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# ABSTRACT

## Incentives and Services for College Achievement: Evidence from a Randomized Trial*

Many North American college students have trouble satisfying degree requirements in a timely manner. This paper reports on a randomized field experiment involving two strategies designed to improve academic performance among entering full-time undergraduates at a large Canadian university. One treatment group ("services") was offered peer advising and organized study groups. Another ("incentives") was offered substantial merit-scholarships for solid, but not necessarily top, first year grades. A third treatment group combined both interventions. Service take-up rates were much higher for women than for men and for students offered both services and incentives than for those offered services alone. No program had an effect on men's grades or other measures of academic performance. However, the Fall and first-year grades of women in the combined group were significantly higher than those of women in the control group, and women in this group earned more course credits and were less likely than controls to be on academic probation. These differentials persisted through the end of the second year, in spite of the fact that incentives were given in the first year only. The results suggest that the study skills acquired in response to a combination of services and incentives can have a lasting effect, and that the combination of services and incentives is more promising than either alone.

JEL Classification: I21, I28, J24

Keywords: post-secondary schooling, dropout, randomized trials

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## I. Introduction

Recent years have seen growing interest in interventions designed to increase college attendance and completion, especially for low-income students. Major efforts to increase enrolment include need- and merit-based aid, tax deferral programs, tuition subsidies, part-time employment assistance, and improvements to infrastructure. These expenses are justified in part by empirical evidence which suggests that there are substantial economic returns to college education (see, e.g., Kane and Rouse, 1995).

In addition to the obvious necessity of starting college, an important part of the post-secondary education process is academic performance. Many students perform poorly and take much longer to attain a degree than the nominal completion time. First-year students are especially likely to struggle. Nearly one-third of first-year college students in the U.S. take remedial courses in reading, writing, or mathematics (National Center for Education Statistics, 2003). About one in five students who begin a four year college program leave within a year, either voluntarily or because of unsatisfactory achievement; about two in five leave within six years without a degree. Moreover, fewer than half of Black students, Hispanic students, and students attending colleges with a predominantly part-time student body graduate within six years (Consortium for Student Retention Data Exchange, 2004).[1]

One reason for poor student performance is lack of preparation. In particular, many students have poor study skills. Motivated by the view that the return to these skills is high, the traditional response to achievement problems has been an array of academic service strategies

[1]Pantages and Creedon (1978) summarize research on college retention from 1950 to 1975, and Peltier, Laden, and Matranga (1999) and Lotkowski, Robbins, and Noeth (2004) review more recent research. Interestingly, the three articles report consistently high college attrition rate with little downward trend over time. The average six-year graduation rate, for example, among students that entered a 2 or 4 year college program, was about 40 percent in 1957 (Pantages and Creedon (1978), 40 percent between 1985 and 1996 (Peltier, Laden, and Matranga, and 40 percent in 2000 (Lotkowski, Robbins, and Noeth (2004).

(Barefoot, 2004). For example, most North American institutions offer note-taking, time management, and goal-setting workshops, as well as academic advising and remedial instruction. Sometimes academic support services are combined with psychological support services (Tinto, 1993; Goodlad, 2004).

Like academic support services, merit-scholarships have a long history in the post-secondary context, but traditional programs, like U.S. National Merit awards and Canadian Excellence Awards, have focused on a relatively small number of very high achievers.[2] A recent development in the scholarship field is an attempt to use financial awards and incentives to motivate good but not spectacular students. Examples include state tuition waivers for students who maintain a B-average, such as Georgia's HOPE Program. As Dynarski (2005) notes, programs of this sort are relevant for many students. For example, nearly 60% of high school graduates in Georgia qualify for a HOPE scholarship (if they go to college). In addition to providing more financial resources for college, a second goal of the HOPE program is to encourage academic achievement (Seligman et al. 2004). The promise of a scholarship may increase the time devoted to schoolwork and lead students to acquire better study habits.

To the best of our knowledge, neither academic support strategies nor financial incentives have been the subject of large-scale evaluations using a random-assignment research design in a traditional college setting. The purpose of this paper is to report on a large randomized field experiment designed to assess major strategies now being used to improve short- and long-term academic achievement. We are interested in whether poor-performing students do better when offered additional college services, merit scholarships, or both, and whether the effects of these interventions extend beyond the period in which they were offered. Extended effects, if present,

[2]The National Merit program awards roughly 8200 scholarships to students selected from 1.4 million PSAT-takers.

suggest that incentives and services promote the development of effective study habits. In other words, they increase human capital as well as effort.

Approximately 1,600 first-year students participated in the Student Achievement and Retention Project (STAR) at a large Canadian university. In American terms, this institution can be thought of as a large state school, with tuition heavily subsidized. The STAR demonstration involved most of the entering class at one of the university's satellite campuses. The satellite campus is of special interest in this context since achievement and retention are more of a problem there than on the main campus. Most students are from the local area, with a common secondary school background. For the purposes of the study, all first year students entering in September 2005, except those with a high school Grade Point Average (GPA) in the upper quartile, were randomly assigned to one of three treatment groups or a control group. One treatment group was offered an array of support services, including access to mentoring by upper-class students, and supplemental instruction to promote critical thinking. A second group was offered substantial cash awards – up to the equivalent of a full year's tuition – for meeting a target GPA. Finally, a third treatment group was offered both services and incentives, a combination that has not been looked at previously using any sort of research design.

The first result that comes out of this study is much higher use of services by young women than young men. A second finding related to service use is the appearance of a strong interaction between the offer of fellowships and service take-up; students in the combined group were much more likely to use services than those offered services with no opportunity to win fellowships. Incentives therefore had the immediate short-term effect of increasing the rate at which students sought academic support.

The effects of the STAR intervention on students' academic performance are more mixed. Paralleling the sex differential in take-up rates, the results show an impact on grades for women only. The effects on women are strongest among those offered both the fellowship and services (i.e., the combined group). Although women in both the combined and the fellowship-only groups had markedly better Fall-term grades, the initial grade boost faded for the fellowship-only group so that first-year GPAs were significantly higher only in the combined group. The combined group also earned more credits and had a significantly lower rate of academic probation at year's end. Importantly, women in the combined group continued to outperform the rest of the STAR population in second year. This is in spite of the fact that fellowships and services were available in first year only. These findings suggest students in the combined group benefited from a lasting improvement in study habits, a result we interpret as increased human capital, though not necessarily in the form of academic subject knowledge.

## II. Background and Context

The benchmark economic model of schooling-as-human-capital treats educational attainment as the outcome of an optimization problem solved by equating marginal costs and benefits. This framework allows for heterogeneous costs and benefits, thereby generating a distribution of schooling choices even among observationally similar individuals (see, for example, Card, 1995). In this framework, new information may make some students update their assessment of costs or benefits and therefore leave school. For example, students may discover that the college workload is higher than they anticipated or that they dislike studying college-level material. Moreover, some studies suggest that the economic returns to a partially completed degree are not substantially below the returns to degree completion in per-year terms

(Kane and Rouse, 1995). Viewed in this way, it is not clear why sub-par academic performance or the decision to leave school should be of concern to economists or policy-makers.

In practice, a number of considerations provide a rationale for interventions designed to boost academic performance and reduce the number of college dropouts. First, students may incorrectly gauge the economic gains from doing well in school or from staying in school (Dominitz and Manski, 2000). Students may also weigh discount the consequences of their decisions more than can be accounted for by rational, forward-looking assessments (Oreopoulos, 2007).[3] A second consideration is the lasting benefit of good study habits. Incentives and services that promote such habits may have an effect even after the incentives are removed. Charness and Gneezy (2006) provide an example of this sort of response in a study paying subjects to go to the gym. The treatment group continued to go to the gym more than the control group even after the payments were stopped.

The traditional approach to college performance and retention issues focuses on the development of academic skills. College students clearly run into trouble when they are poorly prepared for college work. Proxy variables for academic background, such as high school GPA or standardized entrance test scores are the best single predictors of first-year college performance and attrition (Lotkowski, Robbins, and Noeth, 2004). Aware of this fact, many institutions offer an array of services, including remedial courses, academic advising, orientation classes, content-based tutoring, and writing workshops. A service strategy known as Supplemental Instruction, which plays a role in our evaluation, is used to encourage critical thinking in specific courses.

[3]Laibson (1997) and O'Donoghue and Rabin (1999) discuss present-biased (hyperbolic) preferences as an explanation for impulsive behaviour and addiction. Frederick, Loewenstein, and O'Donoghue (2002) provide a comprehensive review of empirical research on intertemporal choice, as well as an overview of related theoretical models. Fudenberg and Levine (2006) offer more specific explanations for present-bias. Spear (2000) suggests adolescents may be particularly predisposed to this bias.

Non-experimental evidence on the effectiveness of student services is mixed (see surveys, for example, by Bailey and Alfonso, 2005, Pascarella and Terenzini, 1991, Lotkowski, Robbins, and Noeth, 2004, and Wyckoff, 1998). More rigorous studies with experimental and quasi-experimental designs, mostly for high school students, paint a more promising picture. At the high school level, Grossman and Tierney (1998) examine a program that randomly assigned Big Brother/Big Sister applicants to either an advisor or a waiting list where they remained for at least 18 months. Youth matched to advisors were substantially less likely to use drugs and skip school. Lavy and Schlosser (2006) find positive effects of a high school remediation program. At the college level, Bettinger and Long (2005) show positive effects of remedial freshmen courses on retention. Bloom and Sommo (2005) analyze early outcomes from a program that sorted freshman college students into small groups taking the same first year classes. Students randomly assigned into these "learning communities" were more likely to pass required English courses than a control group, but second year retention rates were unaffected. As far as we know, there have been no other randomized evaluations of college support services.

Merit scholarships have grown substantially in recent years, in both absolute and relative terms. Recent programs introduced by several U.S. states differ from previous, privately-offered merit aid in that they offer more broad-based rewards to students with solid, though not necessarily exemplary, academic records. The Arkansas and Georgia merit scholarships for students at public universities cover tuition as long as students maintain a GPA of 3.0 (a B average) or better. These programs are partly an effort to attract better students to public institutions. But they are also motivated by the view that merit-aid increases interest in school and makes students more willing to develop good study habits.

