The Financial Aid Tax and Student Work Incentives*

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Abstract

This paper investigates whether students account for the financial aid tax when making their decisions to work, and how much four-year university students know about how their financial aid is determined. This paper is divided into two parts. In the first part, I use the NPSAS:2000 data to determine if students respond to the financial aid tax structure by bunching below the point where the tax comes into effect. I find that they do not. In the second part, I survey Stanford undergraduate students on how the financial aid tax has influenced their decisions to work and save. Difference in differences analysis suggests that removing the tax would increase the probability that a student would earn in the tax paying range by 22 percent with a standard error of 12.6 percent. Finally, I suggest reforms that universities could make to improve the financial aid system. These reforms include educating students on how their financial aid is determined, replacing the single 50 percent marginal tax rate on student earnings with a progressive structure similar to that on parent earnings, and allowing low-income students a larger tax exemption.

Keywords: Financial Aid, Higher Education, Tax Salience

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1. Introduction

Most of the financial aid literature focuses on how the financial aid methodology affects parent’s decisions to save (Long 2004, Edlin and Dick 1995, Feldstein 1995). The literature on student employment mainly deals with employment’s effects on academic and labor market outcomes (Ehrenberg and Sherman 1985, Stinebricker and Stinebricker 2003, and Light 1999). Surprisingly, there is no paper that discusses the distortions on student earnings and saving caused by the financial aid tax. Perhaps researchers have dismissed student’s earnings as a minor part of paying for college. However, as the cost of higher education has increased, students are contributing more to their own education than ever before.

Scott-Clayton (2007) finds that in the past thirty years, the inflation-adjusted cost of attendance per year has more than doubled at four-year public universities, four-year private universities, and two-year community colleges. There has also been a large documented rise in college students working while enrolled in school. Using the Current Population Survey, Scott-Clayton finds that from 1970, the average labor supplied by full-time undergraduate students enrolled at four-year universities has nearly doubled, from 5.0 hours per week to 9.6 hours per week today. Taking working students only, they work an average of 21 hours per week today. My own analysis corroborates her findings. According to the National Postsecondary Student Aid Survey:2000 (NPSAS:2000), 79 percent of four-year undergraduate students who applied for financial aid also worked, and conditional on working, the average working student was employed for 20 hours per week.
The financial aid methodology taxes student earnings in the sense that student earnings lower the amount of financial aid for which a student qualifies. This does not necessarily mean a decrease in financial aid because a given university may not be able to offer every student the full amount of aid for which a student qualifies. However, a handful of highly selective universities practice “need blind admissions” where the university guarantees full funding for all of its admitted domestic students. In this case, an increase in the student’s calculated ability to pay results in a one to one reduction in financial aid.

The financial aid tax on student earnings only has one marginal rate. Earnings are untaxed up to an exemption, and are assessed at 50 percent above the exemption. Other taxes such as the federal income tax, state income tax, Social Security, Medicare, and disability insurance could easily push the combined marginal tax rate into the 70-80 percent range if grant aid is being taken away. However, the reduction in aid could also be in the form of taking away subsidized loans or work-study. For students, subsidized loans and work-study have less value than grants because loans have to be repaid and students need to work to collect work-study. As a rule of thumb, the NPSAS:2000 assigns subsidized loans half of the present value of grants. Therefore, if loans were being taken away, then the effective marginal tax rate is 35-40 percent.

One would expect such a jump in the marginal tax rate, from zero percent to 50 percent, to have a noticeable effect on student work behavior. However, for many students filling out the FAFSA is their first experience with personal finance. For example, 44 percent of first year students that applied for financial aid did not file a tax return for that year. For those students who did file, they could not have filed many times
before; most first year students are 18 or 19 years old. Furthermore, colleges and universities are not forthcoming with information regarding the tax on student earnings. Understandably, they do this to prevent students from “gaming the system.”

This paper looks at whether four-year college students respond to the financial aid tax on student earnings. In the first part, I use the NPSAS:2000 to see if students bunch below the discontinuity where the tax comes into effect. I find that they do not. If anything, there are more students just above the discontinuity than just below it. In the next part, I survey 236 randomly selected Stanford University students to determine if the financial aid tax affects their earnings. I exploit the fact that college seniors receiving financial aid are exempt from the tax because they are graduating. With students who do not receive financial aid serving as the control group, the difference in differences estimate suggests that lifting the tax increases the probably that a student has earnings in the tax paying range by 22 percent with a standard deviation of 12.6 percent.

2. Background

A troubling finding by Bound, Lovenheim and Turner (2007) is that between the 1972 and 1992 cohorts, the average time to complete the baccalaureate degree increased by a quarter of a year. In addition, they find the completion rate among college attendees dropped from 51.1 percent to 45.3 percent and, conditional on receiving a degree, the percent graduating within 4 years dropped from 56.8 percent to 43.6 percent. While Bound et al. attribute most of this change to increased enrollment in less selective public four-year and community colleges and decreased per pupil spending at these institutions, they also find an increase in student employment. However, they point out the difficulty in assigning causality in terms of whether students working causes poor
educational outcomes, or low quality institutions lower the opportunity cost for students to work.

Stinebrickner and Stinebrickner (2003) is the most definitive paper in the literature that estimates the effect of work on college educational outcomes. All students at Berea College are randomly assigned jobs where they are required to work a minimum of 10 hours. Students assigned certain jobs have the option to work more than 10 hours. Stinebrickner and Stinebrickner find an extra hour of work per week decreases GPA by 0.162 points on a four point scale.

While this large point estimate is shocking, it is certainly too large to be extrapolated to the general population. Stinebrickner and Stinebrickner caution that Berea College is one small liberal arts college in Kentucky with a distinct student population. As mentioned above, Scott Clayton finds that conditional on working, the average student works 21 hours per week, or 11 hours above the Berea College minimum. Extrapolated linearly, the average working student would be 1.8 grade points below what he could achieve if he did not work. Nevertheless, Stinebrickner and Stinebrickner (2003) offers compelling evidence that suggests excess work causes negative educational outcomes.

Stinebrickner and Stinebrickner’s findings suggest limiting student work hours may increase academic performance. A tax on student earnings could accomplish this if students take the tax into account when making the decision of how much to work. However, Avery and Hoxby (2005) find that students do not respond optimally to financial aid incentives. They find that students do not respond rationally to financial aid packages offered by different colleges. Approximately 30 percent of students make mistakes such as over valuing loans relative to grants, or overvaluing front loaded
packages relative to evenly distributed packages.

It is interesting to note that Avery and Hoxby (2005) found students whose parents have high incomes or attended very selective colleges generally respond much more rationally to financial aid offers than other students. When surveyed, parents overwhelming complain about the complexity of the financial aid process, and that colleges do not explain their offers well. Avery and Hoxby (2003) attribute the irrational responses of the students to lack of sophistication and understanding about financial aid.

The author believes that the financial aid application process and the secrecy of the financial aid office contribute to this lack of understanding on the students’ part. The FAFSA applications looks much like a tax return, where students and parents input information about their income and assets. In fact, many of the FAFSA inputs come directly from the parent’s and student’s tax returns. In a tax return the filer must look up the deductions, tax brackets, and such to arrive at one’s tax liability. On the other hand, the FAFSA is an electronic application where one’s expected family contribution is calculated automatically and without explanation. This “black box” approach does not give the family and students the information to optimize their behavior subject to the financial aid tax.

