Stopping out of College: The Role of Credit Constraints *

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Abstract

Stopping out, or taking a break during college, is quite common. Twenty five percent of students who complete a bachelor's or associate's degree stopout at some point during their college career. Yet, little research has been done as to why students are stopping out. This is the first paper to test whether credit constraints matter. If students are credit constrained, they might need to stop enrolling in college temporarily in order to save money to pay for school. While learning about academic ability may be part of the story, a quarter of students who leave have a last reported college GPA of 3.25 or above. This paper employs a specific definition of credit constraints in which loan limits are a function of individual limits (aid cannot exceed the cost of attendance) and program limits. I use a dynamic structural model of college enrollment and savings decisions to test whether increasing loan limits would reduce the rate of stopout. The results indicate that increasing program limits reduces stopout by 20 percent.

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Introduction

Students taking time off from college, or stopping out, is not a rare phenomenon. The National Center for Education Statistics examined enrollment patterns of first time students who were part of the Beginning Postsecondary Students Longitudinal Study 2004/2009. Only 60.7 percent of students were continuously enrolled and students at two-year schools were less likely to be continuously enrolled than students at four-year schools. Using the National Longitudinal Study of Youth 1997 (NLSY97) data, this paper finds twenty nine percent of students who ever enroll in college stopout at some point during their college career. Conditional on completing a degree, one quarter of students have stopped out at some point. Even though this is a common behavior, little research has been done about who these students are and why they are not continuously enrolling. While there are many reasons why students could take time off during college (see Arcidiacono et al. (2013), Light (1995b), and Pugatch (2012) for example), previous work has not explored the extent to which credit constraints play a role. Specifically, this paper tests whether increasing the Stafford loan limit would reduce stopout behavior among college students. To test this, I estimate a dynamic structural model of enrollment and savings. The problem with the market for human capital is that it is hard to borrow against future earning (Becker, 1964). Therefore, students might have to temporarily stop enrolling in college to work so that they can save up money to pay for school.

It is not clear whether stopout is efficient. If students would enroll continuously in the absence of credit constraints, then stopping out is not efficient. In this case policy makers could use financial aid rules to help alleviate credit constraints. If students are stopping out in order to learn about their labor market and schooling abilities as in Arcidiacono et al. (2013), then stopout is beneficial to students. An option value arises because students who dropout have the option but not obligation to return to school after learning about financial aid offers, college ability, labor market outcomes and parental transfers.[1] In this case, it would be both more difficult and less beneficial to students to enact policies aimed at reducing stopout.

Applying for financial aid requires filing a Free Application for Federal Student Aid (FAFSA).

[1]See Stange (2012) for a discussion on the option value of college enrollment.

An Expected Family Contribution (EFC) is calculated based on information related to both the student's and parents' finances, unless the students is an independent according to aid rules. While college students are usually adults in the legal sense, the government makes it very hard for them to be considered independent of their parents when it comes to paying for college.[2] There is no guarantee that parents are willing and able to help pay for school. Also, many students have unmet need which means the aid packages does not cover the cost of attendance (COA) minus the EFC.[3] If a parent earns more, the EFC likely increases even if none of that money will be going towards paying for college.

Another contribution of this paper is calculating loan limits in a manner more similar to financial rules students face instead of just using program loan limits. A common misconception is that the amount of federal loans a student is able to borrow is based solely on program limits.[4] However, loan limits are also a function of financial need. The Consumer Financial Protection Bureau and U.S. Department of Education 2012 Report states that, "If a student borrows more than the EFC, his or her overall federal aid can be recomputed and reduced and may even be subject to recapture to the extent that it has already been disbursed." Figure 1 shows why individual loan limits matter. Conditional on having a Stafford loan, over half of students are borrowing at their individual limits. Papers that only use federal program limits would wrongly conclude that students hitting individual limits could borrow more when they in fact could not. Individual limits make it impossible to know who is borrowing at their limit if only total loans are known. Unfortunately, NLSY97 does not contain the student's EFC so this paper sets the individual's limit such that aid can not exceed the COA.[5]

[2]According to Federal Student Aid (An Office of the U.S. Department of Education), to be independent the student must be either at least 24 years old by December 31st of the award year, be married, be a graduate student, be currently serving in the U.S. armed forces, be a veteran of the armed forces, have a dependent who receives at least half of their financial support from you, be an emancipated minor or in a legal guardianship. Additionally, you can be independent if any time after the age of thirteen 1)both of your parents were deceased; 2) you were in foster care; 3)you were a dependent or ward of the state. Lastly, you can be considered independent if you were a homeless unaccompanied youth or were self-supporting and at risk of being homeless after a certain date.

[3]Carey and Dillon (2009) show that conditional on having some unmet need, the average amount of unmet need has been increasing and exceeds the maximum annual federal loan limit.

[4]The program limits differ depending on whether the student is independent or dependent and also vary by how long the student has enrolled in college.

[5]While the National Postsecondary Student Aid Study has more detailed financial aid information, NLSY97 is preferred because has very detailed dynamic information about the respondent's assets and labor market experiences.

Credit constraints have more clear policy implications than other reasons for stopping out. In an effort to decrease time-to-degree students are given financial incentives to remain continuously enrolled and finish quickly. However, if students are stopping out because they are credit constrained then current financial aid rules are exacerbating the problem. According to Kantrowitz (2012), the one-year extension of the 3.4 percent interest rate on subsidized Stafford loans to undergraduates was paid for, in part, by eliminating subsidized interest rates to new borrowers as of July 1, 2013 who take longer than 150 percent of the normal timeframe to graduate. Also, some scholarships and grants require students to be continuously enrolled.

Literature Review

There is not a large literature on why students stopout. Light (1995b) uses a hazard model and men from the National Longitudinal Survey of Youth 1979 (NLSY79) to examine what affects stopout. It finds that re-enrollment is positively related to father's education, AFQT score, being a minority, living in an urban area and the unemployment rate. Arcidiacono et al. (2013) use a model in which students decide whether or not to enroll and how much to work to explore the role of learning about different types of ability in the decision to stopout. Pugatch (2012) explores stopout behavior in South Africa. Goldrick-Rab (2006) finds that students from lower socio-economic backgrounds are more likely to have interrupted enrollment patterns (controlling for prior academic achievement). A paper not directly about stopout, but very closely related to this one is Keane and Wolpin (1997). It uses a dynamic structural model of schooling, work and occupational choices to learn about human capital accumulation.

There is a rich literature debating whether credit constraints affect educational attainment. The interest in whether credit constraints exist stems from the positive relationship between family income and educational outcomes. While a variety of strategies have been used to try to test for credit constraints in the data, most do not use financial aid rules to measure credit constraints. One strategy employed is estimating a debt limit such as in Keane and Wolpin (2001). Keane

and Wolpin (2001) finds that increasing loan limits would not increase schooling levels while a tuition subsidy would have a large effect on completed schooling. Another strand of credit constraint literature has measured credit constraints through models allowing for different interest rates (Becker (1975), Rosen (1977), Willis and Rosen (1979), Willis (1986), Lang (1993), and Card (1995) for example). The idea is that credit constraints will show up in the models through higher interest rates for the constrained population. A concern with these two methods is that the models will not be able to differentiate between credit constraints and loan aversion. While loan aversion was not discussed much in the past, it is currently an important issue.[6]

Some have interpreted work by Card (2001) in which the IV returns to education are higher than the OLS estimates to indicate that students are credit constrained. Carneiro and Heckman (2002) lists arguments as to why this interpretation is invalid. Cameron and Taber (2004) uses differences in direct and indirect costs of schooling to test for credit constraints. The argument is that students who are credit constrained should be more responsive to changes in the direct cost of college than the indirect cost of college. Shea (2000) uses parental variation in union experience, industry and job loss to examine how income affects human capital accumulation. Brown, Scholz and Seshadri (2012) focuses on the impact of the EFC. It uses variation in sibling spacing to test whether changes in financial aid have a larger impact on students who are less likely to have received financial help from parents while in school. Cameron and Heckman (2001) argues that the relationship between family income and schooling attainment is largely driven by long term factors. This argument is echoed in Carneiro and Heckman (2002) in which the idea of long term credit constraints is defined as the "inability of the child to buy the parental environment and genes that form the cognitive and noncognitive abilities required for success in school." Lochner and Monge-Naranjo (2011) test for credit constraints by employing a model in which students must follow federal loan program limits but can also take private loans. It is easier for higher ability students to get private student loans in the model. The counterfactual indicates

[6]Loan aversion means people get disutility from loans which could be due to a physic cost from having debt. For example, Field (2009) does an experiment in which law students can either have a scholarship that would convert into a loan if the student did not pursue a public service career or could have a loan that would be forgiven if the student pursues a public service career. Even though the two alternatives are financially equivalent, more applicants enrolled when offered the scholarship

that increasing federal loan limits would disproportionally improve the educational attainment of the least able poor students. The paper most directly related to this paper is Stinebrickner and Stinebrickner (2008) which explores the role of credit constraints in the dropout decision. It takes advantage of data from Berea College in which the direct cost of schooling is essentially zero because all students there receive a scholarship that covers tuition for four years. It finds that 20 percent of students are constrained and among this group the average amount the student would like to borrow is $889 while the median amount is $500. Among credit constrained students, 40 to 48 percent of dropout can be attributed to credit constraints.

Overall, the results on whether credit constraints affects educational attainment has been mixed. However, a pattern has emerged of papers using older data sets concluding credit constraints do not affect education attainment while papers using more recent data sets concluding credit constraints do matter. This is consistent with work showing the growth in inequality in college entry, persistence and completion by socioeconomic status despite improvement in college entry among all socioeconomic groups (Bailey and Dynarksi 2011). Belley and Lochner (2007) shows the dramatic increase in the effect of income on college attendance from the NLSY79 and the NLSY97.

In addition to estimating the effect of credit constraints on educational attainment, work has been done on whether credit constraints cause students to delay entry into college. Kane (1996) uses state variation in tuition to argue students are credit constrained while Johnson (2013) concludes that delayed entry is mainly driven by preference shocks.

Data

The data come from the Restricted Access NLSY97. NLSY97 includes both a cross-sectional nationally representative sample representing and supplemental samples of the black and Hispanic population. There is monthly college enrollment data starting in 1997. There is also information on whether the student is enrolled part-time or full-time, whether the student is enrolled in a two-year school, four-year school or graduate school, and if the student is seeking a degree. Addi-

tionally, there is information about financial aid (what types of aid students received, how much of each type, and how much they had to pay for school out of pocket) as well as if students were given money by their parents. There are also demographic variables, asset information, measures of academic outcomes (test scores, GPA, credits, etcetera), and employment information. The Integrated Postsecondary Education Data System (IPEDS) can be merged with the Restricted Access NLSY97 to obtain information on student costs (tuition, fees, books, etcetera) and school characteristics. IPEDS is an annual survey conducted by the National Center for Education Statistics. The survey includes information about enrollment, graduation rates, characteristics of incoming students, costs, financial aid and expenditures. All postsecondary institutions participating in or applying to participate in a federal financial aid program (for example, the Pell grant or federal student loans) is required to submit the information. See Table 1 for more information about the sample selection for the descriptive work.

Who are stopouts?

Given that so little is known about stopouts, the first part of this paper aims to establish some stylized facts about stopouts in the NLSY97 data. First, stopout is common among college students. To get a better idea of what might be driving this behavior, students with different enrollment patterns are compared. Stopouts are less advantaged than students who continuously enroll and complete degrees but more advantaged than dropouts. If stopouts were less productive we would expect to see a wage penalty, but there is no correlation between stopout and wages. While there are many reasons students might stopout, this paper explores major selection (too hard of a major and thus dropout), noncognitive skills, learning, and credit constraints.