A number of quasi-experimental evaluations suggest merit-based aid programs like Georgia HOPE boost college attendance and completion (Dynarski, 2002, 2005; Cornwell, Mustard, and Sridhar, 2006). A few recent studies look at the impact of financial incentives on the performance of college students. Garibaldi, et al. (2007) find that Italian university students finish school more quickly when tuition is *increased* for those who run past the nominal completion time. A few recent studies have looked at college-level incentives in randomized trials. For example, Leuven, Oosterbeek and van der Klaauw (2003) experimented with achievement incentives in a small sample at the University of Amsterdam. DesJardins and McCall (2006) report effects on early outcomes in an evaluation of the Gates Foundation effort to boost college achievement among minority students. Finally, Brock and Richburg-Hayes (2006) present early results from an experiment that offered $1,000 to low-income parents attending community college for maintaining at least a half-course load in first year and another $1,000 for maintaining a 2.0 (or C) grade average. Both enrolment and credit completion appear to have increased for the treatment group in this study.

Other evidence on incentives for academic performance comes from pre-college populations. For example, Ashworth et al. (2001) discuss a non-experimental evaluation of stipends for high school students who stay in school and Kremer, Miguel, and Thornton (2004) report results from a randomized evaluation of a merit scholarship program for adolescent girls in Kenya. Angrist and Lavy (2002) evaluate a demonstration program that provided substantial cash incentives to high school students in Israel. Finally, Angrist et al. (2002) evaluate the impact of school vouchers in Colombia that required students meet grade promotion standards

for eligibility. All of these programs point to at least some positive effects for some types of primary or secondary school students, especially for girls.[4]

STAR appears to be the first randomized evaluation of a merit-aid program for traditional college students with scholarship amounts and grade targets that closely resemble actual state-sponsored merit-aid programs. Our study is also the first to examine a program that simultaneously targets academic skill and motivation. Tinto's (1993) pioneering work on retention emphasizes this interaction. In particular, Tinto argues that students enter post-secondary school with varying abilities, commitment, and interests. These characteristics interact with an institution's academic environment to determine whether skills and motivation increase or decrease and whether a student drops out or achieves academic success.

## III. The Student Achievement and Retention (STAR) Demonstration Project

### A. Study Design

The STAR demonstration involved three treatment arms: a service strategy known as the Student Support Program (SSP), an incentive strategy known as the Student Fellowship Program (SFP), and an intervention offering both, known as the SFSP. The SSP offered 250 students access to a peer-advising service and a supplemental instruction service in the form of Facilitated Study Groups (FSGs). Peer advisors were trained upper-class students in the treated students' program of study. Advisors were meant to offer academic advice and suggestions for coping successfully with the first year of school. They emailed participants regularly and were available

[4]Interest in student incentives appears to be growing. A nascent but ambitious effort involves achievement incentives across the New York City school system, including a $600 payment for each passing grade on New York State Regents exams (Medina, 2007a). The New York City school district is also piloting plan that rewards attempts and success on AP exams (Medina, 2007b) In addition, the STAR treatment is related to the Dallas Advanced Placement Incentive Program, which pays students (and teachers) for success on Advanced Placement exams. For a recent quasi-experimental evaluation of APIP see Jackson (2007)."

to meet at the STAR office. FSGs are class-specific sessions designed to improve students' study habits and learning strategies, without focusing on specific course content. FSG facilitators were also trained upper-class students. The FSG model is widely used in North American colleges and universities (Arendale, 2001).

The SFP offered 250 students the opportunity to win merit scholarships for maintaining solid but not necessarily top grades in first year. Participants in the merit scholarship program were awarded $5,000 in cash, almost exactly the same as a year's tuition, for a grade average of B (a GPA of 3.0) or higher, or $1,000 in cash for a C+ or B- (a GPA of 2.3 to 2.9).[5] To be eligible for a fellowship, students had to take at least 4 courses per term and register to attend the second year of their program (a full load, required to complete a degree program in four years, is 5 courses per year). In the 2003-4 school year, 7-8 percent of registered students met the standard for a $5,000 award, while 26-28 percent met the standard for a $1,000 award. As it turns out, however, award rates in our cohort were somewhat lower.

A third treated group of 150 students was offered both the SSP and SFP. It is important to note, however, that other than being given access to both services and scholarships, there was no link between the two strategies in this group. In particular, SFSP students need not have used SSP services to be eligible for a fellowship. Finally, the STAR demonstration included a control group of 1006 students, with whom program operators had no contact.[6]

[5]Fellowship, scholarship, and bursary amounts are tax exempt in Canada. These award amounts are not counted when determining financial aid grant eligibility but are counted when determining eligibility for loans. Amounts are in Canadian dollars, roughly worth 0.90 US at the time.

[6]The fraction treated was small relative to the total first year population. 16 percent of the first year population received a fellowship offer, and 26 percent were invited to participate in one of the three treatment programs. The STAR demonstration was not advertised to the control group and we received few inquiries from controls or other non-program students about the program. Some treated students discussed their offer with schoolmates, but no one interviewed said that the program was a source of discussion throughout the year, or a concern for schoolmates they mentioned the program to.

The SSP strategy was motivated in part by the view that retention is strongly influenced by a student's interaction with others who take an interest in their welfare (Habley, 2004). Several universities match first year students with upper-class peers or faculty advisors who provide academic support. Wyckoff (1998) suggests these informal and formal interactions increase the likelihood students stay in school. Few colleges, however, offer as extensive a mentoring program as the SSP component of STAR. Peer advisors in the STAR program had exceptional social and academic skills. They participated in a 3-day training course and received continuous training and feedback from supervisors. The advisors emailed at least once every two weeks to remind advisees of their availability and to solicit questions about university assimilation, scheduling, studying, and time-management. The advisors complemented existing student services by informing advisees about the availability of STAR and non-STAR services, and by encouraging advisees to use these services and to go to tutorials and faculty office hours. Advisors were also trained to identify circumstances that called for more professional help and to make appropriate referrals.

The second component of the SSP consisted of Facilitated Study Groups (FSGs). FSGs are voluntary, course-focused, weekly sessions open to all treated students. FSG facilitators are students who were previously successful in the course they were hired to facilitate. They attend the course with their assigned STAR students, and try to help students develop reasoning skills useful for the subject they are facilitating. FSGs are designed to complement the regular content-based tutorials taught by graduate students. For example, rather than walking through sample problems, FSGs focus on critical thinking, note-taking, graphic organization, questioning techniques, vocabulary acquisition and test prediction and preparation. FSGs are a type of supplemental instruction commonly used in North American universities (Lotkowski, Robbins,

Noeth, 2004). A number of studies suggest students who participate in FSG-style supplemental instruction outperform non-participating peers (Congos and Schoeps, 2003, Hensen and Shelley, 2003, Ogden et al. 2003). The STAR demonstration offered FSGs for approximately half of the largest first year courses.[7]

The SFP grade targets were based on a trade-off between program costs and award accessibility. A high GPA target is, of course, less costly, but few low-skilled students are likely to qualify. A low GPA target can get expensive and probably has little effect on those who can easily meet the target.[8] Grade targets were therefore set as a function of high school GPA. The top GPA quartile was dropped from the entire STAR demonstration sample because few in this group fail to graduate (7.2 percent of incoming students in 1999 in the top high school grade quartile had not graduated by 2006, compared to 35.3 percent of students in the other quartiles). For each remaining quartile, the $5,000 target was set so that without the intervention, about 5 to 10% would reach it based on historical data. The $1,000 target was set so that about 20-25% were expected to qualify in the absence of a treatment effect. For a subset of SFP students, there was also an intermediate target of $2,500. The resulting GPA targets were between 2.3 (C+) and 3.0 (B) for the $1,000 award and between 3.0 (B) and 3.7 (A-) for the $5,000 award.[9] The exact targets appear in a chart in the appendix.[10]

[7]FSGs were offered to treated students taking Calculus (first year mathematics), Computer Science, Biology, English, Anthropology, Management and Commerce, Political Science, and Philosophy. Some of the other large courses offered FSGs to all students because these services were already in place before the experiment began.

[8]Dynarski (2005) and Cornwell et al. (2006) estimate that the vast majority of Georgia HOPE scholarships would have maintained the first-year target GPA of 2.0 even in absence of the program.

[9]Treated students were not told how their GPA target was chosen. If any students inquired, program operators were asked to tell them that the targets were individually set for research purposes. This occurred only once.

[10]Course grade distributions are not fixed. Average grades typically vary as much as 5 percentage points from year to year. Even large program effects would generate overall changes that are within this range. Effects on the order of half a standard deviation, for example (an increase of 6 percentage points), would raise the overall average by 1.5 percentage points (0.06*0.25). In fact, the average grade average for control students fell 3 percentage points relative to students in the same high school GPA quartile from the previous two years.

Students receive 1 credit unit for taking a two-semester (Fall and Spring) course and half a credit unit for taking a one semester (Fall or Spring) course. A full course load of 5 credits per year is typically required to finish an undergraduate degree program in four years. About 40 percent of students take a full course load in the Fall and Spring terms, but many who drop below the full course load also take courses over the summer. To allow some students with fewer than 5 credits to be eligible for a merit scholarship while minimizing the incentive to take fewer courses, the GPA for award eligibility was based on a student's top four credits over the Fall and Spring terms.

In addition to meeting grade targets, SFP and SFSP students were required to enrol for a second year at any college to be eligible for a fellowship. Fellowship cheques were sent to students in August after students registered for their second year. It turned out that all students with grades above their targets continued studying into their second year, without interruption and without changing university.

Shortly after they acknowledged receipt of program details, students in the SSP and SFSP were assigned advisors. The advisors emailed participants in an effort to set up an initial meeting. FSG times and locations were announced often. After the first semester, bookstore gift certificates (worth up to $50) were offered to those who attended FSGs or met with peer advisors. Wallet-sized reminder cards were mailed in November detailing a student's grade targets for those who participated in the SFP and SFSP. A second reminder went out in February and a third in March.