In addition, the financial aid office may not explain how it calculates financial aid to the parents or students. In one example, the author, a student, called Stanford University’s financial aid office once to ask some specific questions about how financial aid is calculated. The financial aid officer responded that it was not the University’s policy to publicly disclose the financial aid methodology. In the free response part of
Stanford University survey, the overwhelming complaint students had about financial aid is the lack of communication from the University.

Understandably, the government and universities are afraid of students using this information to “game the system.” However, student labor supply could be affected by the financial aid tax regardless whether students know exactly how it is calculated. The results of this paper suggest that many students have some notion that their earnings are taxed through decreased financial aid. On the other hand, most students do not know the exact marginal tax rate. In addition, students may factor in the uncertainty of their estimate into their labor supply decisions. It is difficult to say what the net effect of all these factors is on student labor supply, but they probably do not cancel out to zero. A lack of information only leads students to make non-optimal decisions on how much to work and how much to study. Also, the lack of transparency makes the student earnings tax an ineffective policy tool to decrease student work hours if that is the policy objective. The next section gives a detailed description of the financial aid methodology.

3. Financial Aid Methodologies

Federal Methodology

In 2009, the federal government provided $83 billion in student aid to over 10 million students (Federal Student Financial Aid Website). To qualify, students must fill out the Free Application for Federal Student Aid (FAFSA) where the parent’s and student’s income and assets information is collected.

The Federal Methodology (FM) assesses student earnings at 50 percent after certain allowances. Allowances are made for actual federal income taxes paid, estimated Social Security and Medicare taxes, estimated local taxes paid, the income protection
allowance (IPA), and an extra allowance if the parents are calculated to have a negative Adjusted Available Income.

Actual federal income taxes paid are reported directly on the FAFSA form. Social Security and Medicare taxes are estimated by multiplying student income by the Social Security and Medicare assessment rates.\(^1\) One interesting detail is that most student employees are exempt from the Social Security and Medicare taxes for work during the school year, but they still receive this deduction.\(^2\) All students pay the Social Security and Medicare taxes on summer earnings.

Estimated local taxes paid are calculated from IRS data on itemized deductions for state and local taxes (such as state and local income and sales taxes). Each state has a different deduction, ranging from 6 percent of income for Washington D.C. to 0 percent for South Dakota. The student is assigned a deduction based on the state of his legal residence, not the state of the institution. This means that actual state and local income taxes paid and the deduction granted might not match for students that go to college out of state. For example, California, at 4 percent, has the fifth highest deduction rate in the nation. In other words, students living at Stanford face the fifth highest state and local tax rates in the nation. Students attending Stanford from 90 percent of the other states do not receive the full deduction for paying California’s high taxes. On the other hand, a California student attending college in South Dakota would be granted an exemption in

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\(^1\) For 2009, Social Security and Medicare taxes are 7.65 percent of income up to $106,800 and 1.45 percent of income over $106,800.

\(^2\) One could argue that a student who does not pay Social Security taxes will have to finance his retirement in an alternative way, and he should be granted the same deduction. This leads to the question of whether Social Security is savings or a tax. Given that Social Security only considers the highest 35 years of indexed earnings to compute benefits, Social Security contributions for the majority of part time student employees are probably 100 percent tax.
excess of his actual state and local tax payments. To further complicate this, some but not all states have reciprocal agreements with other states so that residents working out of state pay the income tax of their home state. For example, residents of Indiana, Virginia, Arizona, and Oregon working in California pay the income tax of their home state and vice versa.

In 2007, the Income Protection Allowance (IPA) gives the student a $3,000 income allowance. This means that the first $3,000 of after tax student earnings is not subject to the 50 percent assessment. An appealing feature of the FAFSA methodology is that if the parent’s Adjusted Available Income is negative, the student can claim it as part of his own allowances. This effectively gives low-income students a larger IPA. The floor on the parental Adjusted Available Income is -$750. Therefore the largest IPA a low-income student can claim is $3,750.

Assets such as stocks, bonds, checking and savings accounts, and all other investments, are assessed at 20 percent with no allowances made (The 2007-2008 EFC Formula Guide).

**Institutional Methodology**

Many private universities, especially ones that practice need blind admissions, use the College Scholarship Service (CSS) Profile to collect more financial information on the student and family. Compared to the FAFSA, the CSS Profile collects more detailed information about the student’s ability to pay. For example, the CSS Profile requires financial information from both parents if they are divorced, while the FAFSA only collects financial information from the custodial parent. The methodology that the CSS
Profile employs to calculate student need is commonly referred to as the “Institutional Methodology.”

The Institutional Methodology also assesses adjusted student earnings at 50 percent. Federal income taxes paid, Social Security and Medicare taxes, and estimated state and local income taxes are deducted from gross earnings. Different from the Federal Methodology, the Institutional Methodology includes the sales tax in the student expense budget rather than deducting it from income based on the student’s state of legal residence. Thus, the Institutional Methodology allows all students of the same university the same sales tax deduction, no matter the students’ state of legal residence.

Instead of relying on itemized deductions from the IRS, the Institutional Methodology estimates state and local taxes based on data from the Institute for Taxation and Economic Policy (ITEP). For states with an income tax, there is one bracket for student earnings up to $20,000 and another bracket for earnings over $20,000. The state with the highest deduction is Oregon at 3.5 percent and 4 percent respectively, while 15 states have no income tax. Although sales tax is included in the student expense budget, which is influenced by the institution’s location, income tax is still estimated by the student’s state of legal residence. This still puts students from low income tax states that work during the school year at universities in high-income states at a disadvantage if two states do not have reciprocal state income tax agreements.

A major difference between the Federal Methodology and the Institutional Methodology is the Institutional Methodology’s minimum student contribution. The Federal Methodology has no minimum student contribution; the student is expected to contribute zero if he earns zero. However, the Institutional Methodology imposes a
minimum amount that the student is required to contribute to his own education costs. The minimum student contribution is determined by multiplying the minimum wage by 35 hours per week and by 12 weeks. For the 2007-2008 school year, this amount equals to $2,150.\(^3\) Assets are taxed at 25 percent with no allowances.

If 50 percent of a student’s earnings is less than the minimum student contribution, then the minimum is applied. In other words, a student can earn up to twice the minimum student contribution before he or she is subject to the 50 percent assessment on additional earnings (CSS/Financial Aid Profile Users Guide).

**Stanford Methodology**

Stanford University uses the institutional methodology with slight modifications in determining the expected student contribution. For the 2007-2008 academic year, Stanford set the minimum student contribution at $2,000 or upper class students and $1,700 for freshmen.

In addition to the expected student contribution, all Stanford students have a self-help expectation as a part of their financial aid package. While the expected student contribution is supposed to come primarily from the previous summer’s earnings, the self-help expectation is the student’s expected contribution from loans, outside scholarships, and work during the school year. The normal self-help expectation is $2,500, while extremely low income students have a self help-expectation of $2,000. Outside scholarships are defined as grants not from Stanford University or from the government.