In order to determine who stopped out during college, the individual's enrollment status is checked in the spring semester (February) and the fall semester (October). Stopout also depends on enrollment intensity. For example, a student who returns for a painting class should not be counted as a stopout. Therefore, in order to be counted as a stopout the student must re-enroll as

either a full time student or a part time student who is seeking a degree. Also, this paper focuses only on enrollment decisions while in undergraduate education. Thus, students who take time off between undergraduate and graduate school or between high school and college are not considered stopouts for the purpose of this paper. Twenty nine percent of the weighted sample stopout at some point. Out of the students who obtain an associate's degree or bachelor's degree, twenty five percent have stopped out at some point. This may underestimate the amount of students who return to school because it is possible that students return to school after the 2009 survey. Also, students who enroll in less-than-two-year programs (for example certificate programs) are not counted as enrolled by the NLSY97.

Figure 2 shows the distribution of the number of non-enrollment spells conditional on stopping out.[7] The most common number of non-enrollment spells is one, and the density decreases as the number of non-enrollment spells increases. The maximum number of non-enrollment spells any student has is five. Having more than one non-enrollment spell is more consistent with credit constraints than learning, because students who have already learned that they would receive little utility from the unskilled labor market would not need to stopout again to learn even more. On the other hand, students who are credit constrained might need to leave multiple times as their assets dwindle from paying for school. This is more consistent with the learning explanation. Figure 3 shows how many semesters students are enrolled prior to stopping out for the first time. Most students who stopout leave after only one semester of school.[8] Generally speaking, the longer a student is enrolled, the less likely it is that he will stopout. Figure 4 shows the distribution of the length of the non-enrollment spell measured in semesters for students with only one non-enrollment spell.[9] The most common number of terms taken off is one and most breaks do not last very long.

[7]This is from raw data - no weights were used
[8]This is from raw data - no weights were used
[9]This is from raw data - no weights were used

How do stopouts compare with other students?

Table 2 shows some descriptive statistics broken down by enrollment type. Stopouts appear to be more advantaged than dropouts but less advantaged than students who enroll continuously and complete a degree (called continuous completers in the table). Stopouts appear very similar to dropouts in terms of being much more likely to start at two-year schools and being much more likely to be a minority (Black, Hispanic or more than one race). Stopouts are more likely to complete an associate's degree than continuous completers, but are much less likely to complete a bachelor's degree.

If stopouts are worse students than people who are continuously enrolled, we might expect to see them selecting less demanding majors than students who do not stopout. Table 3 compares the first major listed for stopouts and students who do not stopout. The top three majors are business management, computer/information science and nursing for both groups. Table 4 compares the last major listed of stopouts and students who do not stopout. Major is defined as the last major ever listed by the student (although some never listed a major). Business management is the most popular major among both groups. While the rest of the ranking differs by whether the student stopped out or not, there does not appear to be a clear pattern of stopouts selecting less demanding majors. It is interesting to note that students who do not stopout see a decline in the popularity of computer/information sciences and engineering majors while there is an increase in the popularity of education and fine and applied arts. Among stopouts, there is also a decline in computer/information sciences, but an increase in the popularity of engineering.

Labor market outcomes

Next we examine whether labor market outcomes are worse for stopouts than students who continuously enroll and have similar educational attainment. If stopouts are less productive employees, we would expect a wage penalty. Wage regressions for those without a college degree and those with a bachelor's degree are done separately. First, do stopouts earn lower wages conditional

on not completing a degree? Results are in Table 5. The natural log of the wage is the dependent variable. Standard errors are clustered at the person level. Year and region fixed effects are always included. Experience is accumulated based on hours and weeks worked, regardless of enrollment status. In these wage regressions a person gets .25 experience for each semester of part time work (300 or more hours and 15 or more weeks) and .5 experience for every semester of full time work (875 or more hours and 25 or more weeks). The sample includes stopouts who never complete a degree and dropouts. A wage observation is included only if it is after the person has completed all of his schooling. In none of the specifications is there a significant correlation between stopping out and lower wages. Thus, stopouts and dropouts appear to be equally productive workers.

Stopping out is correlated with being less likely to complete a degree, but do stopouts who manage to earn a bachelor's degree earn the same wages as students who did not stopout? Table 6 explores this question. Again, region and year fixed effects are always included. The only specification in which stopout is negatively correlated with wages is the one without controls for experience after completing the bachelor's degree. This is not surprising because students who do not stopout have a longer time period after the bachelor's degree to accumulate experience in the data. Also, it is worth noting that there does not appear to be any return to experience accumulated prior to completing the bachelor's degree. However, these regressions may underestimate the true penalty for stopping out if stopouts select lower paying occupations. Specification IV shows that even without occupation fixed effects there is no correlation between stopping out and lower wages when controlling for experience after completing a bachelor's degree. These results indicate that stopouts are no less productive people than those who continuously enroll.

To further explore occupational choices of stopouts and those who continuously enroll, Table 7 ranks occupations for both groups. The occupation listed is the last occupation in the period immediately following completion of a bachelor's degree. This is used in order to give students time to start their post-baccalaureate careers. Occupations are defined as the 2002 Census four-digit codes. Office administration support, sales and teacher are the top three occupations for both enrollment types. There does not appear a clear pattern of stopouts working in lower paying occupations, at least immediately following graduation.

Light (1995a) looks at the effect of interrupted schooling on wages in the NLSY79 data but uses a different definition of stopout. In that paper students can stopout during high school, between high school and college and during college. It finds the returns to additional schooling shrink the longer the student stops out. The only group not facing a penalty for deferring schooling is students with the lowest schooling levels who return to school relatively quickly. Since stopping out is not correlated with a wage penalty in this sample it may indicate that stopout behavior is driven by different reasons in the NLSY97.

Why stopout?

Credit constraints can only be part of the story as to why students stopout. Students likely have different life situations and make enrollment decisions for different reasons. Therefore, it is important to explore various reasons why students might decide to take time off from school.

It could be the case that some students chose majors that are too hard and dropout as a result. After taking a break some of these students may decide to enroll again but with a different major. Table 8 checks for evidence of this. After returning to school, students do have a different ranking of most popular majors.[10] However, there does not appear to be a strong pattern of less demanding majors after returning from a non-enrollment spell. For example, engineering is the tenth most popular major for students both before and after stopping out.

Since Heckman and Rubinstein (2001) finds GED recipients have lower noncognitive skills, noncognitive skills of stopouts are compared with dropouts and continuous completers. We might expect that stopouts have lower noncognitive skills than their continuously enrolled peers. In addition, we might expect that stopouts who eventually complete degrees have better noncognitive skills than stopouts who are not observed obtaining a degree. The noncognitive skills examined here come from Girls Behavioral/Emotional Problems Scale and Boys Behavioral/Emotional Problem scale. These questions were part of the 1997 survey which allows for a lower non-response rate and is administered before students attend college. The items for these questions were se-

[10]This is from raw data - no weights were used

lected from the Child Behavior Checklist and were chosen based on their ability to identify who was referred to mental health services among demographically similar children (Child Trends Inc. and Center for Human Resource Research at The Ohio State University, 1999). For each question the respondent could select "not true", "sometimes true", or "often true" as responses. Girls were asked

1. Your school work is poor.
2. You have trouble sleeping.
3. You lie or cheat.
4. You are unhappy, sad, or depressed.

while boys were asked

1. You have trouble concentrating or paying attention.
2. You don't get along with other kids.
3. You lie or cheat.
4. You are unhappy, sad, or depressed.

A higher score indicates more frequent or more numerous emotional and behavioral problems. If the respondent only answered three out of the four questions there is still a score, although it has been scaled to account for the one missing answer. Answering less than three questions results in a "missing" on the Behavioral/Emotional Problems Scale. Parents were also asked to evaluate their child using the same set of questions.

The first relationship of interest is whether the relationship between noncognitive skills and GED recipients found in Heckman and Ruinstein (2001) hold in the NLSY97 data. For both girls and boys, students who receive a GED score significantly higher (worse) on the Behavioral/Emotional Problems Scale than those with a traditional high school degree.

Table 9 shows scores on the Behavioral/Emotional Problems Scale separately for students who continuously enrolled and completed a degree, students who stopped out, and students who

dropped out. For all of the scores, those who continuous enroll score significantly lower (better) than those who stopout or dropout. There is no difference in scores between stopouts and dropouts. Thus, scores on this noncognitive measure appears to be correlated with leaving school without a degree, but not with returning to school.

Table 10 compares the scores on the Behavioral/Emotional Problems Scale for stopouts who complete degrees compared to stopouts who do not complete degrees. On all measures except the Girls Youth Report, stopouts who earn degrees score lower (better) than stopouts who do not earn degrees. Thus, stopouts with non-cognitive skills closer to continuous completers are more likely to complete than stopouts with noncognitive skills closer to dropouts. Therefore, cognitive skills are not the only skills correlated with degree completion.

The next potential explanation is that students are learning about their labor market and educational abilities over time. The learning story is that stopouts and dropouts do worse in school than expected and that is why they leave. Dropouts learn their ability in the low skilled labor market is high while stopouts realize they are even worse off in the low skilled labor market. Thus the stopout will return to school while the dropout remains not enrolled. To test for descriptive evidence of this, we need to compare educational outcomes for those who remain enrolled and those who leave school. In the table comparing students of different enrollment patterns, we saw that dropouts and stopouts have lower college GPAs after the first semester. However, only comparing means masks distributional differences between those who remain enroll and those who leave school. Figure 5 shows that many students who leave (not including due to graduation) have GPAs that would not indicate that they have poor schooling ability.[11] While learning can explain why those in the lower tail of the distribution are leaving, it does not explain why a quarter of the students who leave have GPAs at or above a 3.25. Running a regression on wages in the period immediately following when students leave allows for a descriptive comparison of the success stopouts and dropouts have in the low skilled labor market. The dependent variable is the natural log of wages and region, occupation and year fixed effects are included. The other covariates are the same as before (female, minority, ASVAB, etc.). The coefficient on dropouts

[11]GPA in this figure is the last GPA reported by the individual. GPAs are grouped such that 0 corresponds to a GPA of 0 to .25, 4 corresponds to 3.75 to 4 and the rest are intervals of .5

(compared to stopouts) is -.022 and is not significant at the five percent level. It is significant at the ten percent level. Thus, dropouts may actually perform worse than stopouts in the labor market. What seems to matter most in terms of wages for this group is experience. Learning may be part of the explanation as to why students stopout, but it can not be the whole story.

To descriptively examine whether credit constraints matter for students' stopout decisions we want to compare financial data for those who stopout and those who do not. Students might be credit constrained because their parents have few financial resources to help them pay for college. Figure 6 compares the distribution of parent net worth in the 1997 survey for those who will leave in the next period and those who will remain enrolled in the next period.[12] The mean parent net worth for those who will remain enrolled is $138,771.1 and the mean parent net worth for those who will leave is $116,880.2. The median amounts are $78,050 for those will remain enrolled and $60,550 for those who will not remain enrolled.[13] Thus, students who leave school without a degree are more likely to come from families with fewer financial resources.

If students are stopping out because they need to accumulate assets to pay for school, then we would expect students who return to have more assets than those who continue to not enroll. Assets include savings, checking and money market accounts. Figure 7 compares the distribution of assets for those who will return to school in the next period and those who will not return to school in period.[14] The mean amount of assets for someone who will return to school in the next period is $819 while the mean amount of assets for someone who will not return to school in the next period is $160. Interestingly enough, the mean and median parent net worth for those who will return and those who will not return are quite similar. What seems to matter for students returning to school is their own assets, and not the net worth of their parents.