B. Student and School Background

Table 1 reports means and differences in means by treatment group for key administrative and background variables. Almost all of the 1656 full-time, first year students selected for random assignment in August of 2005 registered for class in the Fall. The 85 students who did not register by the start of the school year or were registered for no more than two courses on November 1 (a group we call "no-shows") were dropped from the main analysis. With or without the no-shows, there are no significant differences by treatment status in basic student background variables – students' sex, age, last year of high school GPA, or mother tongue.[11] In July, prior to treatment selection, we surveyed all incoming first year students. More than 90 percent of the 1571 who registered for at least two courses completed this survey.[12] The likelihood of completing the survey appears to be unrelated to treatment status.

The university in which this study was carried out is primarily a commuter school. Roughly eighty percent of students in our sample were living at home with their parent(s). Slightly less than a quarter identified this campus as their first choice for college. The majority plan to work at least part-time while in college (and most worked in high school). Many of the students are immigrants or children of immigrants, as suggested by the fact that 30 percent have a non-English mother tongue.[13] The students' parents, however, are reasonably well-educated; many have college degrees. Only about a quarter of the students claim to never or rarely procrastinate. On the other hand, 56 percent said they wanted more education than a bachelor's degree and 82 percent said they intended to complete their undergraduate program in 4 years.

[11]Only 1 of the 31 no-shows who were in a treatment group signed up. Table 1 shows no significant difference in the proportion of no-shows across program groups. The main results are essentially unchanged when including no-shows in the analyses.

[12]The high response was obtained after first making the survey online, sending a letter by the university president encouraging students to participate, offering a chance to win a laptop, several email reminders, and, finally, calling non-responders.

[13]Few students are French-speaking. Most of the non-English speakers in our sample are from South or East Asia.

Among those who entered in 2001, however, only 38 percent completed a degree this quickly. In this earlier cohort, the six-year graduation rate was about 70 percent and 13 percent dropped out after first year.

Merit scholarship programs like STAR may affect course enrolment decisions and/or the selection of courses by treated students. In view of this concern, Table 2 reports treatment effects on students' completed course load and the number of math and science credits completed (these courses are considered more difficult). The estimates reported in the table are coefficients on dummies for each of the three STAR treatment groups, estimated either with a small set of controls from administrative data or a larger set of controls that includes variables from the background survey.[14] For the most part, there is little evidence of a change in the number or type of courses for which students registered. An exception is the SFP effect on the number of math and science credits completed by men. It seems unlikely, however, that this positive effect on course difficulty is a response to the treatment (since financial incentives seem more likely to lead students to shift to an easier load).[15]

A second selection issue addressed in Table 2 is the likelihood of having Fall grades. This is important because some students take no one-semester courses and are therefore omitted from the sample used to analyze the impact on Fall grades. As can be seen in the last two columns in Table 2, about 89 percent of the sample who was registered for at least two courses have a Fall grade. The likelihood of being in this group is unrelated to treatment assignment.

[14]In this table and those discussed below, columns labelled "Basic controls," report estimates of the coefficient on assignment-group dummies in models that control for sex, mother tongue, high school grade quartile, and number of courses as of November 1. These variables come from administrative data. Columns labelled "All controls," add the responses to three survey questions collecting data on parents' schooling and procrastination. These variables were selected on the basis of their predictive power in the grades regressions below.

[15]Students interviewed during our focus groups (discussed more in Section V) said that the fellowship program did not influence their course selection. When asked whether the fellowship program affected their attitude towards which courses to take, one said, "No, not at all, just how much to work," and another said, "I wasn't looking to take bird courses or anything". Two first-year instructors in Economics and Biology also said no student mentioned Project STAR when asking for remarking or additional grades.

C. Consent Rates and Service Use

Students randomly assigned to STAR treatment groups were asked to sign up. Those who did not sign up were ineligible for services and fellowships. Sign-up imposed no burden or obligation on program participants beyond the receipt of reminder emails and mailings, including a biweekly email from peer advisors in the service programs. Students assigned to the control group were not sent any information about the demonstration.[16] While all students initially selected were tracked with administrative data, sign-up among the treated serves as an indicator of student awareness and interest. A little over half of those randomly assigned to receive services in the SSP responded to the invitation to sign up, a statistic reported in Panel A of Table 3 (columns 1 and 2). Consent rates were much higher for the SFP than for the SSP, about 87 percent versus 55 percent. SFSP consent rates were about 79 percent.

Women in each of the three treatment groups were much more likely than men to sign up to participate in STAR. For example, column B of Table 3 shows that 46 percent of men offered the SSP consented, in contrast with 61 percent of women, a statistic reported in the same column in Panel C. Most students offered the SFP signed up, but a gap by sex remains, with 91 percent of women and 81 percent of men having signed up. Similarly, when offered both services and fellowships in the SFSP, 84 percent of women and 71 percent of men signing up.

The pattern of service use shows differences by treatment and sex similar to those observed in sign-up rates. This pattern is presented in columns 3-4 of Table 3. In particular, service use was higher for those assigned to the SFSP (combined services and incentives) than for those assigned to the SSP (services alone).[17] Women were also much more likely to use services than men. For example, 26 percent of students offered services in the SSP either

[16]Members of the control group who inquired about the program were given general information. We received few such inquires.

[17]Service use was about the same in both semesters.

attended an FSG or met or emailed their advisor, while service use was close to 43 percent for students offered both services and incentives in the SFSP. SFSP service use by men was 29 percent, while SFSP service use for women was about 53 percent. The fact that service use was higher in the SFSP than in the SSP suggests that the opportunity to win a fellowship motivated students to use services.

Specific service-use rates are reported in columns 5-8 in Table 3. Students took advantage of the peer advising service more than the supplemental instruction offered through FSGs. About 12 percent of the SSP group attended at least one FSG (most of those who attended at least once, attended more than once), while 15 percent of men and 26 percent of women met or emailed a peer advisor (excluding advisor-initiated contact). Usage rates for both types of services were higher in the SFSP than the SSP, with 49 percent of women in the SFSP having contacted a peer advisor and 16 percent having attended an FSG.

Take-up rates for the FSG services were lower than the rates we aspired to, and probably diluted somewhat by our inability to offer FSGs in every course in which STAR participants were enrolled (though 86 percent of subjects attended at least one course incorporating an FSG). Take-up was probably also reduced by the fact that we offered services to individual students as opposed to entire classrooms. In addition, there were unavoidable scheduling conflicts. On the other hand, treated students made considerable use of the advising services. In our follow-up focus groups, participants indicated that they found peer advisors to be a valuable resource.

D. Evaluation Framework

The bulk of the estimates reported below are intention-to-treat effects that make no adjustment for sign-up. In cases where program effects are zero, a zero intention-to-treat effect

implies a zero effect on participants. More generally, however, intention-to-treat effects are diluted by non-compliance. For example, the 10 percent of those offered the fellowship program were ineligible for fellowships because they did not sign up.[18] Likewise, those who did not sign up for the SSP and SFSP could not use services and were not contacted by Peer Advisors. This tends to reduce the overall impact of the offer of treatment. The empirical section therefore concludes with a set of estimates that use the offer of services as an instrumental variable (IV) for program participation (i.e., sign-up). This generates an estimate of the effect of treatment on those who signed up to participate.

The IV adjustment works as follows. Let $P_i$ denote participants (in this case, those who gave consent), and let $Z_i$ denote the randomly assigned offer of treatment. The IV formula in this simple case is the adjustment to intention-to-treat effects originally proposed by Bloom (1984):

$$E[Y_{1i} - Y_{0i} | P_i=1] = \{E[Y_i | Z_i=1] - E[Y_i | Z_i=0]\} \div Pr[P_i=1 | Z_i=1].$$

This is the intention-to-treat effect divided by the compliance rate in the treatment group. A regression-adjusted estimate of the effect on program participants can be constructed using two-stage least squares (2SLS) where $Z_i$ acts an instrument for $P_i$. The result is a covariate-weighted average effect of treatment on the treated (Imbens and Angrist, 1994). In the SSP and SFSP, a further distinction can be made between compliance-via-sign-up and compliance-via-service-use. But the availability of services and the weekly emails sent by peer advisors is an intervention to which all SSP and SFSP participants who signed up were exposed, whether or not they actively sought services. In focus groups, treated students reported that they took note of the advisors' emails even if they did not respond. We therefore make no adjustment for the difference between sign-up and usage in the 2SLS analysis.

[18]There were two such cases.

## IV. Results

### A. Main Results

Our analysis of achievement effects begins by looking at students' average grades in the Fall semester and at their official GPAs at the end of the first year of study. The Fall grade variable is a credit-weighted average on a 0-100 grading scale for those who took one or more one-semester courses. This variable provides an initial measure of program impact. Although some students (about 11 percent) are omitted from the Fall grades sample because they took no one-semester courses, membership in the Fall grades sample appears to be unrelated to treatment status (see Table 2). The first-year GPA variable is the registrar's official end-of-year Grade Point Average, computed on a scale of 0-4. For example, a GPA of 3.3 represents a B+. This is the variable according to which STAR fellowships were awarded.

Students assigned to the SFP earned Fall grades about 1.8 percentage points higher than students in the control group, while those assigned to the SFSP earned grades 2.7 points higher than controls. Both of thee effects are significantly different from zero, as can be seen in the first column of Panel A in Table 4, which reports treatment effects estimated in the pooled sample of men and women.[19] Models with a single dummy indicating assignment to either the SFP or the SFSP generate a combined any-SFP effect of 2.1 (s.e.=.73), reported in column 4. The Fall grades estimates can be compared to a standard deviation of about 12. In contrast with the significant estimates for the two fellowship groups, the corresponding SSP effect is small and insignificant, though estimated with approximately the same precision as the SFP and SFSP effects.[20]

[19]The models used to construct the estimates reported in Table 4 include the full set of controls (results with basic controls are similar).

[20]Equal precision of reduced form estimates does not imply equal precision of program-use effects. We discuss this further in the context of two-stage least squares analysis below.

The overall impact of both fellowship treatments on Fall grades is driven entirely by large and significant effects on women. This is apparent in columns 2 and 3 of Table 4. Women assigned to the SFP earned a Fall grade 2.6 points higher than the control group, while women assigned to the SFSP earned a Fall grade 4.2 points higher than controls. Thus, the estimates for women suggest the combination of services and fellowships offered in the SFSP had a larger impact than fellowships alone. The average fellowship effect (i.e., combining the SFP and SFP groups using a single any-SFP dummy) is 3.1 (s.e.=.97). In contrast with the results for women, the estimated effects of both fellowship treatments on men are much smaller, and none are significantly different from zero.