\(^3\) $5.15 \times 35 \text{ hours/week} \times 12 \text{ weeks} = $2,163. $2,150 was chosen probably because it is a round number. Notice the 2007-2008 minimum student contribution does not take into account the increase in the minimum wage passed on May 24, 2007. Also freshmen have a lower expected student contribution ($1,550).
Every dollar earned through work reduces the self-help expectation one to one. If a student does not take loans, then he or she can earn the full amount of the self-help expectation plus twice the minimum student contribution before he is subject to the earnings tax. However, if a student chooses to take loans or has outside scholarships, then he or she would essentially have a lower earnings expectation before being subject to the 50 percent earnings tax. Table 1 summarizes how the amount of scholarship aid granted to a student is determined.

As part of its financial aid reforms, Stanford University for the 2008-2009 school year lowered the assessment rate on student assets from 25 percent to 5 percent. In comparison, the marginal tax rate for parental assets ranges from 3 percent to 5 percent. This seems to be a step in the right direction as it reduces the incentive to shift assets from the student’s name to the parent’s names. (Stanford Financial Aid Website and Cooper Interview 2008).

**The Timing of the Financial Aid Tax**

The timing of the financial aid tax collection is interesting because of its implications on when the student is subject to the tax. The financial aid methodology uses earnings from the last calendar year to determine the financial aid for the next academic year. This statement is initially confusing, and I will carefully break it down. The financial aid forms are usually filed between January and April using the current year’s tax return. Of course, the current year’s tax return is based on the earnings of the last calendar year. The student will actually receive the financial aid in the next academic year.

US universities generally follow two types of academic calendars, the semester system and the quarter system. In the semester system the school year is divided into two
parts, the fall semester and the spring semester. The fall semester starts in August and ends in December. The spring semester then starts in January of the next calendar year, and it ends in May. In the quarter system, the school year is divided into three parts. The fall quarter starts in September and ends in December. This is followed by a winter quarter starting in January of the next calendar year and ending in March. Then, there is a spring quarter starting in April and ending in June. For our purposes, the fall quarter of the quarter system is equivalent to the fall semester, and the winter and spring quarters combined is equivalent to the spring semester in the financial aid calendar. Table 2 shows when a student entering college in September of 2009 is subject to the financial aid tax if he graduates in four years.

To determine the expected student contribution for the freshmen year, the financial aid methodology looks all the way back to the spring semester of the junior year of high school. It is unlikely that many students have finalized their college choices by then. Students would be uncertain of the marginal tax rate they face. On the other hand, similar colleges have very similar financial aid policies. For example, if a student were certain he would attend an Ivy League School, then he would have a very good idea what his marginal tax rate would be. Of course, high school juniors may not be thinking these things when they chose to get a part time job.

If a student graduates in four years, the last semester he would be subject to the financial aid tax would be the fall semester of his junior year. The spring semester of the junior year, that summer, and the entire senior year would be tax-free. I will exploit this tax-free period to estimate the effect the financial aid tax has on student labor supply.
4. Student Response to the Financial Aid

Figure 1 shows the budget constraint for a student facing the financial aid tax. The vertical axis is income, and the horizontal axis is the number of hours of leisure. I assume that all time that is not accounted for by leisure is devoted to work at wage \( w \). Since the financial aid tax is assessed on after tax earnings, wage \( w \) here is the after tax wage.\(^4\) \( H_0 \) is when the student spends all his time at leisure and no time working. The maximum number hours of work the student can achieve is at the origin. This earns an income of \( C \). The budget constraint is the line between \( H_0 \) and \( C \) and it has a slope of \(-w\). The initial financial aid grant shifts the budget line up by \( A \). The first \( (K-A) \) dollars of earnings is exempt from the financial aid tax, so the slope of the budget constraint remains \(-w\) until work earnings reaches \( K \) dollars when the 50 percent tax kicks in. The slope of this section of the budget constraint is \(-0.5w\). The initial financial aid grant is deducted one dollar for every two dollars earned until earnings reaches \( (B-A) \) dollars. Then, the entire initial financial aid grant has been deducted and the budget constraint returns to the original.

How students respond to this financial aid tax depends on the budget constraint and the student’s indifference curves (Figure 2). Student A maximizes utility at an income above point \( B \), where all of his financial aid has been deducted. He chooses to work \( H_A \) hours, and he is not affected by the financial aid tax. Facing the tax, Student C can move to a higher indifference curve from \( C \) to \( C' \). He would shift his work hours

\(^4\) The linear budget constraint in Figure 1 is not entirely accurate because the student is likely to be facing a progressive tax structure. Nevertheless, this simplification does not take away from the main point.
down from $H_C$ to $H_{C'}$. Student C still pays the financial aid tax on a portion of his income. The interesting case is student D who initially works $H_D$ hours, which would subject part of his earnings to the financial aid tax. After the tax he moves to indifference curve $D'$ which is tangent to the kink on the budget constraint where the tax kicks in. Due to the discontinuity in the budget constraint, one would expect many students bunched right below the kink with relatively few students right above the kink.

4. NPSAS Data

The National Center for Education Statistics, part of the Department of Education, regularly surveys students and institutions to determine how students and their families pay for postsecondary education. This survey, the National Postsecondary Student Aid Study (NPSAS), has been conducted every 3 to 4 years since 1987. The NPSAS:2000 surveyed a representative sample of 61,767 undergraduate students from the population of approximately 19 million undergraduate students enrolled at Title IV institutions in the United States and Puerto Rico. Public universities and private universities that accept federal funding are included in the sample. The NPSAS uses a stratified sampling procedure where institutions are stratified by the variables such as being public or private, the highest degree offered (bachelors, masters, or PhD), and the percentage of bachelor’s degrees granted in education. Then, a sample of institutions from each stratum is chosen with the probability of an individual institution being chosen proportional to its size. Finally, a fixed number of students are chosen from each institution. When analyzing the data, each student must be weighted by the probably he is selected by this procedure.\(^5\)

\(^5\) For more information on the NPSAS survey methodology, refer to the NPSAS:2000 Methodology Report (works cited).
The NPSAS:2000 data set is collected from a variety of sources including student interviews, institutional questionnaires, and various federal agencies such as the Free Application for Federal Student Aid (FAFSA) and the National Student Loan Data Center (NSLDS). There is a wide range of institutions covered, from two-year community colleges to four-year doctorial granting universities. Similarly, the student population is also heterogeneous in many respects. A single mother enrolled part time at a community college faces completely different labor supply incentives than a parent-support student at an Ivy League institution. While the labor supply decisions of non-traditional and part-time students are also interesting topics, this paper focuses on the “traditional” full time, dependent student at four-year universities. Filtering on these criteria, the NPSAS:2000 was narrowed to 12,638 students.

