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The Effect of Credit Constraints on the College Drop-Out Decision: A Direct Approach Using a New Panel Study

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Abstract: A serious difficulty in determining the importance of credit constraints in education arises because standard data sources do not provide a direct way of identifying which students are credit constrained. This paper differentiates itself from previous work by taking a direct approach for providing evidence about this issue which is made possible by unique longitudinal data from the Berea Panel Study. The results from our study of Berea College students suggest that, while credit constraints likely play an important role in the drop-out decisions of some students, the large majority of attrition of students from low income families should be primarily attributed to reasons other than credit constraints.

JEL Codes: J24 - Human Capital I2 - Education I3 - Welfare and Poverty

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"I'm tired of living survey to survey."
A participant in the Berea Panel Study describing a lack of spending money
when asked why he was dropping out of college**.**

I. Introduction

Children from low income families are much less likely than other students to attend and graduate from college (Manski, 1992). Recent literature has emphasized the importance of understanding the extent to which "short-run" credit constraints that are present during college contribute to this reality. These types of credit constraints could play an important role by making it difficult for students to pay tuition or other direct costs of college attendance. These types of credit constraints could also operate by making it difficult for students to find money to pay for consumption during college, in which case constrained students may not be able to smooth consumption as much as they would like between the schooling and working portions of their lives. The potential importance of the former avenue has been frequently discussed by policymakers. The potential importance of the latter avenue arises because, while grant, loan, and work-study programs exist to help students pay the direct costs of college, these types of programs are typically not designed to help students replace the consumption that may be lost when earnings are foregone.[1]

As described in Cameron and Taber (2004), a serious difficulty in determining the extent to which access to credit influences educational outcomes arises because standard data sources do not provide a direct way of identifying which students are credit constrained. This has forced researchers to suggest and explore a variety of indirect approaches (Lang (1993), Card (1995), Kane (1996), Keane and Wolpin (2001), Cameron and Heckman (1998, 2001), Carneiro and Heckman (2005), Belley and Lochner (2006)). Given that these indirect approaches rely on different underlying assumptions, it is not surprising that the approaches have produced different conclusions and uncertainty about the importance of credit constraints remains (Kane, 2005).

[1]While this paper examines the importance of short-run (binding) constraints that may be present during college, there exist other types of credit constraints that could influence higher educational attainment. For example, family constraints during a child's youth could influence higher educational attainment of the child by affecting his/her human capital accumulation at the time of high school graduation (Cameron and Heckman, 1998, Restuccia, 2004). In addition, the possibility that an individual may have difficulty borrowing money after college if he/she has difficulty finding employment quickly could influence both decisions about college attendance, and, for reasons analogous to those in Deaton (1991), whether the person wishes to borrow money during college. Nonetheless, the focus in this paper on (binding) constraints that are present during college is natural since these types of constraints receive almost exclusive attention from policymakers concerned with higher education.

This paper differentiates itself from previous work by taking a direct approach for providing evidence about this issue. Motivated by evidence that the well-known differences in college completion rates by family income can, to a large extent, be attributed to differences in college drop-out rates by family income (Manski, 1992), we study the college drop-out decision of students from low income families. We provide evidence about the importance of credit constraints by examining how much college attrition would remain even if credit constraints were removed; our question of interest can be formulated as follows: "how important are factors other than credit constraints in determining the substantial drop-out rates of students from low income families?" More specifically, we provide evidence about whether substantial attrition would remain for low income students under perhaps the most generous policy that might conceivably be considered by policymakers to address credit constraints - one in which all direct costs are removed and students are given access to loans that can be used to finance additional consumption during school. Note that, for ease of exposition, in the remainder of the paper we often use phrases such as "the amount of attrition that is unrelated to credit constraints" when it would be more precise to use "the amount of attrition that would be present if direct costs were removed and students were given access to loans to finance additional consumption during school."

We study the drop-out decisions of students at Berea College. Berea College is located in central Kentucky and operates under a mission of providing opportunities to students of "great promise but limited economic resources." As a result, students at Berea come from low income backgrounds that are of specific concern to policymakers interested in understanding the impact of liquidity constraints in higher education. Our approach takes advantage of both a unique institutional detail at the school and detailed longitudinal data from the Berea Panel Study (BPS) that we have collected specifically for the purpose of understanding the drop-out decision. With respect to the unique institutional detail, the direct costs for students are approximately zero (and perhaps negative) due to the presence of a full tuition subsidy (and large room and board subsidies) for all matriculating students. Given this institutional detail, the finding in Stinebrickner & Stinebrickner (2003a) that approximately fifty percent of matriculating students fail to graduate (and few

transfer) strongly suggests that factors other than direct costs are very important in determining the drop-out decision.

With respect to our use of the Berea Panel Study, we take particular advantage of two unique features. First, the BPS contains a financial module that, among other uses, allows us to identify which students would like to borrow money to increase consumption while in school (and also are not able to borrow from other sources), and, therefore, satisfy a theoretically appealing definition of being credit constrained. This information is used to estimate a lower bound for the percentage of the substantial amount of attrition at Berea that would remain even if students were given access to loans that allowed them to purchase additional consumption during school and even though direct costs are zero. Second, because we designed this longitudinal survey with an explicit theoretical model of the drop-out decision in mind, the data provide substantial detail about whether students who are constrained differ from students who are unconstrained in other (non-financial) ways that might influence the drop-out decision. This allows us to examine whether we can credibly move away from our bound to estimate the percentage of attrition that would remain at Berea if loans were made available to allow students to increase consumption. The estimate of the lower bound leads to the conclusion that the large majority of attrition at Berea would remain even under very generous policies aimed at relaxing credit constraints. Moving away from the bound to estimate the percentage of interest leads to a further strengthening of this result, although our findings do suggest that credit constraints likely play an important causal role in the drop-out decisions of some students.[2]

In Section II we discuss a simple theoretical model of the drop-out decision that guided much of our data collection in the BPS and guides much our empirical work in this paper. In Section III we describe the BPS and present a descriptive view of students at Berea. Our main empirical work takes place in Section IV. Section V contains our conclusions.

II. A simple theoretical model

[2]It is worth noting in advance that our results do not necessarily describe what would happen to students currently enrolling at Berea College under a counterfactual policy in which direct costs are set to zero at *all* schools and consumption loans are made available at *all* schools. For example, under this counterfactual policy, some of the students currently at Berea might choose to enter other schools and these other schools might have different non-financial characteristics.

Let $D(t_0)$ be an indicator variable that is equal to one if the student decides at the time he completes high school, t_0, that he will not attend college. Then, defining $E_{t0}(V_S)$ to be the expected present value of lifetime utility at time t_0 of entering college and $E_{t0}(V_N)$ to be the expected present value at time t_0 of not entering college,

(1) $D(t_0) = 1$ iff $D^*(t_0)=E_{t0}(V_N)-E_{t0}(V_S)>0$.

A person's total lifetime financial resources play a central role in determining lifetime utility. For students from low income backgrounds, these resources will be determined primarily by lifetime earnings while in the workforce. Individuals who enter the workforce without a college degree work in unskilled jobs. Earnings in these jobs depend on a person's unskilled human capital which are likely to be largely determined and known at the time of the college entrance decision. Individuals who enter the workforce with a college degree work in skilled jobs. Earnings in these jobs depend on a person's skilled human capital which is accumulated during college. Skilled human capital is accumulated more efficiently by individuals of high academic ability, and, as a result, is likely related to college grade performance. Hereafter, we refer to academic ability simply as ability.

Unconstrained students allocate lifetime financial resources across periods in a standard manner that depends on, for example, the person's discount factor, intertemporal elasticity of substitution, and risk aversion. However, the credit constrained student is faced with the additional reality that he cannot borrow against future earnings so that during school he must rely on his personal savings at the time of college entrance, contributions from parents during school, and labor income during school to purchase consumption and pay the net direct costs of schooling. The reality that a constrained person would like to borrow to increase his consumption during school implies that his lifetime consumption path will not be "smooth enough" in the sense that the marginal utility of consumption during school is higher than the discounted marginal utility of consumption during his working years. In this case, some constrained individuals do not enter college even though they would enter if they were not constrained.

Given particular levels of consumption, how happy a person will be in school relative to being out of school will depend, in part, on the types of general preference parameters mentioned in the previous

paragraph which influence the curvature of the utility function in consumption. However, it also seems likely that there exist large amounts of heterogeneity in how much individuals will enjoy being in school relative to being out of school that are largely unrelated to the amount of consumption a person can afford per se. For example, some students may be particularly gifted at forming new relationships, have a particular taste/distaste for campus living arrangements, or have a particular attachment to their hometowns.