In order to get some context as to whether this difference in assets between those who will re-enroll and those who will not re-enroll is meaningful we can turn to Stinebrickner and Stinebrickner (2008). Another survey question asked is how much the student expected to spend during

[12]This figure is conditional on answering the question and reporting a net worth greater than or equal to -1,000. This cuts the bottom five percent of the distribution of responders.

[13]No survey weights are used.

[14]No survey weights are used. The figure is limited to those with $5,000 or less of assets. This drops the top .69 percent of people who will not return and the top 3.15 percent of people who will re-enroll.

the year (September - August) not including college related costs. The mean response for the whole sample is $957 and the mean amount for the constrained sample is $695. Thus, students returning could plausibly cover their non-college costs during the year. Whether they could pay for college related expenses would depend on financial aid packages.

Stopouts might be credit constrainted if they receive less aid and have to pay for more of their schooling expenses through loans and out of pocket expenditures. Figure 8 and Figure 9 show the unweighted distributions of loans for those currently enrolled and those currently not enrolled by enrollment status in the next period.[15] In both figures the loan distributions are very similar regardless of enrollment status in the next period. Given this, we can get an idea of how many stopouts are hitting the program loan limit from Chang Wei and Skomsvold (2011).[16] It finds that in 1999/2000 forty eight percent of students took the maximum program amount of Stafford loans and in 2003/2004 fifty one percent took the maximum amount. After a program limit increase was implemented in 2007, forty three percent of students took the maximum program limit in 2007/2008. Thus, a reasonable guess is that about half of the stopouts are hitting the program limit.

Another aid comparison is to plot the current share paid by students depending on whether the student will enroll in t+1. Figure 10 shows that while the middle of the distributions are quite similar the mass point at currently paying the entire share is higher for those those who will not enroll in t+1 while the mass point at currently paying nothing is higher for those who will enroll in t+1.[17] However, since stopouts are more likely to start at two-year schools it is not clear whether the share paid is higher because they get different aid packages or because the overall tuition at two-year schools is different. Figure 11 shows that the out of pocket expenditures student pay looks very similar for those who will enroll in the next period and those who will not enroll in the

[15]These numbers may seem quite small given the media's portrayal of student debt. However, as Dynarksi and Kreisman (2013) point out, 98 percent of students borrow $50,000 or less and 69 percent borrow $10,000 or less. In this sample, 98 percent of students borrow $50,000 or less. Avery and Turner (2012) examines student borrowing and concludes "the claim that student borrowing is 'too high' across the board can- with the possible exception of for-profit colleges- clearly be rejected." McPherson and Baum (2011) caution against attaching too much significance to extreme examples when deciding how much student loans to take.

[16]The sample is undergraduates who attend only one institution, the class year be known, and the student must have taken a Stafford loan. The data comes from multiple rounds of the National Postsecondary Aid Study and the National Center for Education Statistics.

[17]No survey weights are used.

next period.[18] Thus the descriptive data do not indicate that stopouts receive worse financial aid packages.

To summarize the descriptive results, stopouts are more disadvantaged than those who continuously enroll and complete degrees and are less disadvantaged than dropouts. There is no clear pattern of stopouts selecting different majors or occupations. There is also no evidence of stopouts being subject to a wage penalty in the labor market. One part of the story that students stopout is because they are learning about their academic and labor market abilities. Since stopouts have similar aid distributions but fewer resources to pay for school, this indicates that stopout behavior might be partly due to credit constraints. However, it is hard to descriptively determine the extent to which credit constraints affect stopout behavior. To address this, the strategy is now to estimate a dynamic structural model of enrollment and saving decisions. To determine the extent that credit constraints matter, we can compare stopout behavior under the current loan program limits with stopout behavior under a counterfacutal world in which program limits are increased. The reason actual changes in loan limits can not be used is that there is no good control group since the policy limits are set by the federal government. A structural model allows for a comparison of the same person under different policy regimes.

Model

Each period the individual decides whether to enroll in postsecondary school or not. If the individual chooses not to enroll, he will work full time.[19] If he chooses to enroll in school he also is allowed to work some.[20] The individual also decides how much to save and consume each period.

Time starts in the model once the individual has attended their first semester of postsecondary school. Individuals make decisions twice a year (once a semester). Each period is six months long (January to June or July to December). Decisions are made until the individual gets a bachelor's

[18]The figure focuses on those with OOPE less than or equal to $10,000. This drops the top 2.73 percent of students who will stay and the top 3.39 percent of students who will leave school. No survey weights are used.

[19]Full time is defined as 1,000 hours which is based on working forty hours a week for twenty five weeks during the six month period

[20]Given that two thirds of observations of people work at least 300 hours and at least 15 weeks during the six month period in which they are enrolled it is important that student are allowed to work some.

degree or turns 28. Once this occurs the individual can no longer enroll in college and must work full time. Wages are known with certainty for the rest of the lifetime and depend on how much education the person chose. Individuals must solve the following optimization problem

$$\max_{c} \Sigma \beta^t \frac{c_t^\rho}{\rho} \leq PV + assets - loans \tag{1}$$

where PV is the present discounted value of lifetime earnings. The returns to education do not depend on whether the student stopped out or not. However, it is assumed all individuals retire at the same age so stopouts have fewer years in the labor market to get the returns from their degree. People with student loans must repay them with interest at this time. Default is not allowed in the model.[21]

The utility an individual gets for each option is given by

$$U(t) = \sum_{m \in (s,w)} U_m(t) d_m(t) \tag{2}$$

where $d_m(t) = 1$ if alternative m is chosen at time t and zero otherwise and $U_m(t)$ is the reward per period associated with the m'th alternative (enroll in school or not).

School

The utility for individual i at time t is given by

$$U_{it} = \alpha \frac{(c_t + c*)^\rho}{\rho} + \nu_0 \mathbb{1}(m_t = s, m_{t-1} = w, AA = 0) + \nu_1 \mathbb{1}(m_t = s, m_{t-1} = w, AA = 1) + \beta_{term} numterms_t + \epsilon_{it} \tag{3}$$

[21] This does not seem unreasonable given the work by Lochner and Monge-Naranjo (2014) which uses Baccalaureate and Beyond data to examine loan repayment behavior. Students in this study graduated with baccalaureate degrees during the 1992-1993 school year. In both 1998 and 2003, 92 percent are repaying or already repaid in full. Over this time period the default rates goes from 4.2 percent to 5.8 percent. It is noted that being in default at one point in time does not mean the borrower will continue to be default.

where c is consumption, c* is the consumption bonus for being in school,[22] ν's represents the penalty for returning to school after taking time off depending on whether or not you have an associate's degree (AA), and ϵ_{it} is the random shock each period.

Individuals who are in college must pay for their education. Following Arcidiacono (2005), students pay a share of the COA. This specification will give mass points at zero and one which is consistent with the actual financial aid data. Given that there is one school in the model instead of many schools with varying tuition it is easier to focus on the share instead of the dollar amount. The COA includes tuition, fees, books and supplies. The share is determined by

$$share = \begin{cases} 0 & if\ s* \leq 0; \\ s* & if\ s* \in (0,1); \\ 1 & if\ s* \geq 1. \end{cases}$$

where

$$s*_t = S_0 + S_i * Independent_t + S_{hh2} * TopHalf + Serror_t \tag{5}$$

where Independent is equal to 1 if the student is greater than or equal to 24 years old, TopHalf is an indicator for having parents in the top half of the household net worth distribution in the 1997 survey, and the error term is distributed $N(0, \sigma^2_{share})$. The share is defined as the percent of the cost of attendance the student must pay after aid other than loans are subtracted. The cost of attendance is equal to the summation of the tuition, fees, books and supplies. Students pay in-state or out-of-state tuition depending on whether the school is located in the state in which the student completed high school. Non-loan aid includes grants and scholarships, work study, employer assistance, tied transfers from parents, and "other".

Once students are done with school they must repay the loan total plus a three percent interest rate. Loans evolve according to

[22] c* can include access to the library, computer labs, cafeteria, health services, sports centers, etcetera. This follows the idea from Jacob, McCall, and Stange (2013) that students value college amenities.

$$LoanTotal_t = LoanTotal_{t-1} + Loans_t \tag{6}$$

where

$$Loans_t = MIN[FederalLimit, share * COA] \tag{7}$$

where the Federal Limits are the Stafford Annual Limits from 1993 to 2007 (Kantrowitz (2014)). The annual limit is divided by two in order to get a semester loan limit. If a student is independent (by the above age definition) then he faces a different loan limit than a dependent student. Dependent students can borrow $2,625 in their first year, $3,500 in their second year and $5,500 in their third year and beyond until the aggregate limit of $23,000 is hit. For independent students the limits are $6,625 in the first year, $7,500 in the second year and $10,5000 for the third year and beyond until the aggregate limit of $46,000 is hit. It is important to note that in the model it is currently assumed that students take the full loan offered. This assumption will be relaxed in future versions of this paper but for the moment the results can be thought of as an upper bound on students' reactions to loan policy changes. Private student loans do not exist in this model.[23] Loans taken during the first term in school are part of the initial conditions while semester loan limits determine future loans. The part of the share*COA not covered by loans must be paid for by the student. This is referred to as the out of pocket expenditures (OOPE).

Each semester, regardless of enrollment status, the individual can receive a parental transfer. Parental transfers include allowance and non-allowance transfers but does not count money paid towards tuition. Any money from parents that goes to tuition would show up in the budget constraint through lowering the OOPE. Individuals do not know how much parental transfers, if

[23]Dynarksi and Kreisman (2013) state that Stafford loans account for 75 percent of the student loan volume. According to the Consumer Financial Protection Bureau and U.S. Department of Education 2012 report, in 2008 "42 percent of undergraduates at for-profit colleges took out a private student loan, while only 14 percent of all undergraduates used a private student loan." Given that many for-profit schools do not have clear academic calendars, students attending those schools are largely dropped from the sample. In fact, less than one percent of the observations used in estimation are for students at for-profit schools. Also, according to Figure 1 in College Board (2009) private students loans were consistently a small part of student aid until the 2004-2005 school year. Considering that NLSY97 students started entering college in 1997 and started completing bachlor's degrees in 2000, many students will have been enrolled before the growth of private student loans. College Board (2009) also shows that while there has been growth in that area of aid, it remains much smaller part of student aid than Stafford loans. Thus, focusing on Stafford loans should cover most of the loans in this sample.

any, they will receive in the future. Only the transition matrix between different levels of parental transfers is known. The budget constraint is

$$c_t + a_{t+1} = w_t * h_t + ptransf_t + (1 + r)a_t - OOPE_t \tag{8}$$

where c is consumption (which cannot be negative), w is wage, h is hours worked, ptransf is parental transfers, a is assets, and r is the rate of interest. It is important to note that loans do not show up in the budget constraint directly. Students can not take out loans in order to directly increase consumption or savings. Loans only show up in the budget constraint indirectly through lowering the OOPE students must pay for their educational expenses. Consumption is the maximum of a consumption floor and the c_t from equation 8 when individuals are not enrolled. While in school they get the consumption bonus in addition to c_t from equation 8.

Wages

Students are uncertain about their wages until they turn 28 or graduate with a bachelor's degree. Before one of those events occurs, wages are determined by

$$ln(w_t) = A_0 + exp * A_1 + e_t \tag{9}$$

where exp is work experience. Experience increases only if the individual is not in school to keep the state space smaller. e_t is distributed $N(0, \sigma^2_{wage})$ with no serial correlation.