Sixty nine percent of these students filled out the FAFSA, and 53 percent of these students received need based financial aid. The NPSAS:2000 only has complete earnings data for the students that fill out the FAFSA. Much of data for students that did not fill out the FAFSA are gathered by telephone interview. This data has problems such as non-response bias and crude estimation of earnings. As a result, I focus on students that filled out the FAFSA. It likely that students who know they do not qualify for student aid would not bother completing the FAFSA. Therefore, students who do and do not fill out the FAFSA are not comparable. As with any database this size, there are a few missing observations for each variable. Usually this number is small (less than 1 percent). If significant, the number of missing values will be reported with the results.

Conditional on filling out the FAFSA, 74 percent of students actually received need based financial aid. This confirms the intuition that most students who know they
will not receive financial aid do not bother to apply. For the students receiving financial aid, the mean received is $7,089 and the median is $5,963 (Figure 1).\textsuperscript{6} To measure student earnings, I use the student’s total income as reported on the FAFSA.\textsuperscript{7} Importantly, informal earnings are not included in the student’s reported total income unless the student voluntarily reported it. Therefore, most informal earnings are likely not taxed. As noted before, the FAFSA asks about the previous year’s earnings, so this is the student’s income for the 1999 calendar year. Seventy nine percent of students who applied for federal aid also worked. Of those working, the mean earned is $4,445 and the median is $3,777 (Figure 2).\textsuperscript{8} The average number of hours worked per week is 19.6 and the median is 20 hours (Figure 3).\textsuperscript{9} The financial aid and earnings variables are skewed to the right, with a few outliers in the far tails. The average number of hours worked per week was collected by survey, so it tends to be bunched at round numbers such as 10, 15, and 20.

Once again, the data confirm that the majority of students receiving financial aid work substantial hours and have substantial earnings. Therefore, the majority of students are subject to the financial aid tax. By the Federal Methodology, approximately $1,500 of the median working student’s earnings is subject to the tax.

The Standard Occupation Classifications describe the types of jobs at which students worked. This data was collected by survey and 84 percent of the students

\textsuperscript{6} Due to the difficulty of measuring the weighted median, the unweighted median is given. For comparison, the unweighted mean is $7643, which is within 8 percent of the weighted mean. The important point is that the amount of financial aid received is skewed to the right.

\textsuperscript{7} Total income is equal to all taxed and untaxed income minus paid child support, work-study, education tax credits, and taxable scholarships and grants.

\textsuperscript{8} The median is unweighted.

\textsuperscript{9} The response rate to this question is 90 percent. Also, the median is unweighted.
responded. The top 10 occupation categories are given in Table 3. The top 10 occupation categories combined account for 74 percent of the total students that responded. Most of the top categories, such as clerical, personal services, cashier, and laborer, are probably not the fields that four-year undergraduate students aim to go into after graduation. The distribution of students among these occupation categories from the NPSAS:2000 are broadly consistent with Scott-Clayton’s findings from the Current Population Survey (Table 5, page 52). Money is likely the motivating factor for student work behavior.

When the question is directly asked by survey, 91 percent of respondents said that their main motivation for working was to pay tuition and fees or earn spending money. Only 9 percent of respondents cited gaining job experience as their main motivation for working. As noted above, Stinebrickner and Stinebrickner (2003) and Ehrenberg and Sherman (1985) associate student work with negative educational outcomes.

One dollar of student earnings above the Student Income Allowance will raise the expected Student Contribution by fifty cents. If the student receives financial aid to cover his full calculated financial need, then a dollar of earnings directly reduces financial aid by fifty cents. Even if the student does not receive his full calculated financial need, additional income may still reduce his financial aid if actual financial aid is allocated as a percentage of calculated financial need. For example, if the university policy is to give each student 50 percent of his calculated financial need in aid, then each additional dollar of earnings reduces financial aid by 25 cents. Finally, if a student receives no aid at all then he is not subject to the financial aid tax.

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10 The full question asked was, “What was your main reason for working while enrolled? 1) Earn Spending Money (40 percent). 2) Pay tuition, fees, and living expenses (51 percent). 3) Gain Job Experience (9 percent)” The response rate of this question was 65 percent.
If students were completely free to choose their labor supply, one would expect a drop in the number of financial aid recipients right above the kink when the financial aid tax comes into effect. The distribution of students not receiving financial aid around the kink should not be affected. Figures 6, 7 and 8 show the distribution of students, in 300 dollar intervals, around the kink. Figure 6 shows students who had their entire financial need met, Figure 7 shows students who had part of their financial need met, and Figure 8 shows students who did not have financial need and did not receive need based financial need. Table 4 shows the difference in the percentage of students between adjacent intervals.

The surprising feature of all three graphs is that the peaks in students occur just above the exemption amount. In fact, Table 4 shows that the increase in the number of students just above the exemption amount is the largest or second largest jump between adjacent intervals. In addition, in all three graphs the difference around the exemption amount is statistically significantly different from zero at the 95 percent level, while only a scattering of other differences between adjacent intervals are statistically significant.

Students could choose to be just above the exemption amount if they cannot completely control their work hours. In order to be just below the exemption amount, a student must continuously monitor his earnings throughout the year, factoring in taxes, his state of residency, and his parents income. Then he must quit immediately before his earnings reaches the exemption amount. One could imagine the difficulty of doing this.

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11 300 dollar intervals are a reasonable choice to show the variation in earnings around the kink. The author also tried 200 and 400 dollar intervals. The shapes of the distribution for the different interval sizes are roughly the same.
Students making these calculations with approximate numbers may work a little extra for a margin of error. This would put them just above the earnings exemption.

Figure 8 also shows a jump at the kink for students that did not have financial need and did not receive any aid. There are two possible explanations for this. First, the median earnings exemption is $2582. It is possible that interval between $2582 and $2882 is the natural mode of annual after tax earnings for college students. Another argument is that the financial aid tax still affected the sample of students who did not receive financial aid. After all, these are students who initially applied for financial aid, or else they would not be in the data. If a student were to make the effort to apply for financial aid, he must believe that there is some probability of receiving aid. How much he considers the financial aid tax when making the decision to work would be related to his beliefs of the probability of receiving financial aid.

Indeed, the difference across the kink for students receiving financial aid is larger than the difference for students not receiving financial aid. For students with their financial need fully meet, the ratio of students just above to just below the exemption amount is 1.58, the ratio for students with their financial need partially met it is 2.17, while the ratio for students that did not receive financial aid is 1.37. However, none of the above explanations are completely satisfactory, and addition work must be done to explain this conundrum.

5. Stanford University Survey

Undergraduates at Stanford University were surveyed to determine how much they know about financial aid, and whether they take into account the financial aid tax
when making the decision to work. For details on the survey methodology, please refer to the Survey Appendix. The responses from 237 students are used in this analysis.

The background characteristics of the survey respondents closely resemble that of the student population. The sample distributions of students by year of study and by field of study are given in Table 5. Only the proportion of students that are juniors is significantly different from 25 percent. The population distribution of students by year of study is assumed to be uniform across the years. This is not exactly correct, but this approximation is close for Stanford University because total enrollment and the completion rate are steady. Also Stanford University accepts very few transfer students. In 2008 Stanford enrolled 22 transfer students and the six-year graduate rate for the 2002 cohort was 94 percent (Stanford 2008 Common Data Set).