Given the sample of college attendees used in this paper, there is no variation in $D(t_0)$ in our data. Thus, our work examines the effect of credit constraints on the drop-out decision. Defining $D(t_1)$ to be an indicator variable that is equal to one if the student decides at the time he finishes his first year of college, t_1, that he will not return for his second year of college, the drop-out decision can be written analogously to equation (1),

$$(2) \quad D(t_1) = 1 \text{ iff } D^*(t_1) = E_{t1}(V_N) - E_{t1}(V_S) > 0$$

where $E_{t1}(V_S)$ is the expected present value of lifetime utility at time t_1 of returning to college and $E_{t1}(V_N)$ is the expected present value of lifetime utility at time t_1 of entering the workforce.

Differences between the expectations in equation (2) and the expectations in equation (1) primarily reflect learning that has taken place since a student enters school (Manski (1989), Altonji (1993), Carneiro et al. (2005), Cunha et al. (2005)). Credit constraints can have a causal effect on the drop-out decision if, after matriculation, individuals learn about their constraint status (e.g., because they learn about unexpected fees, textbooks costs, or other components of the net direct costs of schooling) or the effect that being constrained has on how enjoyable it is to be in school. However, it is important to note that credit constraints can also have a causal effect on the drop-out decision even if no uncertainty exists about credit constraints at the time of college entrance. This would be the case if being constrained causes an individual to be closer to the margin of indifference at the time of entrance so that he is more likely to leave school when he learns about other factors, such as ability, that influence V_S and V_N. This establishes a very direct connection between the effect of credit constraints on the college drop-out decision studied here and the effect of credit constraints on the college entrance decision which has received much of the previous attention in the literature. This relationship is examined in more detail in an earlier version of this paper (S&S, 2005).

While in reality $D(t_1)$ represents the solution to a non-trivial dynamic programming problem, the estimation of a structural model of the drop-out decision is beyond the scope of this paper. Instead, in Section IV we employ straightforward linear probability models and probit models to provide evidence about whether being credit constrained influences the drop-out decision. A central feature of these models is that they take advantage of our survey efforts by including a student's constraint status as an explanatory variable. However, in order to be truly useful, they must also take into account potential non-financial differences between constrained and unconstrained students. Our data are well-suited for this task because, as discussed in much more detail later, the data have been collected specifically with the goal of providing detailed information about the factors described above that theory suggests could influence the expected values of V_N and V_S.[3]

III. An overview of the Berea Panel Study and a descriptive view of students at Berea

The BPS consists of two cohorts. Baseline surveys were administered to the first cohort (the 2000 cohort) immediately before it began its freshman year in the fall of 2000 and baseline surveys were administered to the second cohort (the 2001 cohort) immediately before it began its freshman year in the fall of 2001. In addition to collecting detailed background information about students and their families, the baseline surveys were designed to take advantage of recent advances in survey methodology (see e.g., Barsky et al., 1997, Dominitz, 1998, and Dominitz and Manski, 1996 and 1997) in order to collect information about students' preferences and expectations towards uncertain future events and outcomes (e.g., academic performance, labor market outcomes, non-pecuniary benefits of school, marriage and children) that could influence decisions. Substantial follow-up surveys that were administered at the beginning and end of each subsequent semester were designed to document the experiences of students and how the various factors that might influence decisions change over time. Shorter surveys that were administered at multiple times each year were designed to provide information about how students were using their time. Student identifiers allow

[3]Indeed, the data have been collected with the explicit goal of allowing the parameters of a structural model of the drop-out decision to be identified in as credible a fashion as possible. We leave the estimation of such a model to future work.

survey data to be merged with detailed administrative data, including information from the Free Application for Federal Student Aid (FAFSA))

The financial module was administered for the first time during the 2001-2002 academic year, after undergoing pre-testing by students from non-BPS cohorts at Berea.[4] Thus, while the 2001 cohort answered the financial questions during their first year at Berea, the 2000 cohort did not answer these questions until their second year at Berea. Given our specific interest in college attrition and the reality that much attrition takes place during the first year, we concentrate here on the 2001 cohort.

The 2001 cohort was surveyed ten times during its first year with six of these surveys being shorter time-use surveys. The total amount of compensation received by a student who answered all surveys in his freshman year was $133. The financial module, which is shown in Appendix A.1, appeared on the sixth survey of the year which was collected at the beginning of the second semester. As a result, we focus on individuals who returned for the second semester, and, therefore, answered the financial questions while still enrolled at Berea. The 2001 cohort had a response rate on the baseline survey of .87 with 375 out of the 433 entering students at Berea participating. Participation on the baseline was a necessary condition for further participation while at Berea. We concentrate on domestic students and exclude the 21 foreign students. Twenty-seven of the remaining students (.076) left school before the beginning of the second semester. This leaves 327 students who were eligible to complete the sixth survey. Our sample consists of the 307 eligible students (.939) who completed this survey.

Some basic demographics of this sample are shown in the first column of Table 1. Forty-four percent of students are male and 19% of students are black. As expected given the mission of Berea, students at the school are quite poor with an average family income of $26,510. Although not shown in Table 1, the first quartile, median, and third quartile are $12,500, $27,000, and $39,500 respectively. In addition to having low income, students' families have little wealth. On average, a student's family has total cash, savings, and

[4]Our survey design involved having students return completed surveys to us in person. This allowed us to ensure that each student had completed each survey conscientiously and to debrief students regarding any difficulties that they may have had understanding survey questions. We found no evidence that students had difficulty understanding any questions on the financial module.

checking account balances of $1241 and total investments (excluding the family residence) of $1855. Roughly half of the students do not have at least one parent that graduated from college.

From the standpoint of thinking about whether the types of non-financial factors that influence students at Berea also tend to influence students elsewhere, it seems particularly useful to think about college entrance exams, which past work has found to be perhaps the strongest predictor of college performance. The average score on the American College Test (ACT) is 23.2 in our sample. In earlier versions of this paper we show that this average implies that students at Berea are at least as academically gifted as students from similar income backgrounds who attend schools nationally or attend the flagship state universities (The University of Kentucky and The University of Tennessee) in the region. This is important for our conclusions because, if this were not true, the amount of attrition that is unrelated to constraints would be expected to be higher at Berea than elsewhere.

In terms of outcomes, many students do not graduate. The drop-out rate before the second year for the individuals in our sample (who all started the second semester) is .169. Taking into account the drop-out rate in the first semester, the overall first-year drop-out rate from Berea for the 354 domestic participants in the BPS survey is .228.[5] As discussed in detail in S&S (2003a), the drop-out rates of students at Berea are generally similar to those of students with comparable backgrounds who attend other schools. Stinebrickner and Stinebrickner (2003a) discuss the reality that very few students who left Berea during 1989-1997 transferred to other four year schools.

Some information about current consumption levels is obtained by Question A.2 in Appendix A.1:

Question A.2 (partial): How much money do you expect that you will spend this year (September 2001 - August 2002) ***not*** including college related costs? $_____

where Question A.1 informs student to include "expenses for things such as clothing, travel, telephone, cars, recreation, entertainment, and food and snacks not included in the college food plan" and college related costs

[5]The overall first-year drop-out rate for non-participants in the BPS is .293. However, given the small number of non-participants, a test of the null that the drop-out rate is the same for participants and non-participants is not rejected at traditional significance levels (p-value=.286).

are described in Question A.1 to include term bills (which include campus room and board), books, and class-related supplies.

While this question is undoubtedly answered with substantial error and includes both the academic year and the summer after the first academic year, the answers leave little doubt that these low income students spend little on consumption during college outside of academic expenses and the room and board they pay to live on campus. The average answer to this question at the beginning of the second semester was $957 and the median response is less than $600. This evidence is entirely consistent with what we informally observed during survey collection when individuals regularly stressed that the survey compensation represented an important source of consumption spending. Thus, there seems to be substantial scope for short-term constraints to operate. In the remainder of the paper we examine whether there is evidence that this is indeed the case.

IV. An analysis of the importance of factors unrelated to credit constraints

IV.1. Are students at Berea credit-constrained?

We identify student i as being credit-constrained and set the dummy variable C^i equal to one if he/she answers in the affirmative to the first part of Question E.1 from the financial module:

Question E.1 Suppose that someone offered to loan you money this year so that you could increase the amount of money that you would have for spending money during this year. Suppose that the loan is made at a fair interest rate and that you would not have to begin repaying the loan until after you leave Berea. Would you accept the loan? YES NO

Question E.2 If you answered YES,

You would like to borrow money to increase your spending at Berea during this year. Remember, you will have to pay back the loan and any interest after leaving Berea. How much money would you choose to borrow this year in order to increase your spending money this year?

$ _____.

Despite our Section III finding that students at Berea have very little spending money, only 62 of 307 (.202) students in our sample are identified as being credit constrained using this criteria.[6] In absolute

[6]Although designed independently, this question is similar in spirit to a question that is included in the 1995 Canadian Out of Employment Panel and is examined by Crossley and Low (2004). They find that 19% of primary wage earners are constrained three quarters of a year after a job loss.

terms, constrained students do not wish to borrow particularly large amounts of money; the average constrained person indicates that he would like to borrow only $889 for the current academic year and the median amount is only $500. At the same time, it seems quite possible that the loans might make a substantial difference to constrained students since these amounts are only slightly smaller than the total expected spending amounts for the year that we found in Question A.2.