Not Enrolled in School

Utility from not being enrolled is

$$U_t = \alpha\frac{(c)_t^\rho}{\rho} - \beta_1 \mathbb{1}(m_t = w, m_{t-1} = s, 1) + \beta_2 \mathbb{1}(m_t = w, m_{t-1} = s, 2{-}6) + \beta_7 \mathbb{1}(m_t = w, m_{t-1} = s, 7) + \epsilon_t \tag{10}$$

The β's represent the cost of switching from school to not being enrolled in school depending on how many terms you have previously enrolled. The cost is different for those enrolled for one term, two to six terms and seven terms.

State Space

The state space (Δ) consists of assets, loans, age, semesters of experience (semesters not enrolled in school), whether the individual was enrolled in the previous period (gone), and parental transfers.

Estimation

The decision problem can be written in recursive form as

$$V(x,\epsilon) = max_d(\upsilon(x,d) + \epsilon_d), \tag{11}$$

where d is whether or not you enroll and

$$\upsilon(x,d) = U(x,d) + \beta\Sigma p(x^{'}|x,d)\overline{\upsilon}(x^{'}) \tag{12}$$

and

$$\overline{\upsilon}(x) = E_\epsilon V(x,\epsilon) \tag{13}$$

where β is the discount factor and E_ϵ denotes the expectation with respect to the vector ϵ with components ϵ_d. It is assumed that the errors (ϵ) are drawn from a Type I extreme value distribution. Then, using arguments in McFadden (1974) and Rust (1987) we have closed form probabilities of choosing option d given the current state x such that

$$p(d \mid x) = exp(\overline{\gamma} + \upsilon(x,d) - \overline{\upsilon}(x)) \tag{14}$$

where $\overline{\gamma}$ is the Euler constant and

$$exp(\overline{v}(x)) = exp(\overline{\gamma})\Sigma_{d'} exp(v(x, d^{'})) \tag{15}$$

The amount of savings comes from the first order condition and the fact that assets can not be negative. Consumption comes from the budget constraint. Individuals know the transition matrix between amounts of parental transfers which can be found in Table 11. Currently the parental transfers are exogenous but in the future could be conditional on enrollment and parental net worth. Parental transfer responses fall into different ranges in the NLSY97 survey. The middle value of the range is divided by two to get how much parents give each semester. This in part explains why people are likely to have the same transfer amount the next semester. The present values of earnings are based on the wage growth by education levels found in Rusbinstein and Weiss (2007).

The model is solved using backwards induction. Simulated Method of Moments is used for estimation. Simulations of 10,000 individuals with initial conditions picked from the data with replacement are used for estimation. However, there is some missing data on parental transfers and assets. Assuming the data is missing at random, the initial parental transfer and asset data are based on the distribution of available initial data. The estimate $\hat{\phi}_s$ is chosen to minimize the weighted distance between the moments observed in the data, $\hat{M}$, and their simulated counterparts that are generated by the model, $\mathrm{m}(\phi_s, \hat{\phi}_p)$:

$$\hat{\phi}_s = \underset{s}{\operatorname{argmin}}(\hat{M} - m(\phi_s, \hat{\phi}_p))'\Omega(\hat{M} - m(\phi_s, \hat{\phi}_p)) \tag{16}$$

where Ω is the symmetric positive semi-definite weighting matrix.

While the inverse of the variance-covariance matrix of sample moments is the asymptotically efficient weighting matrix, Altonji and Segal (1996) argue it is biased in small samples. This paper employs a modified version of the inverse of the variance matrix in which some moments have variances scaled by different factors. To give the enrollment moments relatively more weight the variance of the other moments are scaled up by four.

Seventeen parameters in the model are estimated. Parameters in the utility function to be estimated include the coefficient on consumption (ρ), the cost of going back to school depending on whether or not the person has an associate's degree (ν_0, ν_1), the benefit from being enrolled in school that depends on how many semester the student has been enrolled (β_{term}) the cost of leaving school (β_1, β_2, and β_7), α, the consumption value of school (c*), and the consumption floor when not in school (cfloor). Parameters related to the share of tuition that students pay include the intercept (S_0), the coefficient on being an independent student (S_i), the coefficient on being in the top half of the household net worth distribution (S_{hh2}), and the variance of the error term (σ^2_{share}). The discount rate is set to equal $\frac{1}{1+irate}$ where the period (six months) interest rate is 1.5 percent. Parameters from the wage equation include the intercept (A_0), the coefficient on experience (A_1), and the variance of the error term (σ^2_e).

Moments used in estimation include the mean assets. To estimate the wage parameters, the moments include the wage by experience levels (zero to five, six to twelve and thirteen or more), the overall wage and the wage variance. To match the financial aid data, shares by independent status, shares for those in the top half of the household net worth distribution in the 1997 survey, the overall share mean and the variance of the share are moments. To match enrollment patterns, percent return by terms of school (including current period) and percent leave by terms of school previously enrolled are used. In order to look at the potential for credit constraints moments include the return percent by different asset levels. There are a total of 29 moments.

Simplifying Assumptions

Currently, the estimation sample is a subsample of males who first enroll in college at age 18 (329 individuals). Most students start college when they are 18 years old. The reason for using this subsample is that knowing current age and work experience allows me to know school experience instead of having to keep track of that separately. In the future I will add in students who start college while close to age 18. The sample is currently limited to males, but in the future I will estimate the model separately for females. Another current simplification is to have students

graduate with an associate's degree once they complete four semesters of school and have students graduate with a bachelor's degree once they complete eight semesters of school. The average COA for the estimation sample is used for the COA in the model. Students accept any student loan offered to them in the simplified model.

Results

Table 12 shows results of the estimation. Again, these estimates are based on males who first enroll in postsecondary school at age 18. Given the very small level of assets in the real data, ρ ends up being on the less risk averse end of the range found in the literature. There is a slight benefit to return to school instead of a cost. The cost to leave school is largest when the student has enrolled in two to six terms. The cost is much smaller after seven terms. The coefficients on the share paid are the expected sign. Independent students pay less while students from the top half of the household net worth distribution in the 1997 survey pay more.

Table 13 and Table 14 show the model fit. The model fits wages by experience quite well. The model slightly underestimates the return by asset and return by terms. The model overestimates who leaves after the first term and underestimates who leaves after the fifth and seventh term. The reason the model underestimates who leaves after enrolling in seven terms of school is that students who leave after seven terms should return at high rates because they are so close to receiving a bachelor's degree. Thus, in order to match who returns for their eighth term the model underestimates who leaves after seven. Allowing for graduation probabilities will help ameliorate this problem since some students will receive their bachelor's degree after seven terms. The model overestimates the assets because the individuals are so risk averse, but including the c* and consumption floor help lower the mean asset closer to the real asset mean. The share paid moments fit pretty well with the exception of independent students and students with high net worth parents. The wage has a larger variance in the simulated data but the mean overall wage is off by less than $two. The model fit will be improved in future versions of the paper.

Counterfactuals

The first counterfactual is testing what happens to enrollment patterns when the Stafford Loan limits are increased by $500 each term. An increase in the student loan limit could increase, decrease or have no impact on stopout behavior. If stopout is not at all due to credit constraints then an increase in loan limits would not change the stopout behavior. If students are stopping out because of credit constraints, then an increase in the loan limit would decrease stopout. If the increase in the loan limit induces people who would have otherwise dropped out to return to school, then it could increase stopout behavior.

In the model if an individual is offered a loan while enrolled they do not turn down the loan or accept only part of it. Thus, the results of this counterfactual can be thought of as an upper bound on the affect of increasing loan limits since some students will not accept any or all of the loan. Table 15 shows the results of this counterfactual. This policy would reduce the percent of students who leave by 8.4 percentage points. It would also reduce the percent of students who ever return by 1.6 percentage points or 20 percent. This counterfactual indicates that a large amount, but not all, of stopout is caused by credit constraints.

The second counterfactual is to reduce the cost of attendance by $500 per term. Table 15 shows the results of this counterfactual experiment. The subsidy reduces the percent of students who leave by 6.7 percentage points and reduces the percent who return by 1.5 percentage points. This corresponds to a 19 percent decrease in stopout. Thus, both increasing loan limits and tuition subsidies would reduce stopout behavior.

However, this model abstracts from the decision to enroll in college. If loan limits were increased or students were given a subsidy it could induce people to attend college who would have otherwise not enrolled. These students who are induced to attend might be the type who are likely to stopout. Thus, such a policy might actually increase stopout by changing the composition of students attending school.

As Heckman, Lochner, and Taber (1998) point out, financial aid literature tends to not account for general equilibrium effects such as the effect on enrollment of increasing taxes to finance education subsidies or the change in skill prices. For example, it might be a concern that extend-

ing student more credit will increase default rates. However, Ionescu (2008) finds that defaults are not higher among individuals that are the most financially constrained. Rothstein and Rouse (2011) and Field (2009) indicate that changing how many student loans individuals have could impact career choices. Linsenmeier, Rosen, and Rouse (2006) find marginally significant affects of aid package composition on matriculation for minority students. Also, it would be worth knowing whether increasing loan limits would result in schools increasing tuition such that students are no less credit constrained then they were before the increase.

Future Work

Improving model fit for when people leave is the main goal for the future. Using graduation probabilities based on how many terms students have enrolled should help with this problem. Allowing for more flexibility in the share of tuition function is another goal. Given that not all students take students loans at all or accept the full loan offered future iterations of the paper will estimate how much of the loan offer students will accept. I can use the percent of students hitting the maximum amount from figure one as a moment to identify loans acceptance rates. The model will be estimated for females (separately from males) in the future. This will allow all of the coefficients to vary by gender which is important since men and women may make enrollment decisions for different reasons.

Conclusion

Stopout is a common behavior that has not been studied in great detail. This paper adds to the literature on stopout behavior by establishing some stylized facts using NLSY97 data. First, twenty nine percent of the weighted sample of college goers stopout at some point during their college career. While one non-enrollment spell is the most common, the maximum number of non-enrollment spells is five. Generally speaking, the longer a student has been enrolled, the less

likely it is that he will stopout. Most non-enrollment spells are short in duration. Stopouts appear to be more disadvantaged than their continuously enrolled peers. However, stopouts appear more advantaged than dropouts. The main consequences of stopout is lower graduation rates and increased time-to-degree. Stopouts do not appear to face wage penalties in the labor market. Occupations immediately following completion of a bachelor's degree are similar for stopouts and those who continuously enrolled.

There are many reasons why students might take time off from school. It is important to understand why students stopout in order to know whether policy should be used to reduce it. Non-cognitive skills are correlated with leaving school, but are not different between stopouts and dropouts. Learning may be part of the stopout story, but can not be the whole story. Credit constraints are also a plausible explanation. To determine the extent to which credit constraints matter, this paper estimates a dynamic model of college enrollment and savings. While the model fits many moments quite well, it slightly underestimates return by terms and assets. This will be improved in the future. Given the current set of parameters, the model predicts that increasing the federal loan program limits by \$500 per semester would reduce stopout by 20 percent. Giving students an education subsidy of \$500 per semester reduces stopout by 19 percent. Credit constraints affect some stopout behavior, but are only part of the story.

Sources

Arcidiacono, P. (2005). Affirmative Action in Higher Education: How Do Admission and Financial Aid Rules Affect Future Earnings? *Econometrica*, 73(5):1477–1524.

Arcidiacono, P., Aucejo, E., Maurel, A., and Ransom, T. (2013). College attrition and the dynamics of information revelation. *Working paper*.

Avery, C. and Turner, S. (2012). Student loans: Do college students borrow too much–or not enough? *Journal of Economic Perspectives*, 26(1):165–92.

Bailey, M. J. and Dynarski, S. M. (2011). Gains and gaps: Changing inequality in u.s. college entry and completion. *Working Paper Number 17633, National Bureau of Economic Research*.

Becker, G. (1964). *Human Capital*. Columbia University Press (for the NBER).

