college.
[6] Title IV refers to the section of the Higher Education Acts of 1965 that established federal student financial aid programs. Interestingly, not all proprietary schools are eligible. The federal government specifies several requirements that apply solely to for-profit or vocational non-profit schools. The most important is the "two-year rule" that schools must have been legally providing postsecondary instruction for at least 2 consecutive years. They also must derive no more than 90 percent of their revenues from federal student aid, and they are required to offer at least one program of a specified week and hour

length (the "12-hour rule") (U.S. Department of Education 2001). Although there is currently no accurate estimate of the percentage of proprietary schools eligible for Title IV programs, it seems reasonable to assume that most proprietary schools will respond to changes in the Pell Grant, because those that are not eligible are likely to believe that they will become eligible after 2 years.

[7] The figures cited here are again based on IPEDS data and therefore severely undercount the number of students in these institutions (Cellini, 2005). However, in recent years the IPEDS has made an effort to track down all Title-IV eligible proprietary schools, so these numbers may be fairly accurate insofar as they represent point-in-time full-time-equivalent fall enrollment in eligible institutions.

[8] The Cal Grant A offers the most generous aid for students attending two-year colleges and private four-year colleges. However, due to the design of the program, Kane (2003) points out that the Cal Grant B program has a higher present value for four-year college students attending public institutions. Also, students who are eligible for multiple Cal Grants may only choose one; however, they remain eligible for the Pell Grant and G.I. Bill.

[9] Limiting the analysis of for-profit colleges to the period 1991 to 2003 for a more consistent sample does not change the results.

[10] This is an especially small distance when compared to the average size of a California county. Tabulations of data from the California Department of Finance show that average county area is 2,689 miles, or about 52 miles in each direction.

[11] For simplicity, I assume that four-year college attendance is not an option for these students, but including it as part of the non-attendance option would not change the implications of the model.

[12] It is also possible that students sort themselves across sectors based on the ratio of benefits to costs. Characterizing the student's choice in this manner would not change the implications of the model.

[13] The addition of new programs in an existing community college is more frequent, but colleges must still follow regulations set out in a 35-page book and get approval from the state Chancellor's Office, making this process quite lengthy as well (CCCCO, 2003).

[14] According to Patrick Dorais at the BPPVE, the licensing process for new schools is generally completed in just 4 to 8 weeks (phone interview on September 14, 2005).

[15] The assumption of constant marginal cost makes sense in this context if, for example, teaching comprises a large portion of the cost of education. I use it here for simplicity following Bresnahan and Reiss (1987). See Bresnahan and Reiss (1991) for a similar model assuming U-shaped marginal costs.

[16] As noted above, Rizzo and Ehrenberg (2003), Long (2004), and Singell and Stone (2007) find that public four-year colleges do not raise tuition in response to grant aid. Moreover, California's community college fees are set at the state level and must be voted on by the California legislature, making a quick reaction to changes in grant aid unlikely.

[17] Effects are measured beginning in the calendar year of the announcement of the grant aid ($t+0$), for the reasons described above. I examine effects only over 4 years, as the sample size diminishes substantially beyond this timeframe.

[18] Home prices may proxy for both cost and wealth in the county, with opposite effects on enrollment.

[19] Adult poverty levels are calculated by subtracting the number of children (under age 18) in poverty from the total population in poverty.

[20] Note that grant aid is not added separately, as it is unidentified with the addition of year fixed effects.

[21] Email correspondence with Carol Durante at California Student Aid Commission August 13, 2004

[22] Military employment includes all full-time and part-time jobs classified as military in the Rand Corporation's California Statistics Database.

[23] New "mom-and-pop" colleges may in fact enroll fewer than 350 students in their first few years. On the other hand, new branches of existing national chains may enroll more than the average. As I have no further data on enrollment to test these hypotheses, I use 350 throughout.

[24] These calculations do not include the costs of administration of each program.