The proportion of students across the fields of study in the population is estimated from the number of BA degrees conferred by each field of study (Stanford School of Humanities and Sciences Website). Factors such as differing completion rates across the fields of study or double majors may bias this estimate, but once again, the author believes these numbers are appropriate for approximate comparisons.

The proportion of students receiving financial aid in the survey sample is 10 percent higher than that of the student population. This may be because students receiving financial aid are more inclined to fill out a survey on the topic. Also, since students receiving financial aid tend to be less wealthy than students who do not, students receiving financial aid may have been more motivated by the $5 compensation.

Of the students who received financial aid in the sample, 96 percent received grants, 43 percent received loans, and 43 percent received work-study. Students were not
asked the amount of each type of aid received, but according to the 2008 Stanford Common Data Set, the average grant was $30,244, and the average loan was $2,955 for the 2007-2008 academic year.

Students were asked about their school year and summer earnings of the previous year. For seniors taking the survey, this would be the junior year earnings, and the earnings in the summer between the junior and senior years. A summary of the work behavior of students is given in Table 6. Sixty eight percent of students worked during the summer, while 50 percent of students worked during the school year. The percentage of students working in the summer is the same for both financial aid recipients and non-financial aid recipients. Wages, hours, and earnings are only reported for students who worked. Over the summer financial aid recipients worked on average 2.1 fewer hours, had wages that were 1 dollar and sixty cents lower, and earned $771 less. However, none of these differences in means are significant at the 10 percent level. During the school year, financial aid recipients have a 15 percent higher probability of working, and conditional on working, worked 0.6 hours more, had wages that were 4 dollars and eighty cents lower, and earned $2,061 less on average. The probability of working during the school year, the school year wage, and school year earnings are significantly different at the 5 percent level. Also, financial aid recipients have a 14 percent higher probability of have a job on campus during the school year.

The types of jobs that Stanford students were employed at both over the summer and during the school year greatly differ from that of the NPSAS sample. While some students had “traditional” part-time jobs such as camp counselor or tutor, many others
interned at technology companies, investment banks, and law firms. These types of summer jobs probably offer large future benefits above the immediate pay.

Still, money is the most frequently cited factor for working, although the proportion is smaller than the students of the NPSAS survey. Financial aid recipients and non-recipients gave roughly the same reasons for working during the summer. More students in both groups cited money as the main motivation for working during the school year. However, 22 percent more financial aid recipients cited money as the main motivation for school year work. This difference in means is significant at the 5 percent level.

The average of the number of weeks worked can be derived from the total earnings, the hours worked per week, and the wage per hour. The derived number of weeks worked in the summer is 9.6 weeks for financial aid recipients and non-recipients, which is the majority of the summer break. For comparison, the summer quarter at Stanford is 10 weeks long. On the other hand, non-financial aid recipients work 11.2 more weeks on average during the school year. The Stanford academic calendar is 30 weeks, so conditional on employment, non-financial aid recipients are employed during approximately 80 percent of the school year while financial aid recipients are employed during approximately 50 percent of the school year.

In summary, work behavior during the school year is where financial aid recipients and non-recipients differ the most. School year work is of most interest to researchers and policy makers because of its potential impact on academic performance. During the school year, more financial aid recipients worked, cited money as their main motivation for working, received a lower wage, and were employed for fewer weeks.
A lower percentage of non-financial aid recipients worked while in school. Non-financial aid recipients with low earnings potential choosing not to work may explain part of the wage differential. More financial aid recipients cite money as the main motivating factor for school year work, so they probably do not prefer lower paying jobs. It may also be that non-financial aid recipients are more skilled on average than financial aid recipients. The lower wage of financial aid recipients is evident in both summer earnings and school year earnings, although the school year wage differential is larger and statistically significant.

**Difference in Differences Estimate of the Likelihood of Paying the Financial Aid Tax**

A difference in differences approach is used to estimate effect of the financial aid tax on total earnings. Total earnings are the sum of school year earnings and the earnings of the previous summer. Recall earlier that the marginal tax rate on earnings is zero until a kink point when it jumps to 50 percent. The default kink point for Stanford University is $6,500. Seniors who will graduate are exempt from this tax, as they will not be applying for financial aid again. Earnings in the summer between the junior and senior year is also exempt from the tax. However, it is likely that earnings between seniors and non-seniors differ due to other factors such as skill level and work experience. Therefore, students who do not receive financial aid are used as a control. The difference in differences estimate is:

\[
(\text{ProbPayTax}_{\text{financial aid, senior}} - \text{ProbPayTax}_{\text{financial aid, not senior}})
- (\text{ProbPayTax}_{\text{no financial aid, senior}} - \text{ProbPayTax}_{\text{no financial aid, not senior}})
\]

The regression form of the difference in differences estimate is:

\[
\text{ProbPayTax}_i = \alpha_i + \beta_1 \text{Senior}_i + \beta_2 \text{ReceivesFinAid}_i + \beta_3 \text{Senior}_i \times \text{ReceivesFinAid}_i + \epsilon_i
\]
ProbPayTax\(_i\) is the predicted probably that student \(i\) has earnings in the tax paying range, Senior\(_i\) is a dummy variable of whether student \(i\) is a senior, and ReceivesFinAid\(_i\) is a dummy variable of whether student \(i\) receives financial aid. \(B_3\) is the difference in differences estimator. A positive coefficient on \(B_3\) would imply that the lifting of the tax would cause more students to earn above $6,500. The regression above was estimated with all non-seniors as the control group, and with juniors, sophomores, and freshmen separately as the control group. Also, each grade was individually interacted with ReceivesFinancialAid with freshmen as the baseline group. The difference in differences results are given in box form in Table 7 and in regression form in Table 8.

Table 7 shows a higher probability for seniors to work in the tax paying range in both the financial aid recipients group and the non-recipients group. However, the increase in the probability of working in the tax paying range for seniors is larger for financial aid recipients. The difference in difference estimate of the effect of the financial aid tax being lifted is that 22 percent more students will earn above $6,500 and be in the tax paying range with a standard error of 12.6 percent. This result is significant at the 10 percent level.

The difference in differences estimator in Table 7 is replicated in regression (1) of Table 8. Regressions (2) – (4) show the same general result, although the point estimates are not always significant. This may be due to the number of observations being cut in half. The difference in differences point estimate for juniors is the smallest, and not statistically significant. This is a bit troubling because juniors are the closest control group for seniors.
Regression (5) presents a model where senior, junior, and sophomore are independently interacted with receiving financial aid with the baseline group being freshmen. The financial aid tax affects freshmen, sophomore, and juniors equally, so one would expect the coefficients on junior * receives financial aid and sophomore * receives financial aid to be zero. They are indeed not significant and smaller than the coefficient on senior * receives financial aid.

One concern with using the differences in differences approach is that non-financial aid recipients are not identical to financial aid recipients when making the decision to work. Most obviously, non-financial aid recipients are more wealthy than financial aid recipients. This may cause an income effect for non-financial aid recipients to work less than financial aid recipients at any given tax rate. On the other hand, non-financial aid recipients seem to command higher wages than financial aid recipients as noted in Table 6. This may cause a substitution effect to cause non-financial aid recipients to work more.