Belley, P. and Lochner, L. (2007). The Changing Role of Family Income and Ability in Determining Educational Achievement. *Journal of Human Capital*, 1(1):37–89.

Brown, M., Scholz, J. K., and Seshadri, A. (2012). A New Test of Borrowing Constraints for Education. *Review of Economic Studies*, 79(2):511–538.

Cameron, S. and Heckman, J. (2001). The dynamics of educational attainment for black, hispanic, and white males. *Journal of Political Economy*, 109(3):pp. 455–499.

Cameron, S. V. and Taber, C. (2004). Estimation of educational borrowing constraints using returns to schooling. *Journal of Political Economy*, 112(1):pp. 132–182.

Card, D. (1995). Earnings, schooling, and ability revisited. *Research in Labor Economics*, pages 23–48.

Card, D. (2001). Estimating the return to schooling: Progress on some persistent econometric problems. *Econometrica*, 69(5):pp. 1127–1160.

Carey, K. and Dillon, E. (2009). Drowning in debt: The emerging student loan crisis. The Education Sector at American Institute for Research.
http://www.educationsector.org/publications/drowning-debt-emerging-student-loan-crisis.

Carneiro, P. and Heckman, J. J. (2002). The evidence on credit constraints in post-secondary schooling. *Royal Economic Society*, 112:705–734.

Chang Wei, C. and Skomsvold, P. (2011). Borrowing at the maximum: Undergraduate stafford loan borrowers in 2007/08. *U.S. Department of Education, National Center for Education Statistics*. NCES Project Officer was Thomas Weko.

Child Trends Inc. and Center for Human Resource Research at The Ohio State University (1999). NLSY97 codebook supplement main file round 1, appendix 9: Family process and adolescent outcome measures.

College Board (2009). Trends in student aid.
https://trends.collegeboard.org/sites/default/files/sa_2009.pdf.

Consumer Financial Protection Bureau and U.S. Department of Education (2012). Private student loans: Report to the senate committee on banking, housing, and urban affairs, the senate committee on health, education, labor and pensions, the house of representatives committee on financial services, and the house of representatives committee on education and the workforce.

Dynarski, S. and Kreisman, D. (2013). Loans for educational opportunity: Making borrowing work for today's students. *The Hamilton Project: The Brookings Institution*.

Federal Student Aid, An Office of the United States Department of Education (2014). Dependency status. https://studentaid.ed.gov/fafsa/filling-out/dependency.

Field, E. (2009). Educational debt burden and career choice: Evidence from a financial aid experiment at NYU Law School. *American Economic Journal: Applied Economics*, 1(1):1–21.

Goldrick-Rab, S. (2006). Following their every move: An investigation of social-class differences in college pathways. *Sociology of Education*, 79:61–79.

Heckman, J. J., Lochner, L., and Taber, C. (1998). General-equilibrium treatment effects: A study of tuition policy. *The American Economic Review*, 88(2):pp. 381–386.

Heckman, J. J. and Rubinstein, Y. (2001). The importance of noncognitive skills: Lessons from the ged testing program. *American Economic Review*, 91(2):145–149.

Ionescu, F. (2008). Consolidation of student loan repayments and default incentives. *The B.E. Journal of Macroeconomics*, 8:1935–1690.

Jacob, B., McCall, B., and Stange, K. M. (2013). College as country club: Do colleges cater to students' preferences for consumption? *Working Paper 18745, National Bureau of Economic Research*.

Kantrowitz, M. (2012). The college completion agenda may sacrifice college access for low-income, minority and other at-risk students. Student Aid Policy Analysis.

Kantrowitz, M. (2014). Historical loan limits. http://www.finaid.org/loans/historicallimits.phtml.

Keane, M. and Wolpin, K. (1997). The Career Decisions of Young Men. *The Journal of Political Economy*, 105(3):473–522.

Keane, M. P. and Wolpin, K. I. (2001). The effect of parental transfers and borrowing constraints on educational attainment. *International Economic Review*, 42(4):pp. 1051–1103.

Lang, K. (1993). Ability bias, discount rate bias, and the return to education. *MPRA Paper Number 24651*.

Light, A. (1995a). The effects of interrupted schooling on wages. *The Journal of Human Resources*, 30(3):pp. 472–502.

Light, A. (1995b). Hazard model estimates of the decision to reenroll in school. *Labour Economics*, 2(4):381 – 406.

Linsenmeier, D., Rosen, H., and Rouse, C. (2006). Financial aid packages and college enrollment decisions: an econometric case study. *Review of Economics and Statistics*.

Lochner, L. J. and Monge-Naranjo, A. (2011). The nature of credit constraints and human capital. *American Economic Review*, 101(6):2487–2529.

Lochner, L. J. and Monge-Naranjo, A. (2014). Default and Repayment Among Baccalaureate Degree Earners. *University of Western Ontario, CIBC Centre for Human Capital and Productivity Working Papers*.

McFadden, D. (1974). *Conditional Logit Analysis of Qualitative Choice Behavior*, pages 105–142 in Frontiers in Econometrics. Academic Press: New York.

McPherson, M. and Baum, S. (2011). Get smart about college. http://online.wsj.com/news/articles/sb10001424053111904332804576538312219660354.

Pugatch, T. (2012). Bumpy rides: School to work transitions in south africa. *IZA Discussion Paper 6305*.

Rosen, S. (1977). Human capital a survey of empirical research. *Research in Labor Economics*, 1:3–39.

Rothstein, J. and Rouse, C. (2011). Constrained after college: Student loans and early-career occupational choices. *Journal of Public Economics*.

Rubinstein, Y. and Weiss, Y. (2007). *Post Schooling Wage Growth: Investment, Search and Learning*, volume 1, pages 1–69 in Handbook of the Economics of Education.

Rust, J. (1987). Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher. *Econometrica*, 55(5):999–1033.

Shea, J. (2000). Does parent's money matter? *Journal of Public Economics*, pages 155–184.

Skomsvold, P., Walton Radford, A., and Berkner, L. of MPR Associates, Inc. (2011). Web tables: Six year attainment, persistence, transfer, retention and withdrawal rates of students who began postsecondary education in 2003-04. *U.S. Department of Education, National Center for Education Statistics*. NCES Project Officer was Tracy Hunt-White.

Stange, K. M. (2012). An empirical investigation of the option value of college enrollment. *American Economic Journal: Applied Economics*, 4(1):49–84.

Stinebrickner, R. and Stinebrickner, T. (2008). The effect of credit constraints on the college drop-out decision: A direct approach using a new panel study. *American Economic Review*, 98(5):2163–84.

Willis, R. (1986). *Wage Determinants: A Survey and Reinterpretation of Human Capital Earnings Functions*.

Willis, R. and Rosen, S. (1979). Education and self- selection. *Journal of Political Economy*.

Table 1: Sample Selection

Reason	Change in Sample
Starting Sample	8,984
HS dropout or education unknown	-1,252
Graduated HS (or GED) before '97 or unknown	-133
Attend grad school but never undergrad	-2
Attend school not on semester or quarter	-194
Attend grad school without BA or Associates degree	-17
Switch sector without switching school	-16
Attend undergrad after BA degree	-471
Attend undergraduate after grad school	-2
College degree without having attended	-12
Never Attended College	-2,379
Served in military	-202
Died during sample period	-41
Have "other" asset: trust fund, estate, etc	-27
School calendar unknown/missing	-403
Refuse to give loan information	-1
Attend school with no academic calendar (ex. online)	-23
Attended school that was listed as military	-1
Earn less than Federal Min Wage	-2
Earn greater than $24.5/hour	-70
Attend International school	-17
Attend non-IPEDS school	-17
School didn't report tuition to IPEDS	-2
Did not report school name	-4
Number of People	3,696

Table 2: Characteristics of Students with Different Enrollment Patterns

	Enrollment Pattern			
Variable	Continuous Completers	Stopout	Dropouts	All
Female	.57	.53	.49	.53
Minority	.15	.31	.33	.26
Neither parent attended college	.24	.38	.45	.35
GED recipient	.008	.036	.104	.047
ASVAB Score	60.93 (31.76)	48.79 (31.36)	40.87 (30.19)	51.05 (32.29)
Missing ASVAB	.13	.15	.19	.15
HS GPA	3.41 (.59)	2.98 (.67)	2.86 (.71)	3.11 (.70)
College GPA in first term if listed	3.14 (.72)	2.88 (.80)	2.75 (.86)	2.97 (.80)
Parent Net Worth '97 survey	189,603 (185,569)	122,071 (155,543)	99,276 (135,424)	141,396 (167,128)
Start at 2-year	.22	.58	.62	.45
Complete an AA	.21	.25	0	.15
Time to Degree (if have AA)	3.5 (1.7)	5.3 (2.3)	NA	4.3 (2.2)
Complete a BA	.85	.25	0	.41
Time to Degree (if have BA)	4.8 (1.1)	6.6 (1.6)	NA	5.1 (1.4)
Number of Students	1,283	1,156	1,257	3,696
Percent of Student (unweighted)	34.7	31.3	34.0	100

Numbers in parentheses are standard deviations. Time to degree refers to the years between high school graduation (or when got GED) and college graduation. This table uses NLSY custom weights.

Table 3: Do Stopouts Initially Major in Different Fields?

Rank of how common major was	Did not stopout	Stopped out
1	Business Management	Business Management
2	Computer/Info Sciences	Computer/Info Sciences
3	Nursing	Nursing
4	Engineering	Education
5	Communications	Other health professional
6	Other	Fine and Applied Arts
7	Other health professional	Criminology
8	Fine and Applied Arts	Psychology
9	Biological Sciences	Other
10	Psychology	Communications

Major is defined as the first major reported by the respondent conditional on listing a major.

Table 4: Do Stopouts Major in Different Fields Later in College?

Rank of how common major was	Did not stopout	Stopped out
1	Business Management	Business Management
2	Education	Nursing
3	Nursing	Education
4	Computer/Info sciences	Other Health Professionals
5	Fine and applied arts	Computer/Info Sciences
6	Engineering	Criminology
7	Communications	Psychology
8	Psychology	Fine and Applied Arts
9	Other health professionals	Communications
10	Criminology	Engineering

Major is defined as the last major reported by the respondent conditional on listing a major.

Table 5: Do Stopouts Earn Lower Wages Conditional on Not Completing a Postsecondary Degree?

	Specification			
Variable	I	II	III	IV
Stopout	.0029 (.0162)	-.0002 (.0150)	-.0002 (.0150)	.0015 (.0156)
Female	-.0934 (.0151)	-.0839 (.0139)	-.0852 (.0140)	-.1031 (.0145)
Minority	-.0327 (.0165)	-.0111 (.0156)	-.0090 (.0157)	-.0044 (.0164)
ASVAB	.0008 (.0003)	.0007 (.0003)	.0006 (.0003)	.0006 (.0003)
Missing ASVAB	.0638 (.0241)	.0529 (.0220)	.0508 (.0220)	.0503 (.0232)
Employed full time	.0328 (.0157)	-.0042 (.0161)	-.0177 (.0159)	-.0129 (.0168)
Experience		.0460 (.0041)	.0749 (.0102)	.0811 (.0107)
Experience squared			-.0027 (.0009)	-.0032 (.0010)
Terms of College	.0018 (.0023)	.0044 (.0021)	.0044 (.0021)	.0038 (.0022)
Occupation FEs	X	X	X	

Standard errors are clustered at the person level. Region and year fixed effects are included in all specifications.Weights are not used.

Table 6: Do Stopouts Earn Lower Wages Conditional on Completing a Bachelor's Degree?