Table 1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
A. Colleges and Aid					
Number of For-Profits per County	870	46	111.35	0	957
CC Enrollment †	756	14,746	35,153	0	305,917
Max Pell Grant Award	870	3,347	390	2,856	4,091
Max GI Bill Award	870	5,324	1,513	3,801	8,865
Max Cal Grant A Award	870	8,409	1,622	5,839	10,404
Max Cal Grant B Award	870	10,117	1,550	7,407	12,027
Max Cal Grant C Award	870	3,498	333	3,168	4,288
B. Controls					
Adult Poverty Level	870	47,983	139,975	80	1,224,477
Military Employment	870	4,919	16,625	0	149,321
Population	870	558,059	1,312,963	1,090	9,979,600
Population of Neighboring County	870	586,467	1,316,525	9,200	9,979,600
Population Growth	870	1.7	2.1	-16.9	24.1
Per Capita Income	870	27,322	8,202	16,976	70,215
Unemployment Rate	870	9.2	4.54	1.6	30.4
Percent Black	870	3.8	3.9	0.0	19.4
Percent Age 0-14	870	22.6	3.6	11.7	31.0
Percent Age 15-29	870	20.4	3.7	12.5	32.6
Percent Age 30-49	870	30.6	2.8	21.2	42.1
Median Home Price	870	225,040	90,932	125,120	558,100
C. Aid * Eligibility Interactions (in millions)					
Max Pell Grant * Adult Poverty	870	137.55	405.27	0.18	4,197.25
Max GI Bill * Military Employment	870	21.37	77.72	0.00	1,021.62
Max Cal Grant A * Adult Poverty	870	348.67	1,040.07	0.42	10,060.97
Max Cal Grant B * Adult Poverty	870	417.42	1,234.87	0.53	11,668.36
Max Cal Grant C * Adult Poverty	870	140.81	409.95	0.23	3,538.74

Notes: Observations are county-years. Community college enrollment data not available for 1989 and 1990.
All dollar values reported in real 2003 dollars.
† "CC" refers to community colleges.
Source: Author's tabulations of data from the BPPVE, California Statistical Abstract, California Community College Chancellor's Office, California Postsecondary Education Commission, Rand California Database, and U.S. Census Bureau Small Area Estimates.

Table 2. Cross-Sectional OLS Estimates of the Impact of Financial Aid on the Number of For-Profit Colleges and Community College Enrollment

	A. Number of For-Profit Colleges				B. CC Enrollment (in hundreds)[†]			
	t	*t+1*	*t+2*	*t+3*	*t*	*t+1*	*t+2*	*t+3*
Max Pell Grant Award[††]	2.86	3.622	2.517	1.651	4.282	5.338	2.855	-1.377
(st. error)	(2.060)	(2.296)	(2.532)	(2.932)	(5.232)	(5.143)	(5.580)	(8.817)
approx. no. of students	1001	1268	881	578	428	534	286	-138
Max G.I. Bill Award	0.663	1.360*	2.039**	2.627**	0.932	1.39	2.96	7.690***
(st. error)	(0.563)	(0.696)	(0.891)	(1.069)	(1.359)	(1.352)	(1.806)	(2.754)
approx. no. of students	232	476	714	919	93	139	296	769
Max Cal Grant A	0.468	0.725**	0.853**	0.971***	1.53	2.023**	2.698***	3.705***
(st. error)	(0.309)	(0.337)	(0.337)	(0.351)	(0.943)	(0.827)	(0.807)	(1.038)
approx. no. of students	164	254	299	340	153	202	270	371
Max Cal Grant B	0.472	0.723**	0.842**	0.948***	1.454	1.958**	2.621***	3.663***
(st. error)	(0.302)	(0.329)	(0.330)	(0.342)	(0.913)	(0.804)	(0.784)	(1.039)
approx. no. of students	165	253	295	332	145	196	262	366
Max Cal Grant C	8.667**	10.512***	8.931**	5.286	3.573	12.399	16.093*	34.507
(st. error)	(3.787)	(4.064)	(4.124)	(3.915)	(9.888)	(9.521)	(9.604)	(22.899)
approx. no. of students	3033	3679	3126	1850	357	1240	1609	3451
Number of Observations	870	812	754	696	756	736	716	696

Notes: All regressions include the following variables: adult poverty level, military employment, population, population of neighboring county, population growth, real per capita income, unemployment rate, percent black, percent of population age 0-14, age 15-29, and age 30-49, and real median home price. Robust standard errors in parentheses.