Nevertheless, Stanford University students are rather homogeneous compared to the demographics of less selective universities. Almost all Stanford students are academically high achieving. According to the 2008-2009 Stanford Common Data Set, 66 percent of incoming students scored above 700 on the Math Section of the SAT (top 91 percent of all SAT takers), and 95 percent of incoming students scored above 600 (top 67 percent of all SAT takers). Furthermore, the majority of financial aid recipients at Stanford University come from middle class and upper middle class families. In an interview with the Stanford Review, Stanford’s director of financial aid states that approximately 15-20 percent of students come from families with incomes of under
$60,000, and 35 percent of students come from families with incomes of under $100,000. Stanford gives financial aid to approximately 50 percent of its students, so assuming all students with family incomes of under $100,000 receive financial aid, 30 percent of its financial aid recipients have family incomes of over $100,000. While concerns over the comparability of financial aid recipients and non-recipients cannot be dismissed, the author believes the differences in differences method used in this paper is a good first attempt to answer the question. After all, no work on this topic has been done before.

It is actually surprising that the results turned out to be large given the factors that bias the estimate downwards. First, the students were asked about their earnings from the previous academic year because the current academic year was ongoing at the time of survey. Therefore, senior respondents gave their earnings for their junior year. As noted in the section above titled “The Timing of the Financial Aid Tax,” earnings during the fall quarter of the junior year are taxed. Therefore, the senior respondents only had three tax-free periods, the winter quarter of junior year, the spring quarter of the junior year and the summer in between the junior and senior years. Second, there is likely substantial measurement error in the dependent variable because the data was collected by survey. This would increase the standard errors. The good news is that the independent variables are likely to be accurately measured. Students are unlikely to misreport their class year or whether they received financial aid.

Also, recall from Section 3 that the tax exemption point would be reduced if a student receives outside scholarships or takes out a loan. Therefore, $6,500 is the maximum exemption point, with many students’ actual exemptions below it. If a student earned in between his true exemption point and $6,500, he would be subject to the tax but
not show up in the regression above. These “false negatives” cause the estimator to be biased downwards. In all likelihood, the coefficients in Table 6 are underestimated. Also, this bias would increase the standard error of the estimators.

In the survey, the respondents were asked a variety of other questions including whether they considered the financial aid tax while working, how much they think they know about financial aid, and they were asked to predict the tax rate and exemption amount. Some of the interesting responses are presented below.

Only 32 percent of students receiving financial aid responded that they considered the financial aid tax when making the decision to work. The majority of students either did not have enough information to consider the financial aid tax or they were motivated to work for other reasons. Students who reported that money was their main reason for working during the school year were 9 percent more likely to consider the financial aid tax, although the difference in means is not statistically significant.

Respondents were asked how aware they were about Stanford’s financial aid policies regarding student earnings when they worked. For students receiving financial aid, on a 1 – 5 scale, the modal response was 1 (51 percent). Students of older classes reported that they were slightly more knowledgeable than freshmen. Reported knowledge about financial aid is not significantly correlated with the student’s field of study, the number of economics classes taken, or contacting the financial aid office. In a related question, only 16 percent of financial aid recipients were aware of the recent policy change that reduced the student tax rate on assets from 25 percent to 5 percent.

The survey respondents were also asked to predict the tax exemption, and the marginal tax rate above the exemption. The mean prediction for the exemption amount is
$3,095 with a standard error of $3,718, or $3,202 with a standard error of $3,748 if zeros are omitted. Although the standard errors are large, the means are in the ballpark, especially considering the factors that can reduce the exemption for individual students. This suggests that some students have an idea about at what level of earnings they will have to start paying the tax, and hence the significant difference in differences estimate in regression (1). However, when asked to predict the marginal tax rate for earnings above the exemption, the mean predicted tax rate is 11 percent with a standard error of 22 percent or 18 percent with a standard error of 27 percent if zeros are omitted. This estimate is far lower than the real marginal tax rate of 50 percent. If students knew that the marginal tax rate is actually higher than their estimates, they would likely respond more strongly to the tax.

Finally, there was a free response section that asked students for suggestions on how to improve the financial aid system. Overwhelmingly, students asked for more openness and information from Stanford. Many students wrote that they did not know much about financial aid or they were confused by the financial aid methodology.

6. Conclusions

This paper finds mixed results as to whether the financial aid tax affects student work behavior. The NPSAS:2000 national data does not show student earnings bunching below where the tax comes into effect. When asked to rate their knowledge about financial aid on a 1-5 scale, 51 percent of Stanford aid recipients responded with a one.

However, 30 percent of Stanford financial aid recipients did respond that the financial aid tax affected their work behavior. It is likely that these students may be acting on incorrect beliefs. The responses to other questions suggest that students’
underestimate the financial aid tax. The mean predicted marginal tax rate is 11 percent while the real rate is 50 percent. The standard errors of the estimated tax exemption and the marginal tax rate are larger than their means.

The differences in differences estimate suggests that lifting the financial aid tax will increase the number of students earning in the taxable range by 22 percent with a standard deviation of 12.6 percent. This estimate is very rough given the small sample size. Furthermore, it only applies to Stanford students, who are not representative of the college population in the United States.

The survey data and differences in differences method used in this paper are rather crude. Ideally, one would like to have student level data for all the students of a large university. This type of analysis is not possible with national datasets because of the variation in the financial aid policies of individual schools.

With student level data from the university financial aid office, one cannot use the difference in differences method outlined above. Seniors, who are exempt from the financial aid tax, generally do not fill out financial aid paperwork because they will not be in school next year. The exception is college seniors who plan on attending graduate school the next year. However, they are a small and unrepresentative sample of the student population.

The marginal tax rate on student earnings has never changed. What has changed over time is exemption amount before the tax comes into effect. In further work, one could think of a regression discontinuity approach that takes advantage of the shifts in the tax exemption.
Finally, the author suggests three reforms to improve the financial aid system. First and foremost, universities should inform students about how financial aid is determined. The survey shows that students are frustrated by the lack of information. To take out a student loan, all students are required to complete an online tutorial that explains the effects of their debt burden. In addition, all students with loans must attend a loan counseling session as a requirement for graduation. A similar requirement should be made for all financial aid recipients in the form of a financial aid tutorial. The tutorial does not have to be mandatory, but at least it should be made available. I believe it would be very popular with students and parents alike.

Second, the CSS Profile and FAFSA should replace the one 50 percent marginal tax rate with progressive tax brackets. If the goal is to make high earning students pay more, one 50 percent tax bracket is too blunt when the majority of students receiving financial aid are earning money in the tax paying range. Parental income is already assessed by a progressive structure. This should be extended to the student’s earnings too.

Finally, many low-income students have to work to pay for their own living expenses. In the regular income tax, there are credits and deductions that give low-income individuals larger tax exemptions. Likewise, low-income students should be given a larger tax exemption in the financial aid methodology.

Inevitably, these reforms further complicate the financial aid system. However, the author believes that a more complex system that is open and equitable is better than the current practice of keeping students in the dark.
**Survey Appendix:**

The target population of the survey is the undergraduate student body at Stanford University. According to the Stanford University Common Data Set, there were 6,532 undergraduate students enrolled as of October 15, 2008.