	Specification			
Variable	I	II	III	IV
Stopout	-.0481 (.0200)	-.0026 (.0189)	-.0043 (.0224)	-.0126 (.0242)
Female	-.0037 (.0159)	-.0118 (.0148)	-.0118 (.0148)	-.0150 (.0161)
Minority	-.0215 (.0188)	-.0106 (.0177)	-.0107 (.0177)	-.0076 (.0191)
ASVAB	.0006 (.0004)	.0003 (.0004)	.0003 (.0004)	.0005 (.0004)
Missing ASVAB	.0104 (.0352)	-.0135 (.0329)	-.0137 (.0329)	.0021 (.0356)
Employed full time	.1211 (.0135)	.0687 (.0139)	.0687 (.0139)	.0813 (.0142)
Experience after BA		.0678 (.0057)	.0678 (.0057)	.0642 (.0062)
Experience before BA			.0031 (.0222)	-.0073 (.0234)
Terms of College	-.0061 (.0020)	.0001 (.0019)	.0001 (.0019)	-.0008 (.0019)
Occupation FEs	X	X	X	

Standard errors are clustered at the person level. Region and year fixed effects are included in all specifications. Weights are not used.

Table 7: Do Stopouts Work in Different Occupations Immediately Following BA Completion?

Rank	Did not stopout	Stopped out
1	Office Administrative Support	Office Administrative Support
2	Sales	Sales
3	Teacher	Teacher
4	Management	Food prep
5	Food prep	Executive, administrative and managerial
6	Executive, administrative, and managerial	Personal Care
7	Personal Care	Health Care Technical and Support
8	Math/Computer Science	Counselors, social and religious workers (Tied)
9	Counselors, social and religious workers	Management (Tied)
10	Transportation	Transport., Math/CS, Entertainment/Performer

Occupation is the last occupation listed in the first period (six months) following the period the bachelor's degree was completed.

Table 8: Do Students Change Majors After Stopping Out?

Rank of how common major was	Before Left	After Returned
1	Business Management	Business Management
2	Computer/Info Sciences	Nursing
3	Nursing	Education
4	Education	Computer/Info Sciences
5	Other Health Professionals	Criminology
6	Psychology	Other Health Professionals
7	Criminology	Fine and Applied Arts (Tied)
8	Communications (Tied)	Psychology (Tied)
9	Fine and Applied Arts (Tied)	Communications
10	Engineering	Engineering

Major Before is the major listed in the last semester enrolled prior to taking a break conditional on listing one. Major After is the major listed in the first semester after returning to school conditional on listing one. This table only looks at the first non-enrollment period.

Table 9: Stopouts and Behavioral/Emotional Skills

	Respondent Sex: Female			
	Continuous	Stopped out	Dropout	Number of Obs.
Youth Report	1.66	2.13	2.11	1,217
Parent Report	.84	1.20	1.09	751
	Respondent Sex: Male			
	Continuous	Stopped out	Dropout	Number of Obs.
Youth Report	1.62	1.90	2.04	1,066
Parent Report	.99	1.37	1.54	662

Questions were asked to create these scales in the 1997 survey. As long as the respondent answered three out of four questions there is a score. The set of questions varied by gender. A higher number indicates more behavioral/emotional problems. NLSY custom weights are used.

Table 10: Do Behavioral/Emotional Skills Differ by Who Completes a Degree Among Stopouts?

	Respondent Sex: Female			
	No Degree	Degree	p-value	Number of Obs.
Youth Report	2.18	2.07	.525	360
Parent Report	1.47	.76	.000	228
	Respondent Sex: Male			
	No Degree	Degree	p-value	Number of Obs.
Youth Report	2.09	1.64	.009	321
Parent Report	1.56	1.09	.024	208

Questions were asked to create these scales in the 1997 survey. As long as the respondent answered three out of four questions there is a score. The set of questions varied by gender. A higher number indicates more behavioral/emotional problems. NLSY custom weights are used. A degree means either a bachelor's or associate's degree.

Table 11: Transition Matrix of Parental Transfers

	Amount at t+1							
Amount at t	0	125	375	875	1875	3125	4375	5625
0	.9122	.0542	.0128	.0086	.0043	.0021	.0029	.0029
125	.2113	.6885	.0610	.0261	.0087	.0000	.0061	.0183
375	.2073	.1524	.5488	.0488	.0183	.0000	.0061	.0183
875	.1875	.0893	.0536	.6250	.0268	.0089	.0000	.0089
1875	.2326	.0465	.0000	.0930	.5814	.0233	.0000	.0233
3125	.2222	.0000	.0000	.0000	.0000	.6667	.1111	.0000
4375	.1250	.0625	.0000	.0625	.0000	.0000	.6875	.0625
5625	.1200	.0400	.0400	.0400	.0000	.0400	.0800	.6400

This table uses the smaller estimation sample (males who first enrolled in college at 18 years old).

Table 12: Estimation Results

Parameter	Description	Coefficient
ρ	consumption in utility	-.5002
ν_0	cost to re-enroll in school without AA	-84
ν_1	cost to re-enroll in school if have AA	-89
c*	consumption bonus to being enrolled in school	10,658
cfloor	consumption floor when not in school	83.7
β_{term}	benefit to being enrolled in school interacted with terms enrolled	84
β_1	cost to leave school if enrolled 1 term	62,333
β_2	cost to leave school if enrolled 2-6 terms	67,958
β_7	cost to leave school if enrolled 7 terms	4,109
α	Scale of shocks relative to u(c)	2.00
A_0	intercept in wage equation	2.05
A_1	experience in wage equation	0.002
σ^2_{wage}	variance of error term in wage	0.47
S_0	intercept in share paid	0.27
S_i	independent in share paid	-.17
S_{hh2}	top half of HH Net Worth in 1997 survey in share paid	0.23
σ^2_{share}	variance of error in share paid	0.51

Table 13: Model Fit

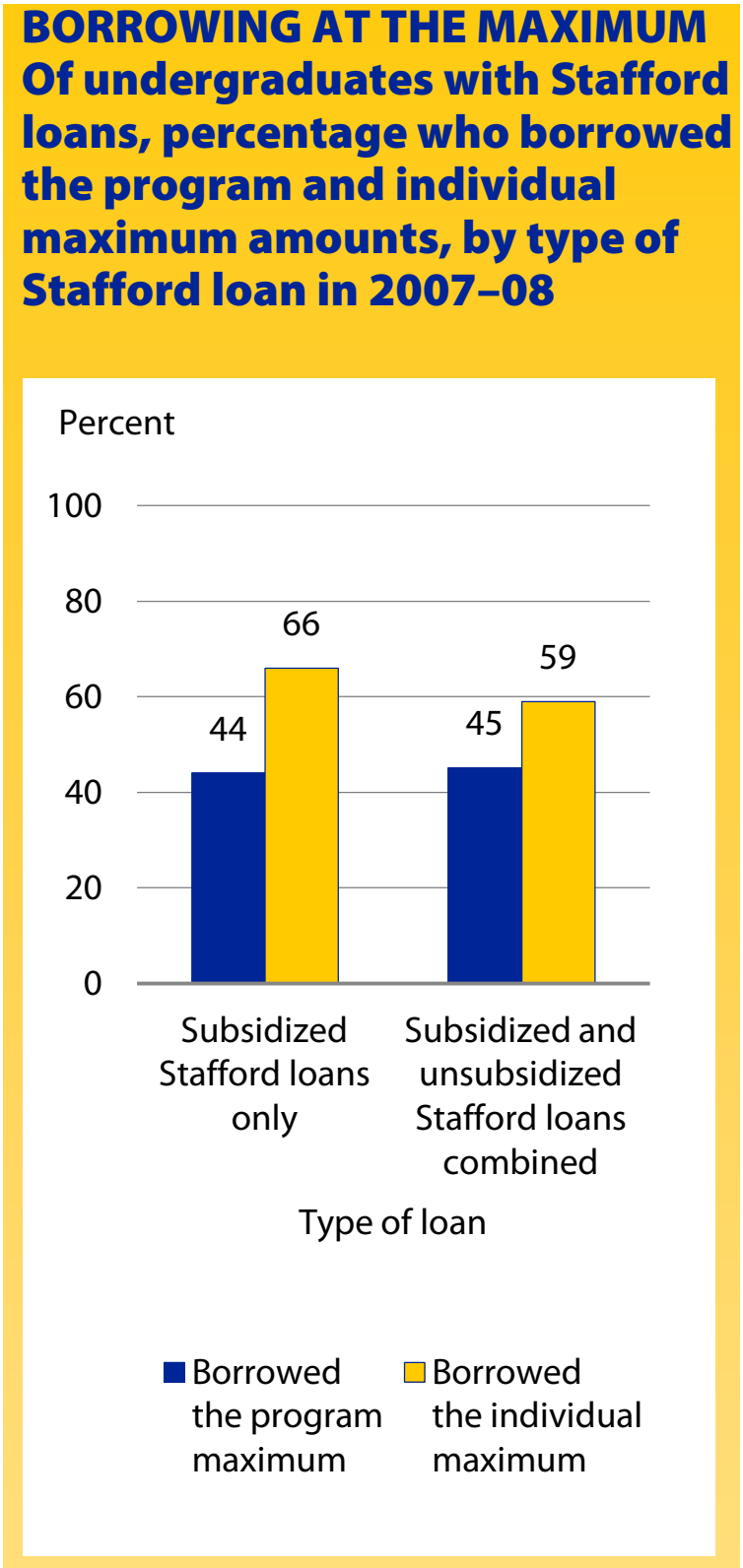
Table 14: Model Fit 2

Moment	Simulated Data	Real Data
Asset Mean	9,013	696
Share Independent	.280	.065
Share Dependent	.349	.359
Share Top Half HH Net Worth	.436	.331
Share Mean	.347	.281
Share Variance	.111	.167
Wage Mean	9.35	11.01
Wage Variance	22.65	18.53

Table 15: Counterfactuals: How Enrollment Choices are Affected by Loan Limits and Tuition Subsidies

Choice	Baseline	↑ loan limit by $500/term	Change	↓ COA by $500/term	Change
Percent Who Ever Leave	.438	.354	-.084	.371	-.067
Percent Who Ever Return	.079	.063	-.016	.064	-.015

Figure 1: Why Individual Limits Matter



Source: U.S. Department of Education, National Center for Education Statistics, 2007-08 National Postsecondary Student Aid Study (NPSAS:08). "Borrowing at the Maximum: Undergraduate Stafford Loan Borrowers in 2007/08"

Figure 2: Distribution of Non-Enrollment Spells Conditional on Stopping Out

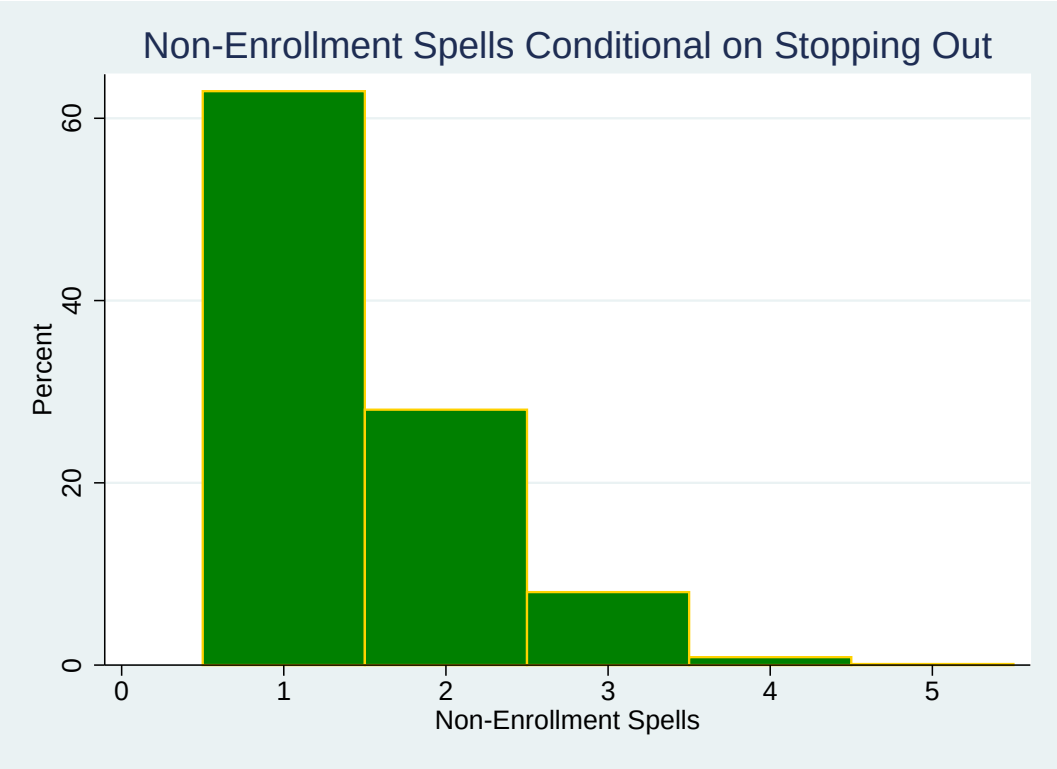


Figure 3: Distribution of How Many Semesters Students Enroll Prior to Stopping Out
The number of semesters enrolled is only for the first time the student stopped out.