[†] "CC" refers to community colleges.

[††] Maximum award amounts in thousands of 2003 dollars.

* Denotes significance at the 10 percent level, ** denotes significance at 5 percent level, *** denotes significance at 1 percent level.

Table 3. Fixed Effects Estimates of the Impact of Financial Aid on the Number of For-Profit Colleges

	Number of For-Profit Colleges			
	year *t*	year *t+1*	year *t+2*	year *t+3*
Pell Grant Max * Adult Poverty Level	0.119***	0.127***	0.128***	0.208***
(st. error)	(0.006)	(0.015)	(0.030)	(0.037)
marginal effect of $1,000 (no. colleges)	5.685	6.078	6.101	9.975
(st. error)	(0.277)	(0.741)	(1.432)	(1.777)
approx. number of students	1,990	2,127	2,135	3,491
GI Bill Max * Military Employment	0.011	-0.001	-0.002	-0.006
(st. error)	(0.019)	(0.026)	(0.039)	(0.053)
marginal effect of $1,000	0.055	-0.004	-0.009	-0.027
(st. error)	(0.095)	(0.127)	(0.194)	(0.262)
approx. number of students	19	-1	-3	-10
Cal Grant A Max * Adult Poverty Level	0.026***	0.025***	0.025***	0.031***
(st. error)	(0.005)	(0.008)	(0.009)	(0.006)
marginal effect of $1,000	1.260	1.175	1.193	1.477
(st. error)	(0.249)	(0.367)	(0.411)	(0.310)
approx. number of students	441	411	418	517
Cal Grant B Max * Adult Poverty Level	0.027***	0.025***	0.025***	0.030***
(st. error)	(0.005)	(0.007)	(0.008)	(0.006)
marginal effect of $1,000	1.290	1.202	1.196	1.425
(st. error)	(0.222)	(0.338)	(0.388)	(0.310)
approx. number of students	452	421	419	499
Cal Grant C Max * Adult Poverty Level	0.199***	0.177***	0.131***	0.043**
(st. error)	(0.033)	(0.032)	(0.025)	(0.020)
marginal effect of $1,000	9.519	8.459	6.242	2.023
(st. error)	(1.587)	(1.524)	(1.206)	(0.965)
approx. number of students	3,331	2,961	2,185	708
Number of Counties/Observations	58/870	58/812	58/754	58/696

Notes: All regressions include the following variables: adult poverty level, military employment, population, population of neighboring county, population growth, real per capita income, unemployment rate, percent black, percent of population age 0-14, age 15-29, and age 30-49, real median home price, and dummy variables for county and year. Standard errors clustered at the county level. Marginal effect of $1,000 on the number of institutions is calculated at the mean adult poverty level (47,982) for the Pell and Cal Grants. For the G.I. Bill, the marginal effect of $1,000 is calculated at the mean military employment level (4,919). Approximate number of students is the marginal effect (no. of colleges) multiplied by the average no. of students per college (350).

* Denotes significance at the 10 percent level, ** denotes significance at 5 percent level, *** denotes significance at 1 percent level.

Table 4. Marginal Effects of a $1,000 Increase in Financial Aid on the Number of For-Profit Colleges in Year *t* , by County Poverty Level

Adult Poverty Level Distribution	10th	25th	50th	75th	90th
Adult Poverty Levels	1,396	3,155	12,754	39,920	96,933
Pell Grant (no.of schools)	0.17	0.37	1.51	4.73	11.48
(st. error)	(0.008)	(0.018)	(0.074)	(0.230)	(0.559)
% change	0.4%	0.8%	3.3%	10.3%	25.0%
approx. number of students	58	131	529	1,655	4,020
elasticity	0.012	0.027	0.110	0.344	0.835
Cal Grant A (no.of schools)	0.04	0.08	0.33	1.05	2.54
(st. error)	(0.007)	(0.016)	(0.066)	(0.207)	(0.503)
% change	0.1%	0.2%	0.7%	2.3%	5.5%
approx. number of students	13	29	117	367	891
elasticity	0.007	0.015	0.061	0.191	0.465
Cal Grant B (no.of schools)	0.04	0.08	0.34	1.07	2.61
(st. error)	(0.006)	(0.015)	(0.059)	(0.185)	(0.448)
% change	0.1%	0.2%	0.7%	2.3%	5.7%
approx. number of students	13	30	120	376	912
elasticity	0.008	0.019	0.075	0.236	0.574
Cal Grant C (no.of schools)	0.28	0.63	2.53	7.92	19.23
(st. error)	(0.046)	(0.104)	(0.422)	(1.321)	(3.207)
% change	0.6%	1.4%	5.5%	17.2%	41.8%
approx. number of students	97	219	885	2,772	6,730
elasticity	0.021	0.048	0.192	0.602	1.462