Financial resources by constraint status

Some confidence in the responses to the survey question can be obtained indirectly by examining whether constrained students differ from unconstrained students in ways that might be generally consistent with the presence of a constraint. The first row of the *Additional Financial Variables* section of Table 1 shows evidence from Question A.2 that constrained students in the sample expect to spend about 30% less on consumption during the year than unconstrained students in the sample, with this difference being significant at a 5% level. Further, the remainder of the *Additional Financial Variables* are consistent with this result. We find that, while neither constrained or unconstrained students are particularly wealthy, constrained students have remarkably few resources that could be used for consumption in the second semester. Perhaps most noteworthy, constrained students report having, on average, personal savings of only $246 and the median constrained student has less than $50 in savings at the beginning of the second semester. In contrast, unconstrained students report having, on average, savings of $940 and the median unconstrained student has approximately $300 in savings. The null hypothesis that the average savings of constrained and unconstrained individuals is identical is rejected at all traditional levels of significance with a t-statistic of 5.405.

The last five entries of the *Additional Financial Variables* section of Table 1 show results from Question B.2 of the financial module which asks students about possible sources that could be used to increase consumption. Consistent with the findings above related to savings, unconstrained individuals in the sample are roughly five times as likely as constrained individuals to report that they could use personal savings to increase consumption above what they currently are planning to spend during the year. Constrained students, who receive slightly less money from their parents, are only half as likely to report that

they could increase spending through grants from parents, friends, or relatives (.14 vs. .27). Neither constrained or unconstrained students tend to believe that they could increase consumption by borrowing money from either family or formal sources. The last financial entry in Table 1 indicates that constrained students are only half as likely to report that they could increase spending through any source (.21 versus .41).

Evidence of financial differences also appear on the Free Application for Student Financial Aid (FAFSA). For example, the first two entries in the financial section of Table 1 shows that the average savings of parents of constrained students in our sample is smaller than the average savings of parents of unconstrained students in our sample by a factor of 3.7, and this difference is statistically significant at a 5% level.

Some additional issues related to using Question E.1 to identify constrained students

With respect to our definition of being constrained, there are several other things to note. First, an ideal definition of being constrained may be that a person wants to borrow and has no other resources that will allow him to do so. In practice, this is very close to the definition we use because only 21% of constrained individuals say that they have any financial resources that could be used to increase consumption and because it seems reasonable to believe that some of these 21% would not be able to increase consumption as much as they would like using these sources. Regardless, the main conclusions of the paper become even stronger and other results change very little if the 21% are excluded from the constrained group.

Second, because we do not explicitly specify an interest rate in Question E.1, it is natural to imagine that students may have in mind a "fair" interest rate that is lower than what might be "reasonable" to actually receive. Similarly, the answers to our survey questions might not exactly mirror what would happen if a loan was actually made available. For example, this might be the case if students tend to have a mentality that "of course I want more money" and do not fully internalize certain costs (e.g., time costs of applying or future consumption costs of borrowing) that would likely become quite apparent during the application process. However, these kinds of reporting errors would seem to imply that, if anything, we would tend to overstate the amount of students that would accept a loan if it was actually offered, and this is not problematic given that it would imply that our bound in Section IV.2 is even more conservative.

Third, it is not clear whether a non-trivial number of students are dropping out because they are not able to borrow money to help parents or family members. If there are such people and these people would not answer in the affirmative to our constraint question, our results pertain to the amount of attrition that would remain under a policy in which all direct costs are removed and students are offered loans that allow them to increase their own consumption during school. If there are not such people or these people would answer in the affirmative to our constraint question, then our results pertain to an even more generous policy in which students can also borrow money to help finance the consumption of parents. What is important is that, in either case, the lower bound described in Section IV.2 is a lower bound for the former (less generous) policy. This is informative because this (less generous) policy is arguably the most extensive policy that might currently be given serious attention by policymakers.[7] Further, we have two ways of providing some information that this issue may not be overly important. First, to the extent that this issue is likely to be of particular relevance for students whose parents lose jobs, it is informative that a parental job loss question in Appendix A.2 indicates that only 6.6% of the drop-outs in our sample and 6.1% of the non-drop-outs in our sample have either a mother or father that "lost a job without being able to find a similarly paying replacement job" between the beginning of the academic year and the end of the academic year. Second, as described in Section IV.4, data from an exit-reason module indicate that few people are leaving school for financial concerns related to their families.

IV.2 The proportion of attrition at Berea due to factors other than credit constraints

The outcome we examine is whether students who start the second semester drop out before the start of the second year. Hereafter, we suppress the time input (t_1) associated with our indicator of drop-out D in equation (2). We define D_1 to be an indicator of whether a particular student would drop out if he was

[7]While required participation in the work-study program at Berea described in S&S(2003b) might imply that the situation being studied is not quite the most generous policy that could be imagined, a couple of institutional details might mitigate concerns about the costs of working. First, work hours in the first year are tightly regulated with little variation around the required ten hours of work per week. Second, the fact that jobs are on-campus may alleviate certain typical costs (e.g., fixed travel costs) of working. Finally, the fact that all students must work may imply that the work policy does not have a large effect on relative (or possibly absolute) grades. In addition, the work-study program undoubtedly has generous aspects in that many jobs allow students to gain human capital that is marketable in the workplace, although this may be particularly true for types of jobs held by upper year students.

constrained and we define D_0 to be an indicator of whether the student would drop out if he was not constrained. Thus, for constrained students, D_1 is observed and D_0 represents a counterfactual outcome.[8]

The proportion of the attrition at Berea that should be attributed to credit constraints is found by dividing the proportion of all students at Berea who drop out because they are constrained by the proportion of all students who drop out for any reason. Our parameter of interest, the proportion of the attrition that is unrelated to credit constraints, P, is one minus this ratio and can be written as

$$(3) \qquad P = 1 - \frac{\Pr(C=1)\ E(D_1 - D_0 | C=1)}{\Pr(D=1)}.$$

A primary contribution of this paper is that our survey efforts described in Section IV.1 allow us to provide an estimate of .202 for Pr(C=1), the proportion of all students that are constrained. From the first row of Table 1, we obtain an estimate of .169 for Pr(D=1), the proportion of all students who drop out for any reason.[9] The difficulty arises because an estimate of $E(D_1 - D_0 | C=1)$, the effect of the constraint on the drop-out probability of constrained students, is not readily available since D_0 represents a counterfactual outcome for constrained students. We begin by estimating an upper bound for this term which implies an estimate of a lower bound for P. We then discuss whether we might be able to credibly estimate $E(D_1 - D_0 | C=1)$, and, hence, P, using additional information from the BPS.

From the first row of Table 1, we obtain an estimate of .274 for $E(D_1 | C=1)$. The estimate of the upper bound of .274 for $E(D_1 - D_0 | C=1)$ comes from making the conservative assumption that all of the attrition of constrained students is caused by the constraint (i.e., that $E(D_0 | C=1)=0$).[10] This number, along with the estimates of P(C=1) and P(D=1), yields an estimate of the upper bound for the proportion of attrition at Berea that should be attributed to constraints of .327 (Row 1, Column 4 of Table 2). Then, the estimate of the lower bound for P indicates that at least 67% of all attrition at Berea is caused by factors unrelated to

[8] $D=D_1$ if the student is constrained. $D=D_0$ if the student is unconstrained.

[9] $\Pr(D=1)$ could also be written as $E(D_1C+D_0(1-C))$.

[10] To be clear, if we observed the entire population, we could compute the upper bound exactly. We refer to this as an estimate of the upper bound because the proportion of credit constrained students who drop out will vary from sample to sample.

short-term liquidity constraints (Row 1, Column 5 of Table 2). Thus, even under the extreme assumption that all of the attrition of constrained individuals should be attributed to credit constraints, our estimate of the lower bound is informative in the sense that it indicates that the large majority of attrition at Berea is due to factors unrelated to short-term constraints during college. It is worth noting that, throughout our analysis, we are implicitly assuming that drop-out is not being caused by students learning that they are constrained after they answer our survey question (at the start of the second semester). Our Section IV.5 analysis of an exit module (that was administered after students left school) suggests that this is a reasonable assumption.

The lower bound is likely to be quite conservative because some constrained students who drop out undoubtedly do so for reasons other than credit constraints (i.e., $E(D_0 | C=1) \neq 0$). As a result, it seems worthwhile to examine whether it is possible to compute a credible estimate of $E(D_1 - D_0 | C=1)$. The simplest possibility is to estimate this term using a linear probability model of the form

(4) $D^i = \alpha + E(D_1 - D_0 | C=1) C^i + u^i$

where the unobservable u captures all of the non-constraint factors discussed in Section II that influence the drop-out decision. As shown in Column 1 of Table 3, the estimate of $E(D_1 - D_0 | C=1)$ from this specification is .131.