The first-year GPA results are weaker than the Fall grades results, as can be seen in Panel B of Table 4 (these results use the same sample as used for Panel A). In particular, by the end of first-year, the SFP effects on women had faded. The estimated SFP effect on first-year GPA is .086 (s.e.=.084), which is roughly the same as the SSP effect, also insignificant at .12 (s.e.=.082). On the other hand, the effect of the SFSP treatment remains large and significant, at about .27 (s.e.=.12) for women and .21 (s.e.=.092) overall. Again, the overall result is driven by the effect on women. In standard deviations units, the SFSP effect on GPAs for women is only a little smaller than the corresponding Fall grade effect (.3σ versus .35σ). Combining both the SFP and the SFSP estimates in a single any-SFP effect generates a significant result for women of about .15 (s.e.=.073). In standard deviations units, this is markedly smaller than the corresponding any-SFP effect on Fall grades because there is no SFP-only effect on GPA.

The first-year GPA effects in the full sample are similar to those in the sample with Fall grades. The full sample GPA results are reported in Panel A of Table 5, separately for year 1

and year 2.[21] Similar to the corresponding estimate in Table 4, the SFSP effect on women's first-year GPA is .244 (s.e.=.11). Again, the estimated effects on men are small and insignificant, as is the estimated effect of SFP-only (for men this estimate is negative).

A striking finding that emerges from Table 5 is the persistence of SFSP program effects on the GPAs of women into second year. This estimate, at .28 (s.e.=.11), differs only slightly from the first-year effects. Thus, the SFSP treatment appears to have generated a robust and lasting improvement in performance that extended beyond the one-year period in which fellowships were awarded. Consistent with the fact that fellowships alone did not lead to better outcomes, the improvement in second-year GPA suggests the SFSP intervention led to a permanent improvement in study habits or skills.

An alternative measure of student academic performance is academic probation. Students with an average GPA below 1.5 after attempting to complete 4 credits are placed on academic probation and are at risk of suspension.[22] Many students spend time on probation. For example, 22 percent of first-years in the control group in our study were on academic probation at the end of their first year.

The SFSP intervention appears to have reduced the proportion of students placed on probation at the end of their first year of school, a result that can be seen in Panel B of Table 5. The overall reduction is 6.9 (s.e.=3.5) percentage points in the combined sample of men and women. For women, the SFSP effect on first-year probation rates is -.10 (s.e.=.051), a substantial reduction. On the other hand, the probation rates for men in the SFSP group are only slightly (and insignificantly) lower than the probation rates in the control group. Like the GPA

[21]There are no significant differences across program groups in the fraction of students having a GPA in year 1 and the fraction of women having a GPA in year 2. The fraction of SFP and SFSP men with GPAs in year 2 is 6.7 (s.e.=3.5) and 6.3 (3.9) percentage points higher than men in the control group.

[22]A credit is awarded for each year-long course successfully completed. A half-credit is awarded for each one-semester course successfully completed.

effects in Panel A, treatment effects on probation rates are also persistent into second year. The second-year probation effect on SFSP women, reported in column 6 of Table 5, declines to -.097 (s.e.=.047), with an insignificant -.053 (se.=.038) effect overall.[23]

A potential problem with the probation outcome is the fact that a student must have attempted to complete at least four credits to be classified as being on probation. Many students take a lighter load and should not necessarily be seen as making good progress in their studies even though they are not on administrative probation. Panel C of Table 5 therefore shows results for an alternative measure of academic standing, a "Good Standing" variable that identifies students who have attempted at least four credits and are not on probation. About 47 percent of first year students were in good standing at the end of the year. Mirroring the probation results, women in the SFSP treatment group were substantially and significantly more likely than controls to be in good standing at the end of first and second years. The SSP treatment group is also more likely than the control group to be registered in good standing, with an effect the same size as for the SFSP group. In contrast with the SFSP results, however, the SSP effect on Good Standing is not corroborated by effects on GPA or probation.

The last outcome for which results are reported in Table 5 is total credits earned, with a zero recorded for students who had withdrawn by second year (effects on withdrawal are not significant). In addition to benefiting from an increase in grades, Panel D of Table 5 shows that women in the SFSP treatment group earned more credits than those in the control group. The estimated treatment effect is .27 (s.e.=.11) in first year and .28 (s.e.=.17) in second year.[24] The credits-earned and academic standing results are encouraging; they suggest that, for women at

[23]This second-year variable codes students who have withdrawn in second year as also being on probation.

[24]Students who have withdrawn in year 2 are coded as having zero credits earned in that year.

least, the SFSP treatment achieved a hoped-for result – an improvement in the rate at which students progress through their studies.

B. Graphical Analysis of the Impact on Grades

The results in Table 5 suggest the STAR intervention affected relatively low-achieving students who were not very likely to qualify for fellowships, but were at risk of probation or failure to maintain good academic standing. Are all of the students affected in this low-achieving group? To investigate this further, Figures 1a and 1b plot the GPA distribution for each of the STAR treatment groups, laid over the GPA distribution in the control group, separately for men and women. We normalized GPA according to high school GPA so GPA targets for different fellowship amounts were comparable for all students.[25]

Consistent with the estimates in Tables 4 and 5, Figure 1a offers little evidence of a systematic shift in any of the grade distributions for men. Among women, the clearest evidence of a shift appears for the SFSP group, which has a grade density to the right of the control group almost everywhere except for a segment to the right of the median where the treatment and control densities overlap. The clearest distribution shift is in the lower-middle portion of the grade distribution. Consistent with the results in Panels B and C of Table 5, the SFSP intervention appears to have reduced the number of students with GPAs low enough to put them on probation. Moreover, the GPA shift occurred in areas of the grade distribution below the STAR fellowship award thresholds, which are also indicated in the figure. This suggests the program might have been made more effective by making the fellowships easier to get. [26]

[25]We added .3 to the GPAs of the lowest high school GPA quartile and subtracted .3 from the GPAs of the second highest grade quartile.

[26]To further investigate the location of the STAR-induced distribution shift, we coded a dummy for theoretical fellowship eligibility in both the treatment and control groups and used this as the dependent variable in a regression

C. Stacked Estimates

Given the similarity of the GPA results across years, it seems natural to try to construct a more precise estimate of a common treatment effect. We did this by estimating a stacked two-year equation of the form,

$$y_{it} = X_i'\pi_t + \kappa ssp_i + \lambda sfp_i + \mu sfsp_i + \nu_i + \eta_{it}, \quad (1)$$

where $X_i$ is the vector of covariates and $\pi_t$ is a time-varying coefficient; and $\kappa$, $\lambda$, and $\mu$ are the treatment effects of interest.[27] The random effect, $\nu_i$, captures year-to-year correlation in student outcomes. To adjust for this, standard errors were clustered by student. The results of stacked estimation of equation (1) are reported in Table 6.

As with the single-year results, stacked estimation generates a significant treatment effect only for women in the SFSP treatment group. The stacked SFSP estimate for GPA is more precise than the corresponding single-year estimates, at .26 with a standard error of .094, reported in column 3 of Table 6. The increase in precision from stacking amounts to a roughly 10 percent reduction in standard errors. In a further effort to increase precision, we combined both fellowship groups as in columns 4-6 of Table 4, in this case estimating a single treatment effect for $sfp_i$+$sfsp_i$ in an equation like (1). The resulting estimate is .12 (s.e.=.06). Not surprisingly, this combined effect is about half the size of the corresponding SFSP effect.

Stacked estimation also generates a more precise estimate of the SFSP effect on the likelihood of academic probation, though again this result is significant only for women. The

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on treatment dummies and covariates Roughly 16 percent of all control students finished their first-year with a GPA that qualified for a $1000 payment. The eligibility rates for students in the SSP, SFP, and SFSP treatment groups were similar. There was a modest increase in the likelihood that women in both fellowship groups met the standard for a $1000 award; .071 in the SFSP group, but this difference is not significantly different from zero at conventional levels. There was a marginally significant .067 gain in $5000 eligibility rates for SFSP women. The SSP does not appear to have affected fellowship eligibility.

[27]Only basic covariates have time-varying effects in the reported specifications. These models also include a year effect.

stacked SFSP effect, reported in Panel B of Table 6 (column 3) is -.098 with a standard error of .036. The combined $sfp_i$+$sfsp_i$ treatment effect on probation, reported in column 6, is -.053 (se.=.025). The gain in precision in the stacked probation estimates is somewhat larger than the gain from stacking GPA.[28]

Finally, we looked at stacked estimates of the impact on credits earned. These results, reported in Panel C of Table 6, show a substantial and reasonably-precise SFSP effect of .27 (s.e.=.12) on women, though the combined any-SFP effect on credits earned by women is not significantly different from zero (at .11, with s.e.=.081). The SFSP effect for women amounts to .22σ, slightly less than the corresponding GPA effect in standard-deviation units.

D. Two-Stage Least Squares Estimates

Intention-to-treat effects are diluted by the fact that some treated students failed to sign up and were therefore ineligible to participate in STAR programs. We refer to students who signed up as *participants*. The average effect of treatment on participants provides a better indicator of the impact of treatment on the subpopulation that was directly affected by incentives and services. Moreover, in a future intervention of this sort, we might expect sign-up rates to be higher, or simply extend services and incentives to all members of the freshman class. As a practical matter, effects on participants are larger than intention-to-treat effects, with the proportional increase equal to the reciprocal of the treatment-group-specific sign-up rate.

Estimates of the effect of each STAR treatment on participants were constructed using a model that parallels the intention-to-treat specifications. The first version of this model allows separate effects on participants in each program. In particular, we estimated the following equation by 2SLS:

[28]Good standing results are omitted from Table 6 since these results are similar to the probation results.

$$y_{it} = X_i'\delta_t + \alpha ssp_i^* + \beta sfp_i^* + \gamma sfsp_i^* + \xi_i + \epsilon_{it}, \quad (2)$$

where $ssp_i^*$, $sfp_i^*$, and $sfsp_i^*$ indicate program participants (i.e., those who signed up). The participation variables were treated as endogenous and the three program-assignment dummies ($ssp_i$, $sfp_i$, and $sfsp_i$) were used as instruments.