Note: Percent change is calculated based on the mean number of for-profit colleges in a county (46). Approximate number of students is the marginal effect (no. of colleges) multiplied by the average no. of students per college (350). Elasticity is the percent change in number of colleges divided by the percent change in the relevant grant program.

Table 5. Fixed Effects Estimates of the Impact of Financial Aid on Community College Enrollment

	Community College Enrollment			
	year *t*	year *t+1*	year *t+2*	year *t+3*
Pell Grant Max * Adult Poverty Level	0.304***	0.186***	0.051	0.395
(st. error)	(0.037)	(0.069)	(0.175)	(0.268)
marginal effect of $1,000 (no. students)	1,460	891	246	1,894
(st. error)	(177.54)	(332.34)	(840.30)	(1284.93)
GI Bill Max * Military Employment	-0.028	-0.134*	-0.401*	-0.653
(st. error)	(0.100)	(0.072)	(0.232)	(0.442)
marginal effect of $1,000	-14	-66	-197	-321
(st. error)	(49.40)	(35.60)	(114.32)	(217.47)
Cal Grant A Max * Adult Poverty Level	0.097***	0.074***	0.071**	0.192***
(st. error)	(0.006)	(0.011)	(0.027)	(0.024)
marginal effect of $1,000	464	357	340	922
(st. error)	(29.64)	(52.50)	(131.21)	(115.80)
Cal Grant B Max * Adult Poverty Level	0.093***	0.070***	0.065**	0.196***
(st. error)	(0.006)	(0.011)	(0.028)	(0.026)
marginal effect of $1,000	448	337	314	938
(st. error)	(27.46)	(54.94)	(135.3)	(125.56)
Cal Grant C Max * Adult Poverty Level	0.265***	0.028	-0.097	1.182***
(st. error)	(0.034)	(0.088)	(0.120)	(0.053)
marginal effect of $1,000	1,271	136	-467	5,671
(st. error)	(161.91)	(423.47)	(573.76)	(255.15)
Number of Counties/Observations	58/756	58/736	58/716	58/696

Notes: All regressions include the following variables: adult poverty level, number of military jobs, population, population of neighboring county, population growth, real per capita income, unemployment rate, percent black, percent of population age 0-14, age 15-29, and age 30-49, real median home price, and dummy variables for county and year. Standard errors clustered at the county level. Marginal effect of $1,000 on the number of students is calculated at the mean adult poverty level (47,982) for the Pell and Cal Grants. For the G.I. Bill, the marginal effect of $1,000 is calculated at the mean military employment level (4,919).

* Denotes significance at the 10 percent level, ** denotes significance at 5 percent level, *** denotes significance at 1 percent level.

Table 6. Marginal Effects of a $1,000 Increase in Financial Aid on Community College Enrollment in Year *t* , by County Poverty Level