As shown in Row 2 of Table 2, using this estimate in equation (3) results in an estimate of P which implies that 84% of attrition should be attributed to factors unrelated to credit constraints. While this conclusion relies on an assumption that constrained and unconstrained students are identical in all dimensions that are unrelated to the constraint, the result is also informative if C is positively correlated with u since, in this case, the equation (4) estimator of $E(D_1 - D_0 | C=1)$ would be upwardly biased. Consistent with a non-negative correlation between C and u is the general notion that students with less personal and family wealth generally also suffer from other disadvantages such as inferior academic ability/preparation. However, it is worth noting that selection issues related to the college entrance decision could, in isolation, generate a negative correlation. For example, if all students who entered Berea were at the margin of indifference between entering and not entering college, then, by definition, students who knew that they were constrained at the time of entrance would have other advantages that would make them less likely to drop out.

In reality, the school is selective in its admissions, and, in addition, the importance of the selection issue would be mitigated if many constrained students do not anticipate the constraint at the time of entrance, a possibility suggested in Section IV.3 and by recent data collection at the time of entrance.[11] Regardless, because we cannot guarantee that C has a non-negative correlation with u, it seems worthwhile to treat the question of whether substantial non-constraint differences exist between constrained and unconstrained individuals as an empirical issue. Roughly speaking, our theoretical discussion in Section II suggests that, in addition to being potentially influenced by credit constraints, the drop-out decision is determined by 1) ability, 2) beliefs about earnings conditional on particular levels of completion and academic performance, and 3) preferences which indicate how much utility a person would receive over his lifetime given particular schooling and earnings paths. As described in full in Appendix B (available online), the detailed data in the BPS allow us to directly examine each of these dimensions. We find that constrained and unconstrained individuals are very similar in non-financial respects; while eight out of fifteen variables related to a student's financial situation at the time of entrance are found in Table 1 to vary in a statistically significant way by constraint status, only one of thirty-nine variables related to the three non-constraint factors above is found in Appendix B (available online) to vary by constraint status.

A more formal approach is taken in Table 3 by adding covariates to equation (4). Table 1 defines a set of traditional variables and a set of additional BPS variables (i.e., a subset of the variables described in Appendix B (available online)) that we use in this exercise. In Column 2 of Table 3 we add the *Traditional variables* from Table 1 to the specification in Column 1 of Table 3. In Column 3 of Table 3 we augment the specification in Column 2 of Table 3 by adding the *Additional variables related to ability and motivation at the time of college entrance* shown in Table 1.[12] In Column 4 we augment the specification in Column 2

[11]While we cannot examine whether the students in our sample anticipated being constrained at the time of entrance, we recently examined beliefs about constraint status at the time of entrance for a new cohort of Berea students. We found that the proportion of people in our new sample who anticipated being constrained at the time of entrance was even smaller (55/308=.176) than the proportion of individuals who were constrained in our sample. Thus, if at the time of entrance some students make type II errors related to their constraint status, then a non-trivial number of constrained students in our current sample likely did not anticipate the constraint.

[12]As discussed in Appendix B (available online), many of the additional *ability and motivation* variables available in the BPS are significantly related to first semester grade point average, but that there is no evidence of relationships between these variables and a person's constraint status.

by adding the variable in Table 1 that describes a student's *Belief about financial return to schooling at time of college entrance*.[13] In Column 5 we augment the specification in Column 2 by adding the *Variables related to preferences at time of college entrance from* Table 1.[14] In Column 6 we include all variables that appear in the specifications in Columns 1-5. We find that adding variables leads to an increase in the R^2, but as expected given the evidence from the previous paragraph, the estimate of $E(D_1 - D_0 | C=1)$ changes relatively little across specifications.[15] The estimates of P obtained by using the estimates of $E(D_1 - D_0 | C=1)$ from Columns 2-6 of Table 3 in equation (3) are shown in Rows 3-7 of Table 2 and range from .853 to .872. Thus, the additional results continue to suggest strongly that the majority of attrition at Berea should be attributed to reasons that are unrelated to credit constraints. Further, the fact that the estimate of P increases slightly as more variables are added suggests that, if one were willing to make the strong "observables are like unobservables" assumption in the general spirit of Altonji et al. (2005), the results would, if anything, be strengthened slightly.

IV.3 The effect of the constraint on constrained students

The finding that attrition should be attributed primarily to reasons other than credit constraints arises primarily because relatively few students are constrained. Indeed, the evidence from Table 3 suggests that credit constraints may have a non-trivial effect on the relatively small number of people who are constrained; the C variable is significant and quantitatively important in all columns of Table 3 and the estimates indicate that between 40% and 48% of the drop-out rate of constrained students should be attributed to the constraint.

It is worthwhile to provide some additional evidence in support of this possibility that credit constraints play an important causal role in the decisions of some students. The effect of liquidity constraints

[13]In Appendix B (available online) this variable is found to be significantly related to drop-out, but does not vary with constraint status.

[14]Available information about the discount factor and intertemporal elasticity of substitution are not included in the regressions because, as discussed in Appendix B (available online), for a non-trivial of students we could not ascertain values of these variables. However, as is true for the *Variables related to preferences at time of college entrance* variables in Table 1, Table Suppl.4 of Appendix B (available online) finds no differences in these variables by constraint status when using all available observations

[15]The estimates of $E(D_1 - D_0 | C=1)$ also change very little if we use a probit model in place of the linear probability model; the estimated marginal effect (standard error) of C in the six columns of Table 3 becomes .131 (.060), .124 (.060), .114 (.063), .116 (.063), .109 (.062), and .099 (.064), respectively.

should operate most directly through how much a person enjoys school. The Table 1 variables *Sch_enjoyable* and *Sch_unenjoyable*, which were constructed from question 1.A. in Appendix B.3.c (available online), indicate that beliefs about how enjoyable school will be relative to being out of school are very similar by constraint status at the time of entrance. This finding is consistent with a situation in which students do not tend to anticipate their constraint status (or the effect of the constraint) at the time of entrance and constrained and unconstrained students are indeed similar in non-financial ways that influence the drop-out decision. However, if constraints are having a causal effect on exits, differences should be revealed after the time of college entrance, and we find some evidence that this is the case. At the end of the first semester, .561 of unconstrained individuals but only .387 of constrained indicate that being in school is much more enjoyable than not being in school. A test of the null hypothesis that the difference in the population proportions is zero has a t-statistic of 2.25. Similarly, .075 of unconstrained students and .184 of constrained students indicate that being in school is less enjoyable than not being in school, and a test of the null hypothesis that the difference in the population proportions is zero has a t-statistic of 1.88. The results at the end of the year are virtually identical.[16] Related to this, although we find that both constrained and unconstrained students are in very good health at the beginning of the year, we find differences at the middle and end of the year.[17] Given that individuals of college age are unlikely to suffer major medical problems in a year conditional on being in good health at the beginning of the year, it seems quite possible that the health problems reported by the constrained students at the middle and end of the year may be stress related, and, therefore, influenced by how much the student is enjoying school or how much the student is worrying about financial matters.

[16]The proportions for the "much more enjoyable" category are .363 (constrained) and .541 (unconstrained) with a t-statistic of 2.22. The proportions for the "less enjoyable" category are .182 (constrained) and .077 (constrained) with a t-statistic of 1.72.

[17]At the beginning of the year, .901 of constrained and .941 of unconstrained students report being in good or excellent health. At the end of the first semester, .873 of unconstrained but only .720 of constrained individuals report being in good or excellent health. At the end of the academic year, .884 of unconstrained and .750 of constrained individuals report being in good or excellent health. A test that the population proportions of constrained and unconstrained individuals that are in good or excellent health is not rejected at traditional significance levels in the first case, is rejected at significance levels of greater than .007 in the second case, and is rejected at significance levels greater than .019 in the last case.

IV.4 Why do so few students want to borrow?

Given the low levels of consumption found in Section III, an open question is why 80% of students do not wish to borrow money. If students are unhappy with their consumption profiles but do not wish to borrow for, say, reasons related to religious beliefs or psychological debt aversion (Field, 2005), then certain alternative policies (e.g., offering subsidies to increase consumption) may have a substantial effect even if the type of loan policy studied here does not. We are able to provide some information about this issue using Question E.3 (Appendix A.1). We find that the majority of students are happy with their current consumption amounts. Sixty-four percent of unconstrained students answer that they do not want to borrow money because they are "happy with the amount I am currently spending and would not choose to increase spending now because I would have less to spend later when I had to repay the loan and interest ." Further, many of the remaining answers to this question that fall into an open ended "other" category can also loosely be interpreted in this way. Thus, our findings suggest that, even in an entirely unconstrained world, individuals would choose to spend substantially less money during school than they would after leaving school. One possible explanation for this result is that the college environment may be one where many services and recreational activities are either provided by schools or are of low cost. Another related explanation is that certain consumption goods might not be as important during school (as they are later) because the college setting may encourage certain activities and uses of time that are not available elsewhere.