In addition to estimates of equation (2), we constructed 2SLS estimates of a combined any-SFP effect by estimating the parameter $\delta$ in the equation

$$y_{it} = X_i'\delta_t + \alpha ssp_i^* + \delta(sfp_i^* + sfsp_i^*) + \xi_i + \epsilon_{it}, \quad (3)$$

using the same instruments as were used to estimate equation (2). This model is over-identified. The over-identification test-statistic in this context can be interpreted a test for whether the 2SLS estimates of $\beta$ and $\gamma$ are equal in the just-identified model (Angrist, 1991). The individual error component in equations (2) and (3), $\xi_i$, captures the year-to-year correlation in outcomes for a given student. The standard errors are clustered by student to account for this. Because the reduced form estimates for men are always zero, 2SLS estimates are reported for women only.

The impact of the SFSP on female participants GPAs, reported in column 1 of Table 7, is a little over one-third of a standard deviation, a substantial effect. The effects on probation and credits earned are a little smaller but also substantial. One of the most important results in Table 7 is the precision of the estimated effects on participants. The 2SLS standard errors give us an idea of the size of the effects on participants we might expect to be able to detect. The estimated standard error for the SSP effect on GPA, .125, is of a magnitude that would allow us to detect an effect size on the order of one-quarter of a standard deviation. In terms of detectable effect size, the precision of the probation estimates is similar. Thus, in spite of lower take-up for the SSP, the 2SLS estimates of SSP effects on participants are such that effects of a plausible magnitude would likely come out as significant. Of course, smaller effects, say .15$\sigma$, would not.

The over-identification test statistics in Table 7 reject the hypothesis of SFP and SFSP treatment-effect equality (or come close). The difference in 2SLS estimates of $\beta$ and $\gamma$ are therefore at least marginally significantly different. Substantively, this means that the differences in intention-to-treat estimates reported in earlier tables are not simply due to differences in compliance rates.

## V. Student Reports

In order to better understand students' perception of the program and their reaction to it, we conducted open-ended interviews with students in each of the treatment groups, sampling from those who signed up.[29] Interviewees were chosen randomly and offered $20 University Bookstore gift certificates for attending. We contacted 54 students by email and phone to obtain a total of 10 interviewees, 7 of whom were female. The students were interviewed focus-group style, separately for each treatment group, and could react to statements by others in the group. Interviews lasted about one hour and were guided by a list of questions.

We were especially interested in the students' reaction to the notion of cash awards, though we also wanted to get a sense of whether the services were seen as relevant or useful. The five SFP participants we interviewed described their initial reaction as strongly positive, though a few wondered at first if the program "was too good to be true."

The two SFSP participants we interviewed also indicated an initial scepticism about the $5000 scholarship, but signed up to participate within the first week of the offer. The SFSP students generally described the program as a motivator that affected study habits, time, and effort. One student reported that "I found my study habits improved. It might have been the

[29]One female student who did not sign up to participate in the SFP was interviewed. Asked why not, the student responded, "Honestly I can't remember why I didn't pursue it. I don't know why. As a first year, I was really nervous starting and overwhelmed. Now that I think of it, I probably should have joined".

money motivation." Another SFSP student said, "First semester was a rude awakening for me because the work is very different than high school…Project STAR definitely gave me the focus and motivation." In fact, four out of five SFP participants interviewed (all female) saw the program as beneficial, even though only one actually received a fellowship; the other (male student) commented: "It [the program] certainly did not detract from anything."

Most of the students seemed comfortable with the idea of cash awards. One SFSP participant commented, "A couple people I mentioned it to described it as a bribe to do well, as motivation, but hey, it worked for me." An SFP participant commented, "I wanted it. $5,000! I definitely wasn't going to miss that." (This student received the full fellowship.) Another felt that "It helped a lot. That promise of money really helped to motivate me. I felt like I was being paid to go to school. It helped me to jump in the motivation to structure my time, think about all my classes and do well in all of them rather than letting myself slip and focus more on ones that I enjoy and leaving the others in the dust." One SFSP student became discouraged, however, once she realized she could not meet her target. A male SFP student we spoke with said the money was not that important a motivator because "I already have enough for 1st and 2nd year tuition so finding the money isn't a big problem for me".[30]

Some interviewees suggested that the reminders (or lack of reminders) through emails and advisor contacts mattered quite a bit. One female SFSP participant thought, "it would have helped if there were more reminders because I forgot. I knew by the time the second reminder arrived, that I wasn't going to get it. A few more reminders wouldn't hurt too much. This was a source of motivation for me in the beginning. Who can't use an extra $5,000 or $1,000?" The female SFP student who received a fellowship and felt the program had a strong influence on her

[30]This student continued by saying that "I was focusing on how boring my courses were. They were so boring. I just thought that passing was good. I think I forgot about the fellowship."

performance also commented, “My [response to the SFP] might have been even better if I just had somebody to e-mail and turn to throughout the year and refresh and motivate me a little more”. Another SFSP student never met or responded to their advisor, but nevertheless felt the advisor’s regular emails were helpful, “Like somebody who cared”. No student said there were too many fellowship reminders or too many emails from advisors.

We talked to a total of 5 students who had access to services, two in the SFSP and three in the SSP. Those who expressed interest in the SSP focused almost exclusively on the advisor program. Many students were pleased with their advisor interactions, or simply glad to know that they could communicate with their advisor if needed. One male SSP students noted, “University is something different and I also wanted extra help. The peer advisor, I personally did not meet him, but he was really helpful because at every 15 days he used to e-mail me and ask me how it’s going and how I did on the test.” Another female student said, “I thought that it was nice to know that there was someone there that you could run to and ask for help. At the beginning I just started to talk to my advisor and she did give me some advice but I found that at the time it’s hard to just all of a sudden change all of your schedules just because she said you should have good time management and you should do this and that. So I guess that you slowly start to see what your peer advisor is talking about then you try to change for the best.”

Several students noted scheduling conflicts that prevented them from attending FSGs. There also seems to have been some peer interaction that affected FSG attendance, with student decisions to attend influenced by whether their friends were in the program and could also attend. Our assignment mechanism did not exploit this as there was no deliberate clustering in the research design.

Eleven other students who were offered the SFP and SFSP were selected at random for one-on-one interviews and offered $10 gift certificates for 30 minute meetings. Six meetings occurred, five of them with women.[31] Reactions to the fellowships were similar to those interviewed in the focus groups, but some students that finished with particularly low grades expressed less or decreasing interest over time. One SFSP student who finished with a 1.2 GPA commented, "At first I was excited about it [the program], but when I was in school I kind of forgot…The [fellowship] I think was good, but I didn't really focus on it. I was more worried about my grades." Another student commented, "I thought about it [the SFP] a lot in first semester. But then when I realized my grades weren't going anywhere, I just forgot about it. But in first semester, yeah, I thought about it all the time."[32]

These discussions suggest the fellowship program penetrated students' consciousness, but in some cases interest declined over the course of the school year. Reminders and communication from advisors helped maintain interest and motivation. Surprisingly, the students we spoke with did not seem to view the fellowship targets as unrealistic. Some that did not receive a fellowship still felt that they benefited from the fellowship program, and no one felt the program influenced them in a negative way. The power of the fellowship might have been boosted by more frequent contacts and by setting lower grade targets, though this would have increased costs. On the service side, virtually all participants welcomed interaction with upper-year student advisors, even when only through email. An important though logistically unavoidable issue with the FSG component was a number of scheduling conflicts, although other students said they felt they simply could not afford the time.

[31]The probability of showing up for these interviews appears unrelated to student GPAs.

[32]Asked why this student found university so different from high school, she responded, "I could do things last minute (in high school)– I always did - everything the night before and I got straight A's. So to come here and then to basically fail every subject was like, 'oh my gosh, like what am I doing?' It's crazy – it's extremely stressful – it's unbelievable."

## VI. Summary and Conclusions

The goal of the Student Achievement and Retention (STAR) Project was to learn more about the potential for support services and financial incentives to improve academic performance in college. Incoming freshman in randomly selected treatment groups were offered peer-advising and supplemental instruction services, merit awards, or both services and awards. The incentives came in the form of $1,000 cash payments for students who cleared GPA thresholds ranging from C+ to B, depending on high school GPA. Larger payments of $2,500 and $5,000 were offered to those clearing higher GPA targets ranging from B- to A-. To the best of our knowledge, STAR is the first large-scale randomized evaluation of incentives of this kind for traditional college students.

Student interest in support services was lower than expected. On the other hand, interest in services as reflected in sign-up rates and service usage was markedly higher in the group that was also offered cash incentives. Interest in services and use of services was also much higher for young women than young men. Peer advising was considerably more popular than supplemental instruction for both sexes. The peer-advising intervention clearly bears further exploration, as does the use of achievement incentives to boost interest in services.

A number of patterns emerge from the STAR results. First, students offered peer advising and supplemental instruction services without fellowships did no better than those in the control group. This may be because sign-up rates were relatively low in the treatment groups offered services since low consent rates dilute intention-to-treat effects. On the other hand, a 2SLS analysis that adjusts intention-to-treat effects for non-participation reveals a level of precision sufficient to detect theoretical service effects equal to about .25σ in the combined

sample of men and women. The results therefore suggest that the benefits of services alone are probably relatively modest.

The largest program effects were for women offered both fellowships and additional college services through the SFSP. Fall term grades for women in the combined group were .35σ higher than grades in the control group. The GPA effects remained strong by the end of the first year and continued through the end of second year, even though fellowships and services were offered only in the first. This result suggests study skills or study habits acquired during the first year helped boost subsequent performance.