Adult Poverty Level Distribution	10th	25th	50th	75th	90th
Adult Poverty Levels	1,396	3,155	12,754	39,920	96,933
Pell Grant (no.of students)	42	96	388	1,214	2,949
(st. error)	(5.17)	(11.67)	(47.19)	(147.71)	(358.67)
% change	0.3%	0.7%	2.6%	8.2%	20.0%
elasticity	0.010	0.022	0.088	0.275	0.669
Cal Grant A (no.of students)	13	30	123	386	937
(st. error)	(0.86)	(1.95)	(7.88)	(24.66)	(59.87)
% change	0.1%	0.2%	0.8%	2.6%	6.4%
elasticity	0.008	0.017	0.070	0.220	0.534
Cal Grant B (no.of students)	13	29	119	373	905
(st. error)	(0.80)	(1.81)	(7.30)	(22.85)	(55.48)
% change	0.1%	0.2%	0.8%	2.5%	6.1%
elasticity	0.009	0.020	0.082	0.256	0.621
Cal Grant C (no.of students)	37	84	338	1,057	2,567
(st. error)	(4.71)	(10.65)	(43.04)	(134.71)	(327.09)
% change	0.3%	0.6%	2.3%	7.2%	17.4%
elasticity	0.009	0.020	0.080	0.251	0.609

Note: Percent change is calculated based on the mean community college enrollment (14,746). Elasticity is the percent change in the number of students divided by the percent change in the relevant grant program.

Figure 1A. Change in Adult Poverty Levels by County, 1989 to 2003

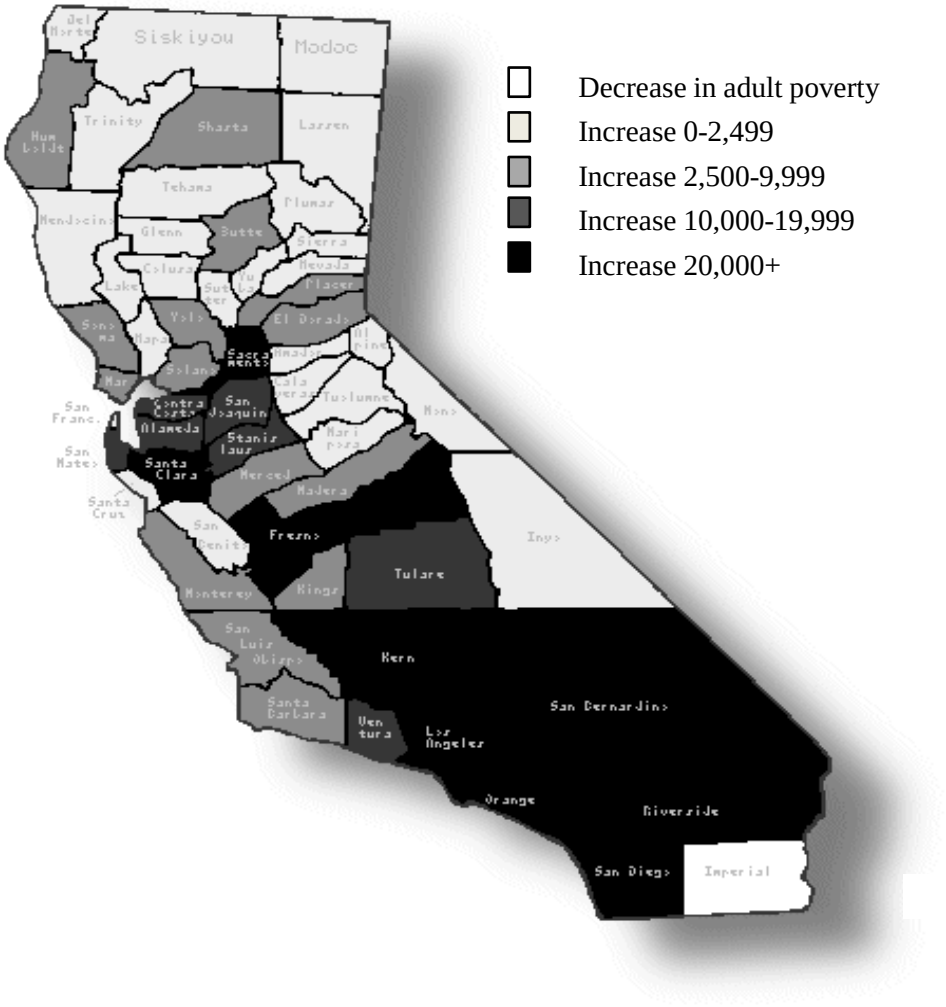

Figure 1B. Change in Military Employment by County, 1989-2003