IV.5 Some additional evidence from an exit module

The theory in Section II suggests that, in order to provide evidence about the percentage of attrition that would remain even if access to credit was made available, it is necessary to consider two avenues through which credit constraints can have a causal effect on the drop-out decision. First, credit constraints can have a causal effect if, after matriculation, an individual learns that he/she is constrained or learns that his constraint will make it less enjoyable to be in school than expected. Second, even if no learning about credit constraints takes place after college entrance, constraints can have a causal effect if a person knows at the time of college entrance that school will be less enjoyable (than it would otherwise be) due to the presence of his constraint.

We can provide evidence about the former using an exit-reason module which is shown in Appendix A.3 and was sent to all drop-outs from the 2001 cohort soon after they left Berea. We focus on individuals who left Berea before the start of their third year. The total drop-out rate before the third year was 31% for our sample of 354 domestic students with 109 of 354 students leaving. Our sample used for the exit-reason analysis includes the 76 (71%) of the drop-outs who responded to the exit survey and had usable information on all questions need for our analysis.

Motivated by a learning model of decision-making, Question G (Appendix A.3) lists an exhaustive set of 14 possible reasons (including an "other" category) that students could have learned after college entrance that school was less beneficial or less enjoyable than expected at the time of college entrance. Two closely related reasons in the exit module (g and h) involve situations where a student has learned that school is less enjoyable for reasons related to his own financial situation:

g. Worries about my own personal financial situation made school less enjoyable than expected

h. Concerns about not having enough money for items that would make my life more pleasant (for example, a car, entertainment, dates, and social activities) have made school less enjoyable than expected.

We find that 57% of drop-outs found reason g to be true, 53% of drop-outs found reason h to be true, and 67% percent of drop-outs found either reason g to be true or reason h to be true. We find that 25% of drop-outs found reason g to be very important, 12% of drop-outs found reason h to be very important, and 28% percent found either reason g or reason h to be very important. However, because the average drop-out indicates that many reasons are true and many reasons are very important, these results do not directly answer the question of interest - what percentage of the drop-outs would have left school even they had not found that g and h were true? One way to provide evidence about this question is to use an additional component of the survey question which appears as Question H (Appendix A.3) For each person, Question H elicits a set $R=\{R_1,...,R_N\}$ where R_i is the reason that the person believes was the ith most important in pushing him over the margin of indifference and out of school, R is a set of reasons that would have been sufficient to push the person over the margin and out of school, and the set $\{R_1,...,R_{N-1}\}$ would not be sufficient to push the person over the margin and out of school.

This question is useful because it implies that, if reasons g and h are each not included in R, then the person would have left school even if he had not learned that g or h were true. We find that R contains either g or h only 8% of the time, and, therefore, our results indicate that at most 8% of the attrition arose because people learned about constraints after arriving at school.[18]

In Section IV.1 we noted that it was not clear whether our conclusions take into account the possibility that some students drop out because they are not able to borrow money to help parents or family members. Reason f in our exit module pertains directly to that possibility:

f. Worries about financial problems related to my family made school less enjoyable than expected.

When we examine whether f, g, or h are elements of R, we find very little change in our results. The new results imply that at most 9% of the attrition arose because people learned about constraints after arriving at school. Of relevance for the interpretation of the results in Section IV, the results suggest that concerns about the financial situation of families do not tend to be a primary driving force in attrition.

In an earlier footnote we mentioned that only 18% of a recent cohort of students anticipated, at the time of entrance, that they would be constrained during college. When combined, our finding that the large majority of students do not anticipate being constrained at entrance and our finding that little drop-out is caused by students learning that they are constrained during college are consistent with our Section IV.2 conclusion that the large majority of attrition should be attributed to factors other than constraints.

V. Conclusion

Our results suggest that there exists a group of students at Berea whose outcomes are likely to suffer because their ability to purchase consumption during school is constrained. Further, because constrained students do not wish to borrow much in absolute terms, the results suggest that a policy to help these students would not be particularly expensive. Nonetheless, the results here suggest that the large majority of attrition would remain under the generous policy in which direct costs are zero and students are given access to loans which could be used to purchase additional consumption during college. Further research is needed to provide a comprehensive view of how students from low income families decide whether to remain in school.

[18]Fifty-six of the 76 students indicate that a single reason was important enough that it would have been sufficient for them to leave school (N=1). Of these students, only three indicate that this reason was either g or h. Eleven students indicate that their two most important reasons would have been sufficient for them to leave school (N=2). Of these students, only one indicates that either g or h was one of these two reasons. The remaining nine students have N=3 or N=4. Three of these students list either g or h in R.

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Table 1 Demographic and parental characteristics for entire sample and by constraint status

	Entire Sample mean (std. dev.) n=307	Not Constrained mean (std. dev.) n=245	Constrained mean (std. dev.) n=62	See note below
Outcome				
$D(t_1)$ - drop-out by beginning of second year	.169	.142	.274	.014
Traditional Variables				
Male	.442	.416	.548	.062
Black	.188	.171	.258	N
ParentEd - at least one parent has college degree	.511	.534	.419	N
Faminc - total family income from FAFSA	26510 (17153)	27146(16895)	24006(18056)	N
ACT - American College Test	23.24 (3.606)	23.551 (3.717)	22.822(3.118)	N
Additional Financial Variables				
expected consumption (Sept - August) as of beginning of second semester from Question A.2	957 (1457)	1023 (1543)	695 (1058)	.05
total parental savings from FAFSA (cash, savings, and checking accounts)	1241 (3671)	1460 (4077)	392 (658)	.046
total parental investments from FAFSA	1855 (6680)	2117 (7106)	857 (4629)	N
total student savings as of second semester	800 (1589) median 200	940 (1734) median300	246 (510) median 50	.0000
first-year grants from parents	874 (1305)	930 (649)	649 (1087)	.097
have a loan from parents or friends	.033	.036	.016	N
have a credit card	.250	.249	.258	N
credit card balance won't be paid this month	78	47	201	.003
labor income second semester	453 (72)	453 (72)	450 (81)	N
could increase spending money using savings	.263	.314	.064	.0001
could increase spending money using new grants from parents, friends, relatives	.247	.273	.145	.036
could increase spending money through loans from parents, friends, relatives	.114	.118	.096	N
could increase spending money through loans from other sources at fair interest rates	.045	.049	.032	N

could increase spending money from one or more source in previous 4 rows	.371	.412	.209	.003
Additional variables related to ability and motivation at time of college entrance				
HSGPA - high school grade point average	3.301 (.753)	3.323 (.720)	3.215 (.698)	N
StudyHS - hours studied per week in high school	10.584 (10.471)	10.339 (11.576)	11.576 (11.556)	N
StudyC - expected study hours per weekday during college	3.605 (3.644)	3.644 (1.594)	3.449 (1.555)	N
Pr_GPA3.5 - percent chance that 1st semester grade point average will be 3.5 or higher	39.178 (25.606)	38.474 (25.341)	41.959 (26.660)	N
GPA_study3 - expected grade point average if study three hours a day during college	3.106 (.660)	3.13 (.642)	2.987 (.723)	N
Pr_forced_leave - percent chance of being forced to leave school at some future point because of bad academic performance	7.453 (13.041)	6.887 (13.501)	9.679 (10.859)	N
Belief about financial return to schooling at time of college entrance				
Return_to_schooling - Log(median earnings age 28 if graduate with 3.0 GPA) -Log(median earnings at age 28 if leave school immediately)	.685 (.373)	.682 (.377)	.698 (.358)	N
Variables related to preferences at time of college entrance				
Health_bad - health fair or poor at time of college entrance	.067	.059	.099	N
Bfriend/Gfriend - boyfriend or girlfriend at home at time of entrance	.322	.314	.354	N
Home_grad - grad Probability of living within 100 miles of home if graduate	.487	.495	.458	N
Home_dropout - Probability of living within 100 miles of home if do not graduate	.672	.676	.655	N
Sch_enjoyable Believe that school will be much more enjoyable than being out of school	.688	.699	.645	N
Sch_unenjoyable Believe that school will be less enjoyable than being out of school	.056	.025	.064	N
Risk_aversion_low - risk aversion < 2.0	.393	.400	.366	N

The last column shows the p-value from a test that the average value of the variable in a particular row is the same across constrained and unconstrained groups if this p-value is less than .1 and shows an "N" if the p-value is greater than .1.