The sample space of the survey is the undergraduate students who listed their email address in the Stanford directory. This is the vast majority of Stanford undergraduate students. Two thousand pairs of random numbers were generated to select the survey invitees. The first number gives to the page number in the directory and the second number points to the location on that page. For example (163, 65) points to the 65th name on the 163rd page of the directory. The random number pairs were generated with replacement, and duplicate pairs were thrown out.

The Stanford directory does not separate undergraduate and graduate students. All of the number pairs that pointed to graduate students were thrown out. In the end, this survey was sent to 726 email addresses (11 percent of the undergraduate student population). The actual number of invitees was slightly less because the directory was printed at the beginning of the school year, and a few email addresses do not exist anymore.

The survey was conducted online in early February 2008 with the Opinio survey software. Two hundred fifty eight respondents (36 percent) answered at least one question in the survey. Two hundred eleven respondents (29 percent) completed the survey. This did not mean that they answered every question, but rather that they clicked “finish” at the end of the survey. The survey respondents were compensated with a $5 gift card to either Peet’s Coffee or Amazon.com. The author only had funds for 200
survey participants, so the survey had to close when 200 respondents requested compensation. By the time the survey closed, the response rate was only a trickle then. If the survey were to have been kept open longer, there would have likely been a few more respondents, though probably not many more. The author removed a few blank and mostly blank questionnaires to arrive at 237 respondents. As not every respondent answered every question, the response rate for each individual question is lower.

This survey was reviewed and approved by the Stanford University Internal Review Board on March 10, 2008.
Table 1. How Stanford Determines Scholarship Aid

| Total Cost | Total costs to attend Stanford. Includes tuition, room and board, books, travel, and personal expenses. $49,363 for the 2007-2008 school year |
| - Expected Parent Contribution | Calculated from the parent’s income and assets. |
| - Expected Student Contribution | Calculated from the student’s income and assets. Theoretically, the expected student contribution comes from the previous summer’s earnings. |
| - Student Self-Help Expectation | Outside scholarships, loans, and work the student is responsible for. Theoretically, the work part comes from work during the school year. |
| = Scholarship Aid Granted to Student | Total amount of grant aid the student receives. This could include federal, state, and Stanford grants. |

Source: Stanford Financial Aid Website

Table 2: When Subject to the Financial Aid Tax

<table>
<thead>
<tr>
<th>Academic Year That the Financial Aid Is Distributed</th>
<th>Date FAFSA Filed</th>
<th>When Subject to the Tax by the Calendar Year</th>
<th>When Subject to the Tax by the Academic Calendar</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Freshmen Year (September 2009 – May 2010)</td>
<td>April 2009</td>
<td>Jan. 1, 2008 to Dec. 31, 2008</td>
<td>High School Junior Year Spring Semester, Summer After High School Junior Year, High School Senior Year Fall Semester</td>
</tr>
<tr>
<td>College Sophomore Year (September 2010 – May 2011)</td>
<td>April 2010</td>
<td>Jan. 1, 2009 to Dec. 31, 2009</td>
<td>High School Senior Year Spring Semester, Summer After High School Senior Year, College Freshmen Year Fall Semester</td>
</tr>
<tr>
<td>College Junior Year (September 2011 – May 2012)</td>
<td>April 2011</td>
<td>Jan. 1, 2010 to Dec. 31, 2010</td>
<td>College Freshmen Year Spring Semester, Summer After College Freshmen Year, College Sophomore Year Fall Semester</td>
</tr>
<tr>
<td>College Senior Year (September 2012 – May 2013)</td>
<td>April 2012</td>
<td>Jan. 1, 2011 to Dec. 31, 2011</td>
<td>College Sophomore Year Spring Semester, Summer After College Sophomore Year, College Junior Year Fall Semester</td>
</tr>
<tr>
<td>Tax Free Time While in School</td>
<td></td>
<td>Jan. 1, 2012 to May 2013</td>
<td>College Junior Year Spring Semester, Summer After Junior Year, College Senior Year Fall Semester, College Senior Year Spring Semester</td>
</tr>
</tbody>
</table>


Note: For schools on the quarter system, the fall quarter is equivalent to the fall semester, and the winter and spring quarters combined is equivalent to the spring semester in the financial aid calendar.


### Table 3: Top 10 Student Occupations

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clerical</td>
<td>11.1%</td>
</tr>
<tr>
<td>Personal Services</td>
<td>10.6%</td>
</tr>
<tr>
<td>Cashier/Teller</td>
<td>9.7%</td>
</tr>
<tr>
<td>Laborer</td>
<td>8.2%</td>
</tr>
<tr>
<td>Education</td>
<td>7.7%</td>
</tr>
<tr>
<td>Sales/Purchasing</td>
<td>7.4%</td>
</tr>
<tr>
<td>Secretary</td>
<td>7.2%</td>
</tr>
<tr>
<td>Manger-supervisory</td>
<td>5.7%</td>
</tr>
<tr>
<td>Research Assistant</td>
<td>3.7%</td>
</tr>
<tr>
<td>Computer Systems</td>
<td>2.8%</td>
</tr>
</tbody>
</table>

Source: NPSAS: 2000

### Table 4: Difference in the Number of Students Between Adjacent Intervals

<table>
<thead>
<tr>
<th>Adjacent Intervals</th>
<th>All Need Met</th>
<th>Partial Need Met</th>
<th>No Aid</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1500 to -1200</td>
<td>-0.19 (-0.39)</td>
<td>0.87 (2.12)*</td>
<td>0.95 (2.18)*</td>
</tr>
<tr>
<td>-1200 to -900</td>
<td>0.64 (1.29)</td>
<td>-0.3 (0.7)</td>
<td>-0.18 (-0.39)</td>
</tr>
<tr>
<td>-900 to -600</td>
<td>0.41 (0.78)</td>
<td>0.33 (0.76)</td>
<td>-0.65 (-1.51)</td>
</tr>
<tr>
<td>-600 to -300</td>
<td>-0.49 (-0.93)</td>
<td>0.54 (1.04)</td>
<td>0.36 (0.72)</td>
</tr>
<tr>
<td><strong>-300 to +300</strong></td>
<td><strong>2.21 (3.86)</strong>*</td>
<td><strong>5.07 (8.77)</strong>*</td>
<td><strong>1.37 (2.90)</strong>*</td>
</tr>
<tr>
<td>+300 to +600</td>
<td>-1.05 (-1.73)</td>
<td>-5.37 (9.39)*</td>
<td>-0.95 (-1.97)*</td>
</tr>
<tr>
<td>+600 to +900</td>
<td>-0.45 (-0.8)</td>
<td>-0.44 (-0.99)</td>
<td>-0.18 (-0.39)</td>
</tr>
<tr>
<td>+900 to +1200</td>
<td>-0.3 (-0.55)</td>
<td>0.05 (0.13)</td>
<td>-0.24 (-0.54)</td>
</tr>
<tr>
<td>+1200 to +1500</td>
<td>-0.38 (-0.72)</td>
<td>-0.22 (-0.51)</td>
<td>0.42 (0.93)</td>
</tr>
</tbody>
</table>