Our findings naturally raise the questions of why the effects were largest in the combined group. Two reasons for the larger impact from in the combined program seem likely. The substantial Fall grades impact in both the SFP and SFSP groups suggest that fellowships alone were a strong motivating force, and our focus-group interviews seem to confirm this. The SFSP group had the advantage, however, of continued guidance and support. These students received more frequent contacts in the form of biweekly emails from peer advisors. The greater interaction with upper-year peers may have made it easier to adapt and integrate into the new university environment. The service-only (SSP) group had similar access but the take-up rates in the SSP were low. For the relatively popular advising service, take-up rates by SFSP women were nearly double the take up rates by SSP women. Thus the SFSP appears to have successfully combined increased motivation with a well-marked channel for a sustained improvement in outcomes.

A second question is why women responded so much more than men. Although we have no simple explanation for this difference, it is worth noting that women often appear more committed to post-secondary study than men. For example, a recent study of Canadian students

(Frenette and Zeman, 2007) finds much higher post-secondary attendance rates among women. Some of this difference appears to be due to better study habits among women, suggesting women may be more motivated to do well in school and therefore to take advantage of programs like STAR.

Finally, it's worth noting that similar sex differentials in program impact have been observed elsewhere. Dynarski (2005) estimates larger effects of tuition aid on college completion for women (in US states), while Garibaldi, et al. (2006) find that tuition affects the completion rates of women more than men (in Italy). In a study of the effects of merit awards on Israeli high school students, Angrist and Lavy (2002) find effects on girls only. A more modest but still marked gender differential crops up in the response to randomly assigned vouchers for private secondary schools in Colombia (Angrist, et al., 2002). Farther afield, Anderson's (2006) evaluation of three pre-school programs suggests these program benefit girls but not boys, and the MTO evaluation (e.g., Clampet-Lundquist et al. 2006) points to benefits of subsidized housing in non-poverty areas for women, but negative effects on men. These gender differences in the response to incentives and services constitute an important area for further study.

Table 1. Descriptive Statistics

| | Control Mean | Contrasts by treatment status: SSP v. Control | SFP v. Control | SFSP v. Control | F-stat (all=control) | Obs |
|---|---|---|---|---|---|---|
| *Administrative variables* | | | | | | |
| Courses enrolled as of Fall 2005 | 4.745 {1.370} | -0.053 [0.095] | 0.015 [0.095] | -0.158 [0.118] | 0.702 (0.551) | 1656 |
| No show | 0.054 | 0.002 [0.016] | -0.030 [0.016] | 0.020 [0.019] | 1.852 (0.136) | 1656 |
| Completed survey | 0.898 | -0.018 [0.022] | -0.010 [0.022] | -0.051 [0.028] | 1.228 (0.298) | 1656 |
| *Student background variables* | | | | | | |
| Female | 0.574 | -0.006 [0.036] | 0.029 [0.035] | -0.005 [0.045] | 0.272 (0.845) | 1571 |
| High school GPA | 78.657 {4.220} | 0.170 [0.308] | 0.238 [0.304] | -0.018 [0.384] | 0.276 (0.843) | 1571 |
| Age | 18.291 {0.616} | -0.054 [0.045] | -0.033 [0.044] | 0.026 [0.056] | 0.752 (0.521) | 1571 |
| Mother tongue is English | 0.700 | 0.017 [0.033] | 0.009 [0.033] | 0.049 [0.041] | 0.495 (0.686) | 1571 |
| *Survey response variables* | | | | | | |
| Lives at home | 0.811 | -0.040 [0.030] | 0.009 [0.030] | -0.004 [0.038] | 0.685 (0.561) | 1431 |
| At first choice school | 0.243 | 0.024 [0.034] | 0.060 [0.033] | 0.047 [0.042] | 1.362 (0.253) | 1430 |
| Plans to work while in school | 0.777 | 0.031 [0.032] | -0.066 [0.031] | 0.037 [0.040] | 2.541 (0.055) | 1431 |
| Mother a high school graduate | 0.868 | 0.015 [0.026] | -0.021 [0.026] | -0.045 [0.033] | 1.040 (0.374) | 1431 |
| Mother a college gradate | 0.358 | 0.053 [0.037] | -0.020 [0.036] | -0.052 [0.046] | 1.487 (0.216) | 1431 |
| Father a high school graduate | 0.839 | 0.025 [0.028] | 0.008 [0.027] | -0.017 [0.035] | 0.416 (0.741) | 1431 |
| Father a college graduate | 0.451 | 0.021 [0.038] | -0.001 [0.037] | -0.024 [0.048] | 0.216 (0.885) | 1431 |
| Rarely puts of studying for tests | 0.208 | 0.031 [0.032] | 0.031 [0.031] | 0.107 [0.040] | 2.534 (0.055) | 1431 |
| Never puts off studying for tests | 0.056 | -0.019 [0.016] | -0.016 [0.016] | -0.032 [0.021] | 1.206 (0.306) | 1431 |
| Wants more than a BA | 0.556 | [0.052] [0.038] | -[0.029] [0.037] | [0.073] [0.048] | (1.752) (0.155) | 1431 |
| Intends to finish in 4 years | 0.821 | -[0.008] [0.030] | -[0.006] [0.029] | -[0.063] [0.037] | (0.942) (0.419) | 1431 |

Notes: Standard deviations are shown in braces in column 1. Standard errors are reported in brackets in columns 2-4. P-values for the F-tests in the last column are reported in parentheses.

Table 2. Selection Effects

| | Number of credits attempted | | Number of math and science credits attempted | | Has fall grades | |
|---|---|---|---|---|---|---|
| | Basic | All controls | Basic | All controls | Basic | All controls |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | | | A. All | | | |
| *Control group mean* | 4.049 (0.893) | | 1.095 (1.206) | | 0.893 (0.309) | |
| Offered SSP | 0.076 [0.056] | 0.049 [0.060] | 0.073 [0.085] | 0.081 [0.091] | 0.004 [0.022] | 0.000 [0.023] |
| Offered SFP | 0.020 [0.056] | 0.037 [0.054] | 0.096 [0.080] | 0.115 [0.086] | 0.007 [0.022] | -0.004 [0.023] |
| Offered SSP and SFP | -0.070 [0.074] | -0.086 [0.081] | -0.148 [0.094] | -0.139 [0.104] | -0.039 [0.032] | -0.041 [0.034] |
| Observations | 1571 | 1431 | 1571 | 1431 | 1571 | 1431 |
| | | | B. Men | | | |
| Control group mean | 3.964 (0.944) | | 1.159 (1.240) | | 0.914 (0.281) | 0.000 (0.000) |
| Offered SSP | 0.080 [0.088] | 0.032 [0.101] | 0.012 [0.126] | 0.020 [0.139] | 0.016 [0.029] | 0.016 [0.031] |
| Offered SFP | -0.123 [0.098] | -0.063 [0.089] | 0.276 [0.138]** | 0.344 [0.149]** | -0.035 [0.036] | -0.051 [0.039] |
| Offered SSP and SFP | -0.133 [0.117] | -0.115 [0.137] | -0.117 [0.160] | -0.048 [0.184] | -0.068 [0.048] | -0.089 [0.057] |
| Observations | 665 | 594 | 665 | 594 | 665 | 594 |
| | | | C. Women | | | |
| *Control group mean* | 4.112 (0.848) | | 1.047 (1.179) | | 0.877 (0.328) | 0.000 (0.000) |
| Offered SSP | 0.072 [0.072] | 0.058 [0.077] | 0.118 [0.116] | 0.132 [0.123] | -0.003 [0.031] | -0.013 [0.032] |
| Offered SFP | 0.111 [0.066]* | 0.093 [0.071] | -0.015 [0.096] | -0.004 [0.104] | 0.034 [0.027] | 0.021 [0.029] |
| Offered SSP and SFP | -0.046 [0.097] | -0.108 [0.103] | -0.179 [0.116] | -0.153 [0.127] | -0.015 [0.042] | -0.011 [0.044] |
| Observations | 906 | 837 | 906 | 837 | 906 | 837 |

Notes: The table reports regression estimates of treatment effects on the dependent variables indicated. Robust standard errors are reported in brackets. The sample is limited to students registered for at least two courses as of November 1 with data on the relevant set of controls. "Basic controls" include sex, mother tongue, high school grade quartile and number of credits enrolled. "All controls" includes basic controls plus responses to survey questions on procrastination and parents' education.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3. Program Sign-up and Use of Services

| | Signed up for STAR | | Received SSP services | | Met with/emailed an advisor | | Attended FSGs | |
|---|---|---|---|---|---|---|---|---|
| | Basic controls (1) | All controls (2) | Basic controls (3) | All controls (4) | Basic controls (5) | All controls (6) | Basic controls (7) | All controls (8) |
| | | | | A. All | | | | |
| Offered SSP | 0.519 | 0.549 | 0.238 | 0.255 | 0.204 | 0.217 | 0.106 | 0.118 |
| | [0.032]*** | [0.034]*** | [0.028]*** | [0.029]*** | [0.026]*** | [0.028]*** | [0.020]*** | [0.021]*** |
| Offered SFP | 0.863 | 0.867 | | | | | | |
| | [0.022]*** | [0.022]*** | | | | | | |
| Offered SSP | 0.762 | 0.792 | 0.412 | 0.431 | 0.383 | 0.397 | 0.131 | 0.139 |
| and SFP | [0.036]*** | [0.036]*** | [0.041]*** | [0.044]*** | [0.041]*** | [0.043]*** | [0.029]*** | [0.031]*** |
| Observations | 1571 | 1431 | 1571 | 1431 | 1571 | 1431 | 1571 | 1431 |
| | | | | B. Men | | | | |
| Offered SSP | 0.447 | 0.464 | 0.194 | 0.206 | 0.145 | 0.149 | 0.096 | 0.107 |
| | [0.049]*** | [0.052]*** | [0.039]*** | [0.042]*** | [0.035]*** | [0.038]*** | [0.029]*** | [0.032]*** |
| Offered SFP | 0.792 | 0.806 | | | | | | |
| | [0.040]*** | [0.040]*** | | | | | | |
| Offered SSP | 0.705 | 0.708 | 0.298 | 0.291 | 0.282 | 0.270 | 0.115 | 0.112 |
| and SFP | [0.058]*** | [0.065]*** | [0.058]*** | [0.063]*** | [0.057]*** | [0.061]*** | [0.042]*** | [0.046]** |
| Observations | 665 | 594 | 665 | 594 | 665 | 594 | 665 | 594 |
| | | | | C. Women | | | | |
| Offered SSP | 0.571 | 0.605 | 0.273 | 0.287 | 0.251 | 0.264 | 0.113 | 0.124 |
| | [0.043]*** | [0.044]*** | [0.038]*** | [0.040]*** | [0.037]*** | [0.040]*** | [0.027]*** | [0.029]*** |
| Offered SFP | 0.912 | 0.908 | | | | | | |
| | [0.024]*** | [0.026]*** | | | | | | |
| Offered SSP | 0.800 | 0.835 | 0.506 | 0.532 | 0.466 | 0.489 | 0.146 | 0.155 |
| and SFP | [0.046]*** | [0.043]*** | [0.056]*** | [0.058]*** | [0.056]*** | [0.058]*** | [0.040]*** | [0.042]*** |
| Observations | 906 | 837 | 906 | 837 | 906 | 837 | 906 | 837 |