Table 2 Estimates of P - the proportion of attrition that is unrelated to credit constraints

Where does estimate of $E(D_1-D_0\|C=1)$ come from?	(1) Estimate proportion of students that are constrained $Pr(C=1)$	(2) Estimate effect of constraint on the drop-out probability of constrained $E(D_1-D_0\|C=1)$	(3) Estimate proportion of students that drop out $Pr(D=1)$	(4) Estimate of proportion of attrition due to constraints $\frac{Pr(C=1)E(D_1-D_0\|C=1)}{Pr(D=1)}$	(5) Estimate of P proportion of attrition unrelated to constraints $1-\frac{Pr(C=1)E(D_1-D_0\|C=1)}{Pr(D=1)}$
(1) Estimate of upper bound from Section IV.2, n=307	.202 (.022)	.274 (.025)	.169 (.021)	.327 (.064)	.673 (.064)
(2) Estimate from Column 1 of Table 3, n=307	.202 (.022)	.131 (.052)	.169 (.021)	0.156 (.072)	.844 (.072)
(3) Estimate from Column 2 of Table 3, n=307	.202 (.022)	.123 (.053)	.169 (.021)	0.147 (.073)	.853 (.073)
(4) Estimate from Column 3 of Table 3, n=283	.194 (.023)	.118 (.056)	.166 (.022)	0.137 (.073)	.863 (.073)
(5) Estimate from Column 4 of Table 3, n=284	.194 (.023)	.116 (.054)	.159 (.021)	0.141(.080)	.859 (.080)
(6) Estimate from Column 5 of Table 3, n=291	.203 (.023)	.112 (.056)	.179 (.022)	0.127 (.076)	.873 (.076)
(7) Estimate from Column 6 of Table 3, n=252	.191 (.024)	.110 (.059)	.163 (.023)	0.128 (.088)	.872 (.088)

Column 5 shows estimates of P, the proportion of attrition that is unrelated to credit constraints. Columns 1-4 show estimates of the elements used to construct P. Each row corresponds to a different specification for estimating $E(D_1-D_0|C=1)$, effect of constraint on the drop-out probability of constrained, in column 2. Row (1) uses the estimate of the upper bound described in Section IV.2. Rows (2)-(7) use estimates from Columns (1)-(6) of Table 3.
Sample sizes vary across rows depending on how many observations were available to estimate corresponding models in Table 3. See note in Table 3. Standard errors in Columns 4 and 5 are computed using bootstrap techniques.

Table 3 Regression of drop-out indicator, $D(t_1)$, on variables of relevance given theoretical model
Estimates of $E(D_1 - D_0 |C=1)$

	(1)	(2)	(3)	(4)	(5)	(6)
	(n=307)	(n=307)	(n=283)	(n=284)	(n=291)	(n=252)
C (constrained) estimate of $E(D_1 - D_0 |C=1)$	.131 (.052)**	.123 (.053)**	.118 (.056)**	.116 (.054)**	.112 (.056)**	.110 (.059)*
Constant	.142 (.023)**	.204 (.166)	.925 (.300)**	.275 (.171)	.226 (.202)	1.15 (.327)
Male		.054 (.043)	.025 (.047)	.060 (.043)	.055(.045)	.013 (.049)
Black		-.029 (.061)	-.107 (.064)*	-.056 (.064)	-.036 (.065)	-.126 (.069)
Faminc/10,000		.008 (.003)**	.009 (.003)**	.008 (.003)**	.008 (.003)**	.008 (.003)**
ParentEd		-.066 (.043)	-.089 (.045)*	-.046 (.044)	-.061 (.045)	-.052 (.048)
ACT		-.003 (.006)	-.005 (.007)	-.008 (.006)	-.004 (.007)	-.013 (.008)*
HSGPA			-.151 (.053)**			-.149 (.057)**
StudyHS			-.003 (.005)			-.005 (.005)
*StudyHS*StudyHS*			.0001 (.0001)			.0002 (.0001)
StudyC			.014 (.063)			-.012 (.066)
*StudyC*StudyC*			-.004 (.006)			-.001 (.007)
Pr_GPA3.5			-.0003 (.0009)			-.0001 (.0009)
GPA_study3			-.018 (.040)			-.036 (.042)
Pr_forced_leave			-.002 (.001)			-.0022 (.001)
Ret_to_schooling <sample median				.091 (.045)**		.074 (.049)
Health_bad					.056 (.091)	.073 (.094)
Bfriend/Gfriend					.050 (.047)	.015 (.048)
Home_grad					-.002 (.001)	-.002 (.001)
Home_dropout					.001 (.001)	.001 (.001)
Risk_aversion_low					.065 (.045)	.045 (.045)
Sch_enjoyable					.065 (.045)	.014 (.053)
Sch_unenjoyable					.207 (.127)*	.192 (.121)
	R^2=.020	R^2=.052	R^2=.080	R^2=.070	R^2=.088	R^2=.185

*significant at .10
**significant at .05
Sample sizes vary across columns because some variables cannot be constructed for some individuals in the sample, due, to , for example item non-response or non-valid response.

Appendix A Survey questions

Appendix A.1. Financial Module from Survey 6

Question A. We are interested in how much spending money you have compared to what you thought you would have when you arrived at Berea.

A.1 When you arrived at Berea in September, approximately how much money did you expect that you would spend during the next year (September 2001-August 2002) **not including** college related costs (term bills, books, class-related supplies)? Please include expenses for things such as clothing, travel, telephone, cars, recreation, entertainment, and food and snacks not included in the college food plan. $_____

A.2 You may have found out that you would like to spend more or less spending money than you expected when you arrived at Berea. You may also have found out that the amount of spending money that you have available after paying for college costs is more or less than you expected when you arrived. How much money do you now expect that you will spend this year (September 2001-August 2002) **not** including college related costs?
$_____

Question B. After taking into account what you need to pay your term bill and other college costs in the future, do you have savings or other financial resources that would allow you to increase the amount of spending money that you have during the current academic year beyond the amount you have written in Question A?

B.1 YES (could increase spending if wanted) NO (cannot increase spending)

B.2. If you circled YES, please check any of the following ways that you could increase your spending money at the present time if you decided that you wanted to.

1. I have personal savings that I could use to increase spending money _____
2. Parents, friends, or relatives would be able and willing to give me more spending money _____
3. Parents, friends, or relatives would be able and willing to loan me money _____
4. I am able to borrow money from other sources at fair interest rates _____

Question C. How much savings do you personally have? Include money in savings accounts, checking accounts, or other investments. $_____

Question D. Do you have one or more credit cards? YES NO

If YES, how much money do you owe on your credit cards? Please include any current balances that you will not pay off this month. $_____

Question E. Suppose that someone offered to loan you money this year so that you could increase the amount of money that you would have for spending money during this year. Suppose that the loan is made at a fair interest rate and that you would not have to begin repaying the loan until after you leave Berea.
E.1 Would you accept the loan? YES NO

E.2 If you answered YES,
You would like to borrow money to increase your spending at Berea during this year. Remember, you will have to pay back the loan and any interest after leaving Berea. How much money would you choose to borrow this year in order to increase your spending money this year? $ _____

E.3 If you answered NO,
Why would you not accept the loan?
1. I am happy with the amount I am currently spending and would not choose to increase spending now since I

would have less to spend later when I had to repay the loan and interest_____
2. I don't like the idea of borrowing money _____
3. Other (please explain)_____

Question F.
Approximately, what is the total amount of money that your parents, relatives, and friends are paying towards your college costs and the spending money described in question A for the current school year. Please do not include loans. $_____

Approximately, what is the total amount of money that you are currently borrowing this year to help pay for your college costs and the spending money described in question A for the current school year? $_____

If you are borrowing money, please describe who you are borrowing it from.

Appendix A.2 Parental Job Loss Question from the end of year Survey 10

1) In the last 12 months did your father lose his job without being able to find a similarly paying replacement job? Note: Please answer NO if your father did not lose his job, lost his job but found a similarly paying new job, did not work at a job for pay, you do not know the work status of your father, or your father is deceased.

YES NO If yes, approximately in what month did this occcur?_____

2) In the last 12 months did your mother lose her job without being able to find a similarly paying replacement job? Note: Please answer NO if your mother did not lose her job, lost her job but found a similarly paying new job, did not work at a job for pay, you do not know the work status of your mother, or your mother is deceased.