Notes: (t Statistics are in Parenthesis). * Denotes 95 percent significance.
Table 5: Background Characteristics of the Survey Sample and Population

<table>
<thead>
<tr>
<th></th>
<th>Survey Sample</th>
<th>Total Student Population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year of Study</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshmen</td>
<td>28%</td>
<td>Approx. 25%</td>
</tr>
<tr>
<td>Sophomore</td>
<td>27%</td>
<td>Approx. 25%</td>
</tr>
<tr>
<td>Junior</td>
<td>20%**</td>
<td>Approx. 25%</td>
</tr>
<tr>
<td>Senior</td>
<td>25%</td>
<td>Approx. 25%</td>
</tr>
<tr>
<td><strong>Area of Study</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td>26%</td>
<td>Approx. 27%</td>
</tr>
<tr>
<td>Social Science</td>
<td>29%</td>
<td>Approx. 30%</td>
</tr>
<tr>
<td>Humanities</td>
<td>21%</td>
<td>Approx. 19%</td>
</tr>
<tr>
<td>Engineering</td>
<td>22%</td>
<td>Approx. 24%</td>
</tr>
<tr>
<td><strong>Receive Financial Aid?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>54%**</td>
<td>44%</td>
</tr>
</tbody>
</table>

**Source:** Stanford Financial Aid Survey

Notes: The population distribution by year of study is assumed to be uniform. The population distribution by area of study is estimated by the number of degrees conferred in that area. The population distribution of students receiving financial aid is from the 2008 Common Data Set. ** denotes that the sample mean is different from the population mean at 5 percent significance.
Table 6 Summary of Work Behavior

<table>
<thead>
<tr>
<th></th>
<th>All Students</th>
<th>Receive Financial Aid</th>
<th>Do Not Receive Financial Aid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Summer</td>
<td>School</td>
<td>Summer</td>
</tr>
<tr>
<td>Work (binary)</td>
<td>0.68</td>
<td>0.50</td>
<td>0.68</td>
</tr>
<tr>
<td>Hours</td>
<td>32.8</td>
<td>8.8</td>
<td>31.8</td>
</tr>
<tr>
<td>Wage</td>
<td>12.5</td>
<td>14.4</td>
<td>11.8</td>
</tr>
<tr>
<td>Earn</td>
<td>3,949</td>
<td>2,240</td>
<td>3,595</td>
</tr>
<tr>
<td>Weeks Worked (derived)</td>
<td>9.6</td>
<td>17.7</td>
<td>9.6</td>
</tr>
<tr>
<td>On Campus (binary)</td>
<td>0.17</td>
<td>0.61</td>
<td>0.17</td>
</tr>
</tbody>
</table>

Motivation: (Single Choice)

<table>
<thead>
<tr>
<th></th>
<th>Money</th>
<th>Professional Experience</th>
<th>Academic Experience</th>
<th>Personal Fulfillment</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.38</td>
<td>0.38</td>
<td>0.29</td>
<td>0.15</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>0.64</td>
<td>0.73</td>
<td>0.06</td>
<td>0.10</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>0.37</td>
<td>0.32</td>
<td>0.09</td>
<td>0.14</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>0.51</td>
<td>0.22</td>
<td>0.11</td>
<td>0.07</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Source: Stanford Financial Aid Survey.
Notes: Wages, hours, earnings, and motivation are only reported for students who worked.
Table 7: Difference in Differences Regression Results
Dependent Variable: Probability of Paying Tax (Earnings > $6500)

<table>
<thead>
<tr>
<th>Financial Aid</th>
<th>Seniors</th>
<th>Not Seniors</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Aid</td>
<td>0.444</td>
<td>0.134</td>
<td>0.306</td>
</tr>
<tr>
<td></td>
<td>(0.506)</td>
<td>(0.342)</td>
<td></td>
</tr>
<tr>
<td>No Financial Aid</td>
<td>0.333</td>
<td>0.243</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>(0.479)</td>
<td>(0.431)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Stanford Financial Aid Survey.
Notes: (Standard errors are in parenthesis.) * denotes 10 percent significance. The differences may not add up exactly due to rounding. The standard error on the difference in differences estimator is obtained from the regression results in Table 7.

Table 8 Difference in Differences Regression Results
Dependent Variable: Probability of Paying Tax (Earnings > $6500)

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1) Control: All Non-Seniors 228 Obs.</th>
<th>(2) Control: Juniors 103 Obs.</th>
<th>(3) Control: Sophomores 118 Obs.</th>
<th>(4) Control: Freshmen 121 Obs.</th>
<th>(5) Individual Year Effects 228 Obs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior x Receives FinAid</td>
<td>0.220* (1.74)</td>
<td>0.111 (0.57)</td>
<td>0.256* (1.65)</td>
<td>0.222 (1.46)</td>
<td>0.222 (1.46)</td>
</tr>
<tr>
<td>Junior x Receives FinAid</td>
<td></td>
<td></td>
<td></td>
<td>0.110 (0.69)</td>
<td>0.110 (0.69)</td>
</tr>
<tr>
<td>Sophomore x Receives FinAid</td>
<td></td>
<td></td>
<td></td>
<td>-0.034 (-0.23)</td>
<td>-0.034 (-0.23)</td>
</tr>
<tr>
<td>Receives FinAid</td>
<td>-0.109* (-1.71)</td>
<td>0.000 (0.00)</td>
<td>-0.144 (-1.35)</td>
<td>-0.110 (-1.03)</td>
<td>-0.110 (-1.03)</td>
</tr>
<tr>
<td>Senior</td>
<td>0.090 (1.01)</td>
<td>-0.014 (-0.11)</td>
<td>0.126 (1.16)</td>
<td>0.152 (1.33)</td>
<td>0.151 (1.33)</td>
</tr>
<tr>
<td>Junior</td>
<td></td>
<td></td>
<td></td>
<td>0.166 (1.33)</td>
<td>0.166 (1.33)</td>
</tr>
<tr>
<td>Sophomore</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.025 (0.22)</td>
</tr>
</tbody>
</table>

Source: Stanford Financial Aid Survey.
Notes: (t statistics are in parenthesis.) * denotes 10 percent significance.
Figure 1: Student Budget Constraint

Student Labor Supply Decision

Figure 2: Student Indifference Curves

Student Labor Supply Decision
Figure 3: Amount of Need Based Financial Aid Received

Source: NPSAS: 2000

Figure 4: Income of Working Students Who Also Receive Financial Aid

Source: NPSAS: 2000
Figure 5: Hours Worked Per Week.

Source: NPSAS: 2000
Figure 6: Earnings Around the Kink for Students Whose Financial Need is Fully Met

Source: NPSAS: 2000 (2664 Observations, 32 percent of students who filled out the FAFSA)

Figure 7: Earnings Around the Kink for Students Whose Financial Need is Partially Met

Source: NPSAS: 2000 (3671 Observations, 44 percent of students who filled out the FAFSA)

Figure 8: Earnings Around the Kink for Students with No Financial Need

Source: NPSAS: 2000 (3671 Observations, 20 percent of students who filled out the FAFSA)
Works Cited