Notes: The table reports regression estimates of treatment effects on the dependent variables indicated. Robust standard errors are reported in brackets. The sample is limited to students registered for at least two courses as of November 1 with data on the relevant set of controls. "Basic controls" include sex, mother tongue, high school grade quartile and number of credits enrolled. "All controls" includes basic controls plus responses to survey questions on procrastination and parents education.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4. Treatment Effects on First-Year Outcomes in the Sample with Fall Grades

| | SFP by type | | | Any SFP | | |
|---|---|---|---|---|---|---|
| | All | Men | Women | All | Men | Women |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | | | A. Fall grade | | | |
| *Control mean* | 64.225 | 65.935 | 62.958 | 64.225 | 65.935 | 62.958 |
| | (11.902) | (11.340) | (12.160) | (11.902) | (11.340) | (12.160) |
| SSP | 0.349 | -0.027 | 0.737 | 0.344 | -0.014 | 0.738 |
| | [0.917] | [1.334] | [1.275] | [0.917] | [1.332] | [1.274] |
| SFP | 1.824 | 0.331 | 2.602 | | | |
| | [0.847]** | [1.233] | [1.176]** | | | |
| SFSP | 2.702 | -0.573 | 4.205 | | | |
| | [1.124]** | [2.010] | [1.325]*** | | | |
| SFP (any) | | | | 2.125 | 0.016 | 3.141 |
| | | | | [0.731]*** | [1.164] | [0.972]*** |
| Observations | 1255 | 526 | 729 | 1255 | 526 | 729 |
| | | | B. First year GPA | | | |
| *Control mean* | 1.805 | 1.908 | 1.728 | 1.805 | 1.908 | 1.728 |
| | (0.902) | (0.908) | (0.891) | (0.902) | (0.908) | (0.891) |
| SSP | 0.073 | 0.011 | 0.116 | 0.071 | 0.008 | 0.116 |
| | [0.066] | [0.107] | [0.082] | [0.066] | [0.107] | [0.082] |
| SFP | 0.010 | -0.110 | 0.086 | | | |
| | [0.064] | [0.103] | [0.084] | | | |
| SFSP | 0.210 | 0.084 | 0.267 | | | |
| | [0.092]** | [0.162] | [0.117]** | | | |
| SFP (any) | | | | 0.079 | -0.042 | 0.147 |
| | | | | [0.056] | [0.095] | [0.073]** |
| Observations | 1255 | 526 | 729 | 1255 | 526 | 729 |

Notes: The table reports regression estimates of treatment effects on the dependent variables indicated using the full set of controls. Robust standard errors are reported in brackets. The sample is limited to students registered for at least two courses as of November 1 with data on the relevant set of controls and at least one Fall grade. The last three columns report estimates from a model that combines the SFP and SFSP treatment groups.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Treatment Effects on First and Second-Year Outcomes

| | Year 1 | | | Year 2 | | |
|---|---|---|---|---|---|---|
| | All | Men | Women | All | Men | Women |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | | | A. GPA | | | |
| *Control mean* | 1.794 | 1.871 | 1.739 | 2.040 | 2.084 | 2.008 |
| | (0.915) | (0.904) | (0.920) | (0.884) | (0.901) | (0.871) |
| SSP | 0.011 | 0.017 | 0.002 | 0.050 | -0.021 | 0.090 |
| | [0.063] | [0.102] | [0.080] | [0.074] | [0.121] | [0.092] |
| SFP | -0.040 | -0.144 | 0.038 | -0.018 | -0.081 | 0.030 |
| | [0.061] | [0.098] | [0.080] | [0.066] | [0.108] | [0.085] |
| SFSP | 0.168 | 0.016 | 0.244 | 0.072 | -0.170 | 0.276 |
| | [0.086]* | [0.146] | [0.111]** | [0.091] | [0.161] | [0.106]*** |
| Observations | 1399 | 577 | 822 | 1241 | 521 | 720 |
| | | | B. On Probation/Withdrew | | | |
| *Control mean* | 0.221 | 0.159 | 0.266 | 0.247 | 0.253 | 0.243 |
| | (0.415) | (0.366) | (0.443) | (0.431) | (0.435) | (0.429) |
| SSP | -0.015 | 0.016 | -0.039 | 0.017 | 0.002 | 0.044 |
| | [0.031] | [0.045] | [0.043] | [0.033] | [0.051] | [0.045] |
| SFP | -0.021 | 0.012 | -0.055 | 0.008 | 0.011 | -0.005 |
| | [0.031] | [0.049] | [0.041] | [0.032] | [0.053] | [0.041] |
| SFSP | -0.069 | -0.022 | -0.100 | -0.053 | 0.014 | -0.097 |
| | [0.036]* | [0.055] | [0.051]** | [0.038] | [0.066] | [0.047]** |
| Observations | 1418 | 590 | 828 | 1418 | 590 | 828 |
| | | | C. Good Standing | | | |
| *Control mean* | 0.466 | 0.486 | 0.451 | 0.633 | 0.643 | 0.626 |
| | (0.499) | (0.500) | (0.498) | (0.482) | (0.480) | (0.484) |
| SSP | 0.042 | -0.058 | 0.104 | -0.023 | -0.019 | -0.032 |
| | [0.035] | [0.055] | [0.046]** | [0.036] | [0.056] | [0.048] |
| SFP | 0.021 | -0.041 | 0.071 | 0.012 | 0.000 | 0.035 |
| | [0.035] | [0.056] | [0.047] | [0.035] | [0.059] | [0.044] |
| SFSP | 0.062 | -0.023 | 0.108 | 0.085 | 0.020 | 0.131 |
| | [0.048] | [0.077] | [0.065]* | [0.043]** | [0.071] | [0.055]** |
| Observations | 1418 | 590 | 828 | 1418 | 590 | 828 |
| | | | D. Credits Earned | | | |
| *Control mean* | 2.363 | 2.453 | 2.298 | 2.492 | 2.468 | 2.509 |
| | (0.986) | (1.069) | (0.917) | (1.502) | (1.525) | (1.486) |
| SSP | 0.054 | -0.066 | 0.130 | -0.098 | -0.176 | -0.070 |
| | [0.073] | [0.109] | [0.101] | [0.115] | [0.175] | [0.153] |
| SFP | -0.012 | -0.157 | 0.084 | 0.027 | 0.155 | -0.024 |
| | [0.064] | [0.106] | [0.082] | [0.108] | [0.180] | [0.137] |
| SFSP | 0.092 | -0.196 | 0.269 | 0.072 | -0.240 | 0.280 |
| | [0.087] | [0.150] | [0.108]** | [0.130] | [0.206] | [0.172] |
| Observations | 1418 | 590 | 828 | 1418 | 590 | 828 |

Notes: The table reports regression estimates of treatment effects on the dependent variables indicated using the full set of controls. Robust standard errors are reported in brackets. The sample is limited to students registered for at least two courses as of November 1 with data on the relevant set of controls. The last three columns report estimates from a model that combines the SFP and SFSP treatment groups. The GPA outcome sample includes students with a GPA in both years. The probation variable indicates academic probation in first year and probation or withdrawal in second year. The credits earned and good standing variables are zero in second year for those who withdrew.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Treatment Effects on Stacked First and Second-Year Outcomes

| | SFP by type | | | Any SFP | | |
|---|---|---|---|---|---|---|
| | All | Men | Women | All | Men | Women |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | | | A. GPA | | | |
| *Control mean* | 1.910 | 1.972 | 1.865 | 1.910 | 1.972 | 1.865 |
| | (0.909) | (0.908) | (0.907) | (0.909) | (0.908) | (0.907) |
| SSP | 0.027 | -0.005 | 0.043 | 0.026 | -0.006 | 0.042 |
| | [0.060] | [0.096] | [0.075] | [0.060] | [0.096] | [0.075] |
| SFP | -0.029 | -0.108 | 0.037 | | | |
| | [0.056] | [0.088] | [0.073] | | | |
| SFSP | 0.123 | -0.078 | 0.264 | | | |
| | [0.078] | [0.137] | [0.094]*** | | | |
| SFP (any) | | | | 0.025 | -0.097 | 0.116 |
| | | | | [0.049] | [0.080] | [0.062]* |
| Observations | 2640 | 1098 | 1542 | 2640 | 1098 | 1542 |
| | | | B. On Probation/Withdrew | | | |
| *Control mean* | 0.234 | 0.206 | 0.254 | 0.234 | 0.206 | 0.254 |
| | (0.424) | (0.405) | (0.436) | (0.424) | (0.405) | (0.436) |
| SSP | 0.001 | 0.009 | 0.002 | 0.002 | 0.010 | 0.002 |
| | [0.024] | [0.035] | [0.033] | [0.024] | [0.035] | [0.032] |
| SFP | -0.007 | 0.011 | -0.030 | | | |
| | [0.023] | [0.035] | [0.03] | | | |
| SFSP | -0.061 | -0.004 | -0.098 | | | |
| | [0.027]** | [0.041] | [0.036]*** | | | |
| SFP (any) | | | | -0.025 | 0.006 | -0.053 |
| | | | | [0.019] | [0.029] | [0.025]** |
| Observations | 2836 | 1180 | 1656 | 2836 | 1180 | 1656 |
| | | | C. Credits Earned | | | |
| *Control mean* | 2.427 | 2.461 | 2.404 | 2.427 | 2.461 | 2.404 |
| | (1.272) | (1.316) | (1.239) | (1.272) | (1.316) | (1.239) |
| SSP | -0.022 | -0.121 | 0.030 | -0.022 | -0.118 | 0.030 |
| | [0.080] | [0.121] | [0.105] | [0.080] | [0.121] | [0.105] |
| SFP | 0.007 | -0.001 | 0.030 | | | |
| | [0.074] | [0.122] | [0.095] | | | |
| SFSP | 0.082 | -0.218 | 0.274 | | | |
| | [0.096] | [0.158] | [0.122]** | | | |
| SFP (any) | | | | 0.033 | -0.078 | 0.113 |
| | | | | [0.063] | [0.105] | [0.081] |
| Observations | 2836 | 1180 | 1656 | 2836 | 1180 | 1656 |

Notes: The table reports regression estimates of treatment effects on the dependent variables indicated using a sample with stacked data from first- and second-year, using the full set of controls, with time-varying covariate effects. Standard errors adjusted for student clustering are reported in brackets. The sample is limited to students registered for at least two courses as of November 1 with data on all controls. The last three columns report estimates from a model that combines the SFP and SFSP treatment groups. The GPA outcome sample includes students with a GPA in both years. The probation variable indicates academic probation in first year and probation or withdrawal in second year. The credits earned variable is zero in second year for those who withdrew.