YES NO If yes, approximately in what month did this occur?_____

Appendix A.3. Exit-Reason Module

Question G. We are interested in how certain factors may have influenced your **decision to leave Berea.** For each letter, first indicate whether you found the given factor to be **True or False**. Then, indicate the extent to which the factor influenced your decision to leave Berea.

a. Classes were more difficult than I expected. This made being in school more stressful or made school less enjoyable because I had to spend more time studying and less time relaxing or doing other things. **True False**
Importance of (a) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

b. Given academic difficulties, I felt it was unlikely that I would eventually graduate and this made staying in school less worthwhile. **TRUE FALSE**
Importance of (b) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

c. I realized that my grades were probably going to be lower than what I expected and this made me realize that the type of jobs I would get **if I graduated** would be worse than what I had expected. **True False**
Importance of (c) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

d. It was harder to meet new friends than expected, I missed my family/old friends/boyfriend/girlfriend more than expected, or I found that activities available at Berea College and in Berea were less exciting than expected. **True False**
Importance of (d) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

e. Physical or emotional harassment made me feel uncomfortable at Berea. **True False**
If True, please circle any that contributed to this feeling: **roommate teacher college staff other students**
Importance of (e) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

f. Worries about the financial matters related to my family made school less enjoyable than expected. **True False**
Importance of (f) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

g. Worries about my own personal financial situation made school less enjoyable than expected. **True False**
Briefly explain why you needed more money (for example, to pay term bill, for spending money etc.)
_____
Importance of (g) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

h. Concerns about not having enough money for items that would make my life more pleasant (for example, a car, entertainment, dates, and social activities) have made school less enjoyable than expected. **True False**
Importance of (h) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

i. Non-financial problems or health difficulties among family or friends at home made school less enjoyable. **True False**
Importance of (i) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

j. Personal health problems or illness made school less enjoyable. **True False**
Importance of (j) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

k. I realized that I wasn't as interested as I expected in the type of material that was being covered in classes. **True False**
Importance of (k) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

l. Berea wasn't academically challenging enough. **True False**
Importance of (l) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

m. Berea didn't provide the types of majors or career opportunities I was interested in. **True False**
Importance of (m) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

n. In the space below, comment on any **other things** that have influenced how you feel about remaining at Berea.
Importance of (n) in your decision to leave Berea. **(circle one below)**
1. Not important at all 2. Not particularly important 3. Somewhat important 4. Very important

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Question H. In Question G above, write (**1**) in front of the reason that was the **most important reason** in your decision to leave Berea, write (**2**) in front of the reason that was the **second most important,** and write (3) in front of the reason that **was third most important.**

H.1 Consider only the reason you labelled (1).
By itself, would this have been enough to cause you to leave school? YES NO
If YES, continue with question (I). If NO, continue with question H.2

H.2 Consider both the reason you labelled (1) and the reason you labelled (2).
Would these two reasons together have been enough to cause you to leave school? YES NO
If YES, continue with question (I). If NO, continue with question H.3

H.3 Consider the reasons you labelled (1), (2), and (3).
Would these three reasons together have been enough to cause you leave school? YES NO
If YES, continue with question (I). If NO, continue with question H.4

H.4 In question H.3 you indicated that the reasons that you labelled (1), (2), and (3) in question G would not have been enough together to cause you to leave school. In question G above, now please write a (4) next to the fourth most important reason in your decision to leave Berea. If reasons (1), (2), (3),and (4) together would have been enough to cause you to leave school, please skip to question (I). If not, write a (5) next to the reason in question G that is the fifth most important reason in your decision to leave Berea. If reasons (1), (2), (3), (4), and (5) together would have been enough to cause you to leave school, please skip to question (I). If not, continue adding numbers in this manner until the group of reasons that you have numbered would have been enough together to cause you to leave school.

Online Appendix B. Details of other sources of heterogeneity between constrained and unconstrained students

In the next three subsections (B.1, B.2, B.3) we examine whether differences exist by constraint status in 1) ability, 2) beliefs about earnings conditional on particular levels of completion and academic performance, and 3) preferences which indicate how much utility a person would receive over his lifetime given particular schooling and earnings paths. The implicit assumption is that the variables being compared are not influenced by the constraint.

B.1. Differences in academic ability by constraint status

Given previous evidence that a student's cumulative grade point average is often the strongest predictor of whether a person stays in school (S&S, 2003a), it seems particularly important to pay careful attention to whether differences exist in determinants of college grade point average such as ability and motivation.

In Columns 1 and 2 of Table Suppl.1 we regress a student's first semester college grade point average on *ACT* and *HSGPA*, respectively. The coefficients (tstats) are .065 (5.338) and .736 (7.854) respectively in the two specifications and these two variables explain .082 and .172 of the variation in college GPA respectively when included separately. Although not shown in the table, the two variables explain .193 of the variation when included in a specification together.

We have used the BPS to collect a variety of additional information at the time of college entrance that helps to characterize a person's academic ability, motivation, and beliefs about the importance of college. For example, with respect to academic ability at the time of college entrance, the BPS asks a student what grade point average he would expect to receive conditional on particular amounts of study time during college. The answer conditional on studying three hours a day determines the *GPA_study3* variable in Table 1. With respect to questions of motivation and work ethic, the BPS asks a student how many hours he spent studying per week in high school (*StudyHS*) and how many hours he plans to spend studying per day in college (*StudyC)*. With respect to questions that combine motivation and work effort with ability, the BPS includes the following two questions which, respectively, ask an individual to express his beliefs about the probability that his grade point average in the first semester will fall into each of a set of mutually exclusive and collectively exhaustive intervals and asks an individual about the probability that he will be suspended from school at some point because of poor grade performance.

We realize that you do not know exactly how well you will do in classes. However, we would like to have you describe your beliefs about the grade point average that you expect to receive in the first semester. Given the amount of study-time you indicated in question H, please tell us the percent chance that your grade point average will be in each of the following intervals. That is, for each interval, write the number of chances out of 100 that your final grade point average will be in that interval.
Note: The numbers on the six lines must add up to 100.

Interval	**Percent Chance (number of chances out of 100).**
[3.5, 4.00]	_____
[3.0, 3.49]	_____
[2.5, 2.99]	_____
[2.0, 2.49]	_____
[1.0, 1.99]	_____
[0.0, .99]	_____

What do you think is the percent chance (number of chances out of 100) that you will be forced to leave school (that is, suspended by the college) in the future due to poor academic performance? _____

The answer on the first line of the former question determines the variable *Pr_GPA3.5* in Table 1. The answer

to the second question determines the variable *Pr_forced_leave*.

In Columns 3-7 of Table Suppl.1 we regress first semester college grade point average on the new variables separately and find that four of the five new variables are statistically related to grade performance. The ninth and tenth columns show that adding these additional variables jointly increases the R^2 of the linear specification by approximately 30% over a specification which contains *HSGPA* and *ACT* as well as M*ALE*, *BLACK*, *PARENTED*, and *FAMINC*. Although not shown, adding these variables increases the R^2 by approximately 50% over the specification that contains only *HSGPA* and *ACT*. A test of the null hypothesis that the effects of the new variables are jointly zero is rejected at significance levels greater than .019.

Thus, the evidence suggests that we have access to a variety of traditional and non-traditional variables that are related to ability and motivation at the time of entrance. What is important for this study is that the descriptive statistics in Table 1 indicates no evidence of a systematic relationship between any of the new variables and a person's constraint status.

B.2. Differences in beliefs about earnings conditional on particular levels of completion and academic performance by constraint status

At the time of college entrance and at the end of the first year, we elicited beliefs about distributions of earnings using a survey approach that follows in the general spirit of the work by Dominitz (1998), and Dominitz and Manski (1996 , 1997). Specifically, for each of a number of schooling scenarios, we ask each individual to report the first, second, and third quartiles associated with the future earnings he would earn at several future ages given the scenario. Here we concentrate on answers associated with earnings at the age of 28.

At the time of college entrance, one of the schooling scenarios involves leaving school immediately. The first row of Table Suppl.2 shows that, on average, the median income associated with this scenario is $29,576 and $29,626 for the constrained and unconstrained groups respectively. Although not shown, the average first quartile and third quartile are also similar across the constrained and unconstrained groups. At the time of college entrance, other schooling scenarios involved graduating from college (unconditional on grade performance) and graduating with a 3.75 grade point average, a 3.0 grade point average, and a 2.0 grade point average, respectively. The latter three scenarios provide information about the distribution of earnings conditional on ability. Rows 2-5 of Table Suppl.2 indicate that, on average, the median earnings associated with these scenarios are also similar across constrained and unconstrained individuals. We reach the same conclusions when we examine, in the second part of Table Suppl.2, the answers to these questions at the end of the first academic year.

Thus, if the answers to our questions truly reflect beliefs, the evidence suggests that constrained and unconstrained individuals do not differ in their beliefs about the financial returns to college. Given the newness of the types of questions being used here, it makes sense to look for evidence of whether the answers are related to the drop-out decision. For the earnings questions that are answered at the time of college entrance, we construct two measures of the returns to schooling.

R_1=Log(Median earnings age 28 if graduate)-Log(Median earnings age 28 if leave school immediately)

R_2=Log(Median earnings age 28 if graduate 3.0 GPA)-Log(Median earnings age 28 if leave immediately)

We compute the same two measures using data from the end of the school year and call these measures R_3 and R_4. As expected given the previous results in Table Suppl.2, the measures R_1, R_2, and R_4 are similar across constrained and unconstrained individuals.[19]

Column 1 of Table Suppl.3 shows the results obtained by regressing the drop-out indicator on a dummy variable which has a value of unity if R_1 is less than a median value, and, therefore indicates that a person's beliefs about the returns to schooling are "small." Columns 2-4 of Table Suppl.3 are similar but include dummy variables that are constructed using R_2-R_4 respectively. We find evidence that individuals that believe that the returns to schooling are small are significantly more likely to drop-out of school; the t-statistics associated with the dummy variables constructed from R_1-R_4 are 1.40, 2.06, 2.35, and 2.30 respectively. In addition, the effects are quantitatively large; the estimates of having beliefs that the returns to schooling are small increases the mean drop-out probability by 44%, 75%, 122%, and 121%, respectively relative to the case where the returns to schooling are large. We use the variable R_2 as our *Return_to_schooling* variable in Table 1.