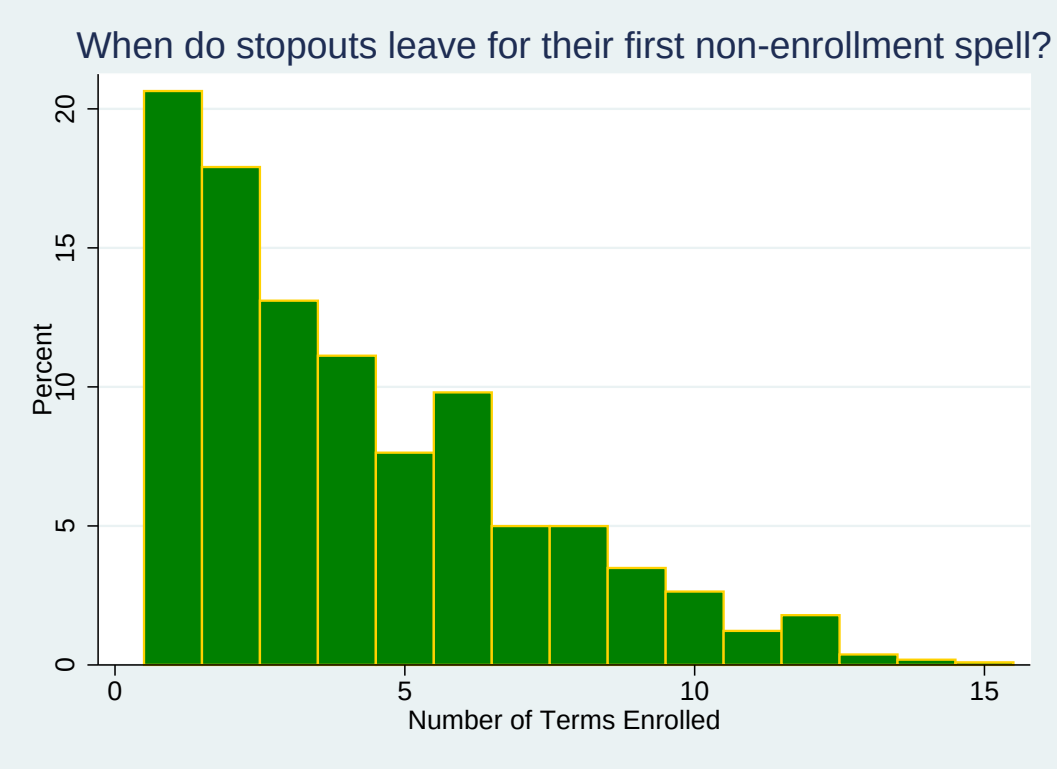


Figure 4: Distribution of How Many Semesters Students Take Off When Stopping Out
This figure includes only those who take one non-enrollment spell.

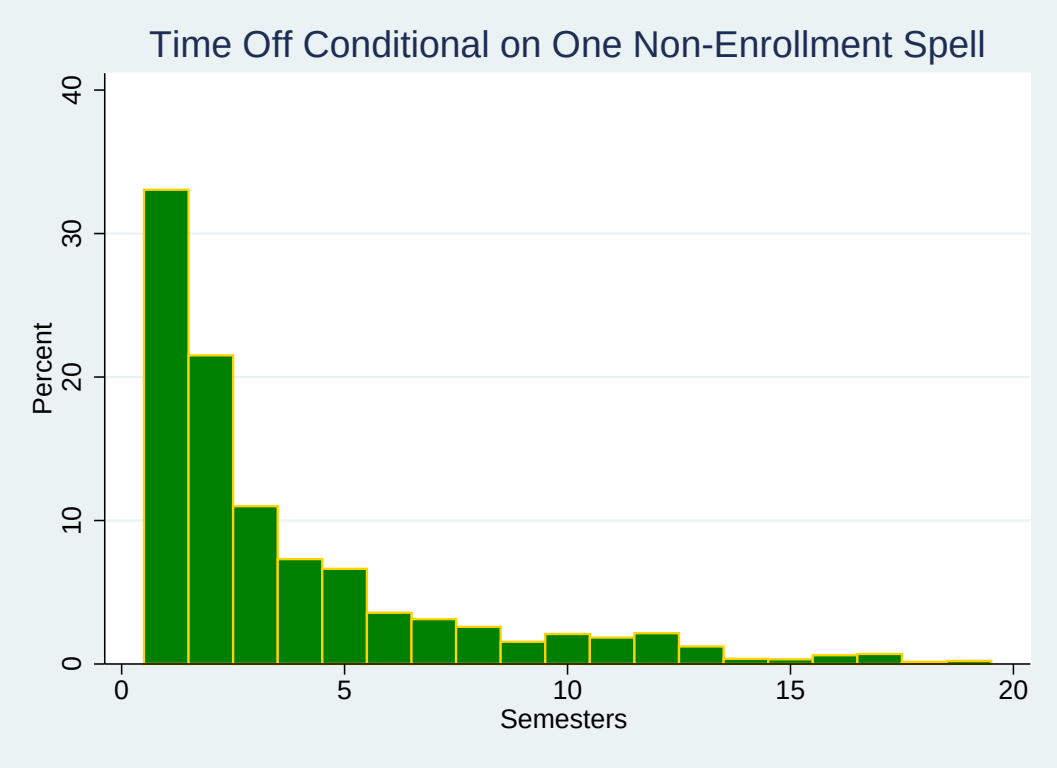


Figure 5: Distribution of Last Reported College GPAs by Who Will Remain Enroll and Who Will Leave School

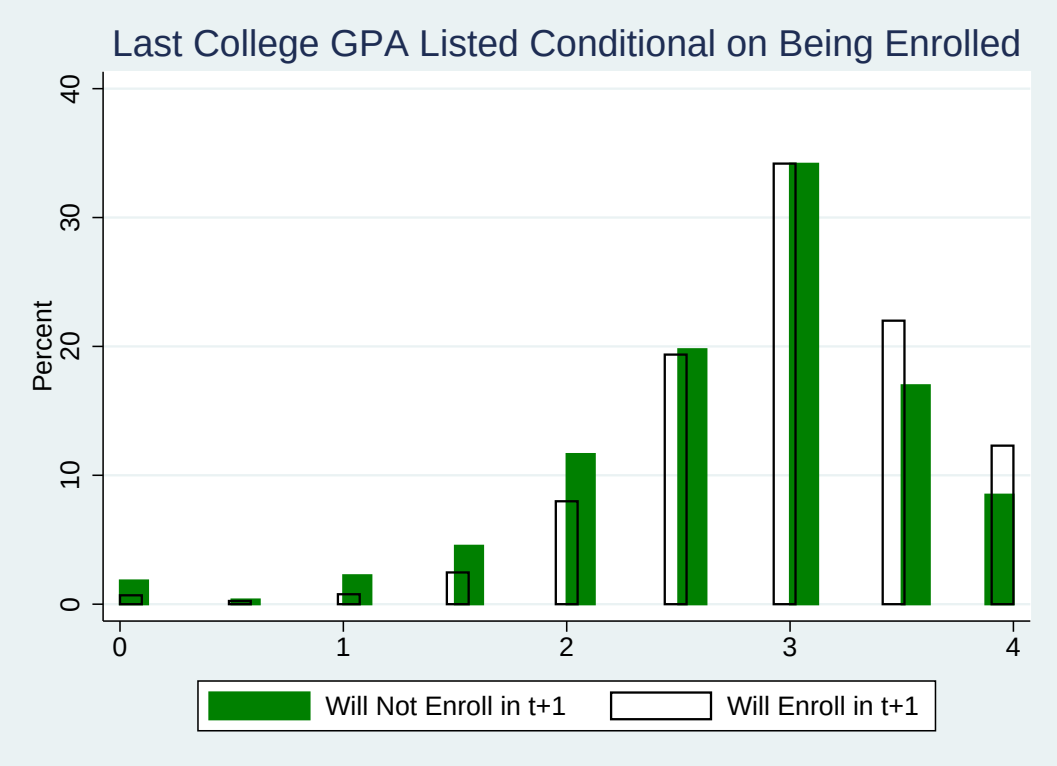


Figure 6: Distribution of Household Net Worth in the 1997 Survey Conditional on Being Enrolled in a Postsecondary Institution. The bottom five percent is not shown in the figure.

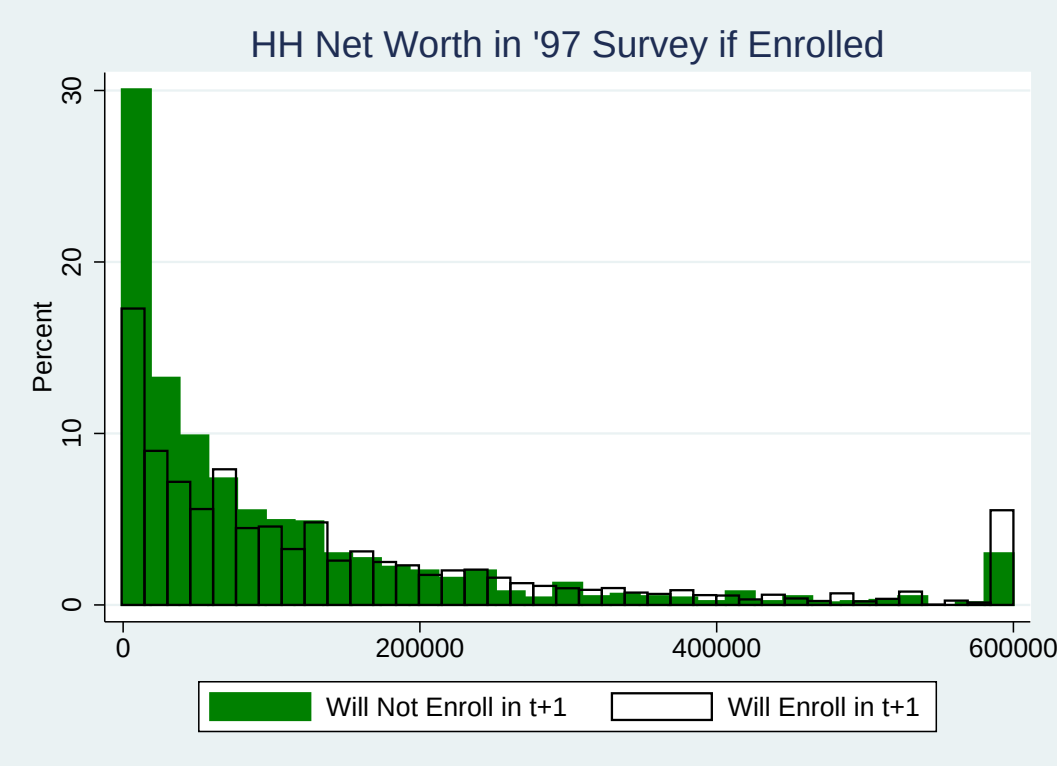


Figure 7: Asset Distribution Conditional on Not Being Enrolled in a Postsecondary Institution and Having Assets Less Than or Equal to $2,000.