* significant at 10%; ** significant at 5%; *** significant at 1%

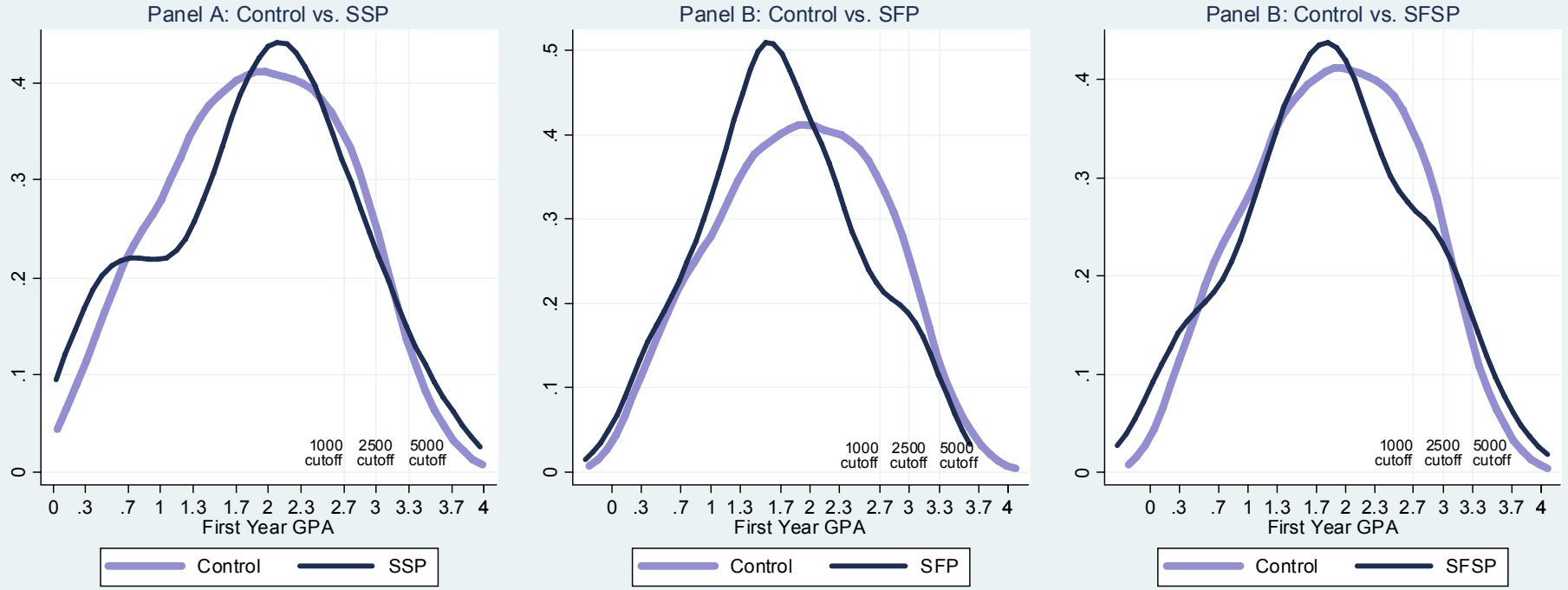
Table 7. 2SLS Estimates for Women (1st and 2nd year)

| | GPA | | On Probation/Withdrew | | Credits Earned | |
|---|---|---|---|---|---|---|
| | SFP by type (1) | Any SFP (2) | SFP by type (3) | Any SFP (4) | SFP by type (5) | Any SFP (6) |
| Control Mean | 1.865 (0.907) | | 0.254 (0.436) | | 2.404 (1.239) | |
| SSP sign-up | 0.071 [0.125] | 0.068 [0.124] | 0.004 [0.053] | 0.005 [0.053] | 0.049 [0.173] | 0.046 [0.171] |
| SFP sign-up | 0.041 [0.081] | | -0.033 [0.033] | | 0.034 [0.104] | |
| SFSP sign-up | 0.315 [0.112]*** | | -0.117 [0.043]*** | | 0.327 [0.148]** | |
| SFP (any) sign-up | | 0.125 [0.070]* | | -0.058 [0.029]** | | 0.121 [0.091] |
| Overid test $\chi^2(1)$ | | 4.487 (0.034) | | 2.900 (0.089) | | 3.211 (0.073) |
| Observations | 1540 | 1540 | 1654 | 1654 | 1654 | 1654 |

Notes: The table reports 2SLS estimates of the effect of signing up for the treatment indicated. Dummies for treatment assigned are used as instruments. The sample stacks first and second year data on women and uses the full set of controls. Standard errors adjusted for student clustering are reported in brackets. The models in columns 2, 4, and 6 pool the SFP and SFSP sign-up dummies. The chi-square statistic is the over-identification test statistic for these specifications, with p-values reported in parentheses.

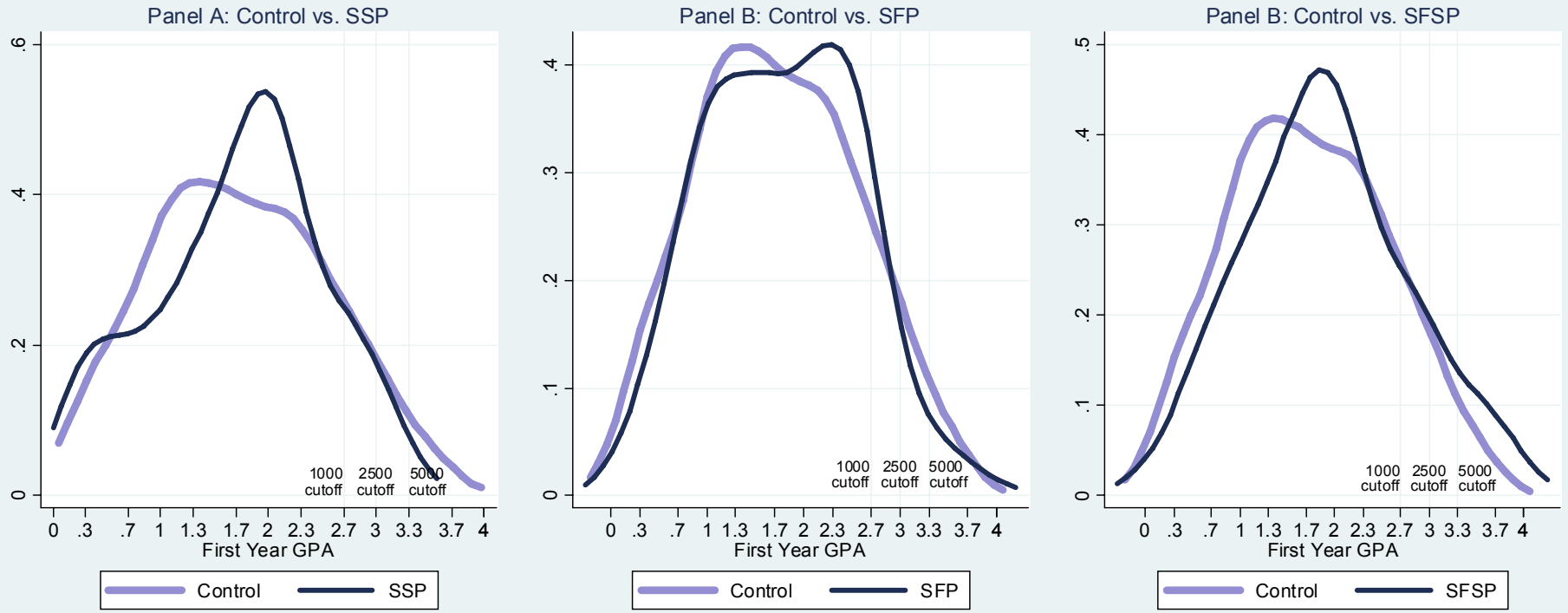
* significant at 10%; ** significant at 5%; *** significant at 1%

## Figure 1a. Males' Normalized First-year GPA




Notes: These figures plot the smoothed kernel densities of first year GPA.
The K-S p-value is a test for equality of distributions.

## Figure 1b. Females' Normalized First-year GPA




Notes: These figures plot the smoothed kernel densities of first year GPA.

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## Appendix: Student Fellowship Program Award Schedule

| Previous High School Grade Avg. Quartile | Award Thresholds | | |
|---|---|---|---|
| | 1000 | 2500 | 5000 |
| 0 – 25th percentile | 2.3 (C+) | 2.7 (B-) | 3.0 (B) |
| 25 – 50th percentile | 2.7 (B-) | 3.0 (B) | 3.3 (B+) |
| 50th – 75th percentile | 3.0 (B) | 3.3 (B+) | 3.7 (A-) |

Notes: Eligibility was determined by the student's best 4 courses. Half of SFP/SFSP participants were offered the 2500 award.