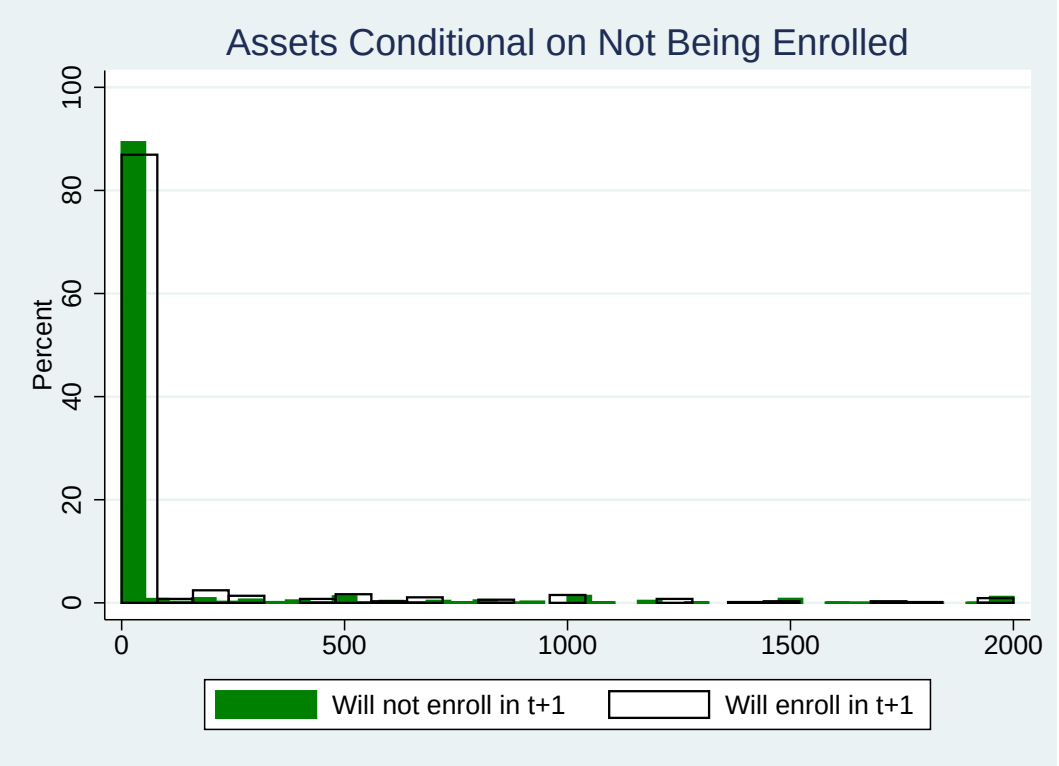


Figure 8: Distribution of Total Loans Conditional on Being Enrolled

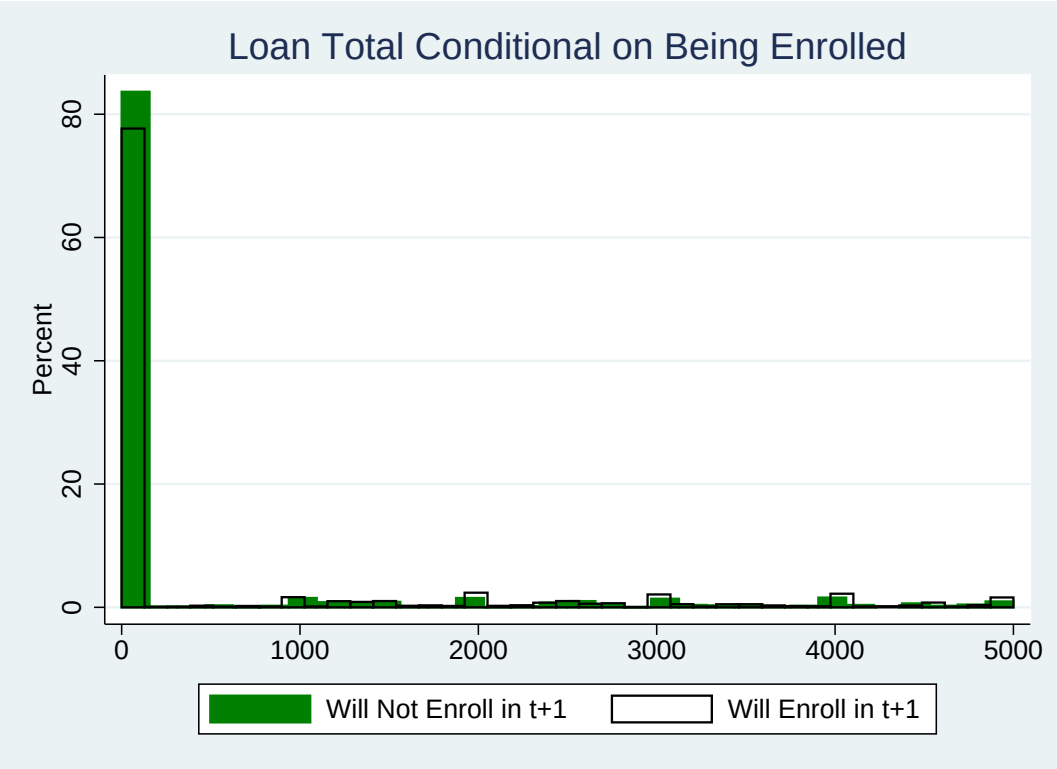


Figure 9: Distribution of Total Loans Conditional on Not Being Enrolled

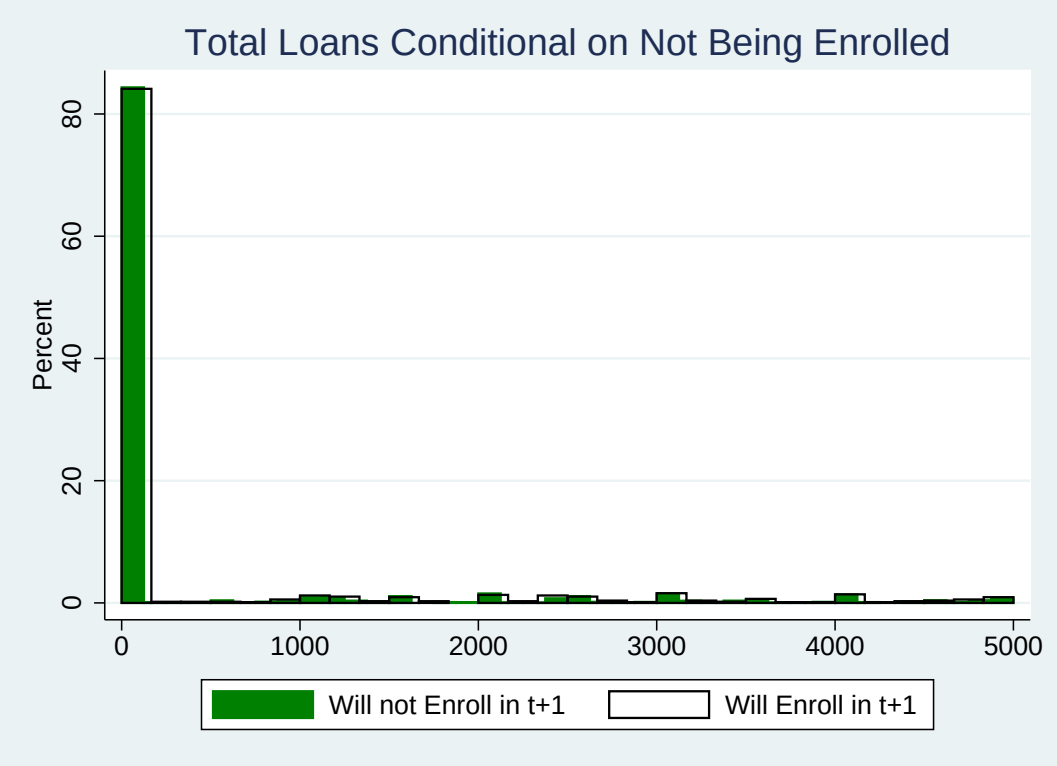


Figure 10: Distribution of Share Paid

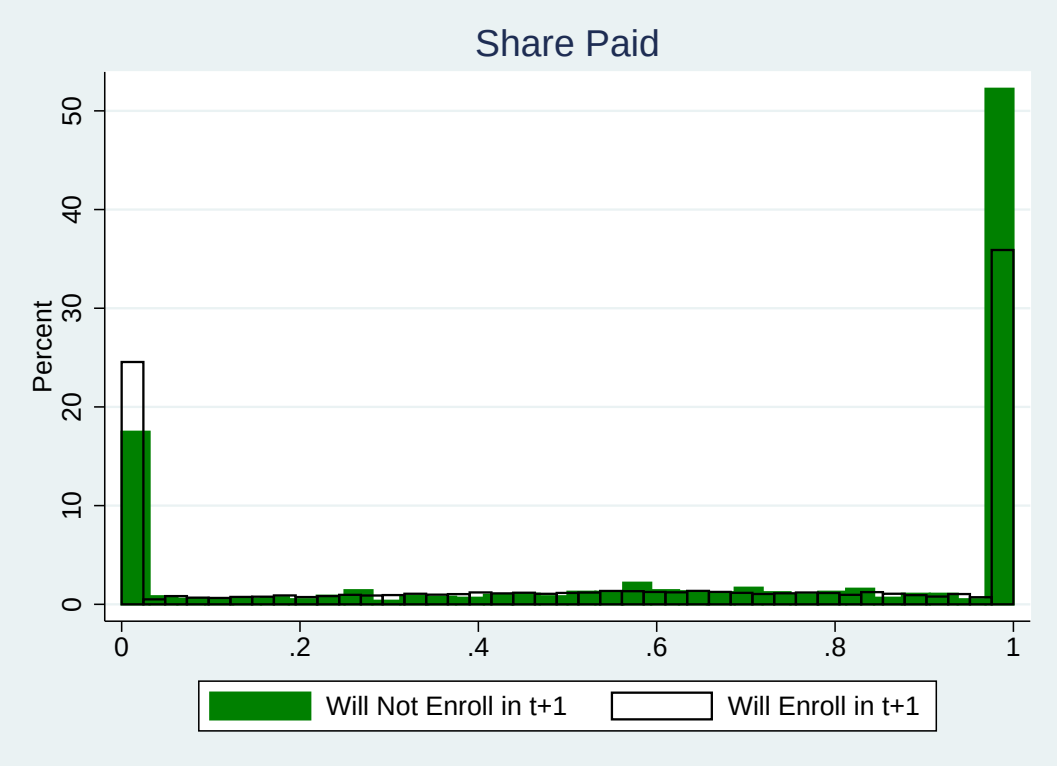


Figure 11: Distribution of OOPE