B.3. Differences in preferences which indicate how much utility a person would receive over his lifetime given particular schooling and earnings paths

In Section B.3.a we take advantage of recent innovations in survey methodology by Barsky et al. (1997) to directly examine whether some of the basic properties associated with utility, such as risk aversion, intertemporal elasticity of substitution, and rate of time preference, differ across constrained and unconstrained individuals.[20] In B.3.b we take an indirect approach of examining whether differences in particular personal or family situations, which might make school less enjoyable relative to being out of the workforce at a given level of consumption, exist between constrained and unconstrained individuals. In B.3.c we take a final, direct approach.

B.3.a. Risk aversion, intertemporal elasticity of substitution, and the discount rate

Risk Aversion

The first general property of utility functions that we examine is risk aversion. We are able to provide some direct evidence using a set of survey questions suggested by Barsky et al. (1997) which involve asking individuals about hypothetical gambles involving income. At the beginning of the year, individuals were asked the following question:

Suppose in the future you have a job which is guaranteed to give you a certain amount of income every year for life. You are given the opportunity to take a new and equally good job, with a 50-50 chance it will double your income and a 50-50 chance it will cut your income by one-third (33%). Would you take the new job? YES NO

If the answer to the question was YES, the person was asked whether he would still accept the job if "The chances were 50-50 that the new job would double your income, and 50-50 that it would cut it in half (50%)." If the

[19] A test of the null hypothesis that the population value of R_1 is the same for constrained and unconstrained individuals has a pvalue of .952. p values for R_2 and R_4 are .807 and .292 respectively. It does not make sense to compare R_3 across constraint status because the constraint may influence a person's grades by influencing their effort.

[20] We thank the authors of Barsky et al. (1997) for providing the questions that we used in the survey.

answer to the question was NO, the person was asked whether he would take the new job if "The chances were 50-50 that the new job would double your income, and 50-50 that it would cut it by twenty percent (20%)." Thus, each person answers two questions and the two answers separate respondents into four risk preference categories. These categories can be ranked in order of risk aversion without making a functional form assumption for the utility function. Bounds on the risk aversion associated with each of the categories can be obtained with a functional form assumption. For example, if one is willing to assume a constant relative risk aversion form for the utility function, an answer sequence of NN would imply that a person has risk aversion greater than 3.76, an answer sequence of NY would imply that a person has risk aversion between 2.0 and 3.76, an answer sequence of YN would imply that a person has risk aversion between 1.0 and 2.0, and an answer sequence of YY would imply that a person has risk aversion less than 1.0.

Table Suppl.4 indicates that individuals are quite risk averse and that constrained and unconstrained individuals have similar levels of risk aversion. For example .60 and .63 of constrained and unconstrained individuals respectively fall into one of the 2 most risk averse categories (risk aversion greater than 2.0 under the CRRA assumption).

As some evidence that these experimental questions contain some useful information, Barsky et al. (1997) find that answers to these types of questions are related to risky activities for respondents in the Health and Retirement Study. Unfortunately, our data do not contain information about risky activities that would be useful for examining the explanatory power of these questions. However, we do find that sample members in the two least risk averse classes (*Risk_aversion_low*) are more than 50% more likely to leave school than sample members in the two most risk averse classes (.220 vs. .143). A test of the null hypothesis that the two population proportions are equal is rejected at significant levels greater than .087.

Intertemporal elasticity of substitution and the discount factor

Our survey questions eliciting time preference and intertemporal substitution were provided by the authors of Barsky et. al (1997). As in their work, the behavioral equation motivating the design of the questions is

(B.1) $\Delta\log(c)=\gamma\,(r-\beta)$

where c is consumption, r is the real interest rate, and β is the subjective discount rate. γ is the elasticity of intertemporal substitution which can be written as

(B.2) $\gamma=d\log(c)/d\log(1+r)$.

Equation B.1 shows that a person's consumption path depends on both γ and β. This motivates our identification strategy which is the same as described in Barsky et. al (1997):

> "...we first posed a hypothetical set of circumstances that are meant to control for heterogeneity in economic and demographic conditions... Then the respondents were shown charts with different profiles of consumption with constant present value at a zero interest rate and were asked to choose the preferred path. In subsequent questions they were asked to choose among constant present value consumption paths with interest rates of 12% and 24%. From the slopes of the preferred paths and how the slopes change when the interest rate changes, one can estimate the rate of time preference and the elasticity of intertemporal substitution."[21]

[21]The interest rates used in Barsky et al. (1997) are different than those used here.

A practical issue that arises because the number of consumption profiles is finite is that a person's optimal consumption path may lie somewhere between the paths offered. One option is to note that the person's choice implies bounds on the person's optimal consumption profile and to use this information to construct bounds for a person's γ and β. Given that our primary interest is to examine whether constrained and unconstrained individuals are similar, the approach we follow here is to use the zero and twelve percent interest rate questions and to assume that the chosen profile in each case is the person's optimal profile. The responses of 30 of the 307 respondents are inconsistent with theory because they indicate that the slope of the consumption profile would decrease when the interest rate is increased. Two other respondents have unusable responses. Table Suppl.4 shows the distribution of γ for the remaining 275 students in the sample. Consistent with the findings of Barsky et al. (1997), the modal (and in our case median) person chose consumption paths at the zero interest rate and the twelve percent interest rate that had the same slope. Under the assumption that the person's choice is his optimal choice, this would imply that $\gamma=0$. It is probably most reasonable to simply interpret these patterns as evidence that the elasticity of substitution is low for these people. This is what we find more generally; consistent with Barsky et al. (1997) we find that most people have elasticities of intertemporal substitution close to zero and very few people have elasticities as high as one (i.e., consistent with log utility). Of particular interest to this paper, we find no evidence of differences between constrained and unconstrained individuals.

Equation B.1 indicates that it is not possible to compute the discount factor for the 158 individuals who do not vary the slope of their consumption profile when the interest rate changes. This implies that the number of constrained students for which a discount factor can be computed is small when only the zero and twelve percent interest rates are used. In an effort to increase this number, we examined the consumption profile associated with the twenty-four percent interest rate for the 158 individuals who did not vary the slope of their consumption profile between the zero and twelve percent interest rates. Forty-five of the 158 increased the slope of their profile at twenty-four percent, while 6 of the 158 violated economic theory by decreasing their profiles. Thus, we were able to compute discount factors for 127 unconstrained and 29 constrained individuals and the results are shown in Table Suppl.4. The responses indicate that people care a lot about the future in the sense that many would choose an upward sloping consumption profile at a zero interest rate (i.e., $\beta<0$). While the sample sizes of constrained and unconstrained individuals are much smaller than ideal, we find no evidence of differences by constraint status.

B.3.b. Differences in personal characteristics/situations potentially related to enjoyment of school

Information on certain other family and personal factors that might influence how much a person enjoys being in college relative to not being in college is shown at the end of Table 1. One personal factor that seemingly could influence the drop-out decision is personal health or the health of individuals in a person's family. We ask specifically about student health on the initial survey and find no evidence of a difference between constrained and unconstrained individuals with .099 of the former and .059 of the latter indicating at the time of college entrance that they are in poor or fair health (*Health_bad)* .

Another factor that could influence whether a student leaves school is whether he (she) has a boyfriend (girlfriend) that does not attend Berea. As seen at end of Table 1, although we find that beginning college with a boyfriend/girlfriend elsewhere is quite common (*Bfriend/Gfriend*), we do not find differences between constrained and unconstrained individuals in this respect. To some extent, this variable measures a student's attachment to his/her hometown. We can measure this directly using two survey questions in the BPS. The first question is "Assume that you graduate from Berea. What is the percent chance (number of chances out of 100) that in 10 years you will be living within 100 miles of your hometown." The second question asks person to assume that he does not graduate from Berea. As can be seen in Table 1, we find no evidence of a difference between constrained and unconstrained individuals in the resulting variables *Home_grad* and *Home_dropout*.

B.3.c. A direct approach

The final approach we take to examine the third factor is more direct. At the beginning of the academic year, we asked individuals the following question about their beliefs regarding how enjoyable school will be relative to being out of school.

Question 1.A. Circle the one answer that best describes your beliefs at this time:
1. I believe that being in college at Berea will be much more enjoyable than not being in college.
2. I believe that being in college at Berea will be somewhat more enjoyable than not being in college.
3. I believe that I will enjoy being in college at Berea about the same amount as I would enjoy not being in college.
4. I believe that being in college at Berea will be somewhat less enjoyable than not being in college.
5. I believe that being in college at Berea will be much less enjoyable than not being in college.

At the time of college entrance, we reject the null hypothesis that beliefs about how enjoyable school will be are different for constrained and unconstrained individuals. For example, .645 of constrained students and .699 of unconstrained students indicate that being in school will be much more enjoyable than not being in school (*Sch_enjoyable*), and test of the null hypothesis that the difference in the population proportions is zero has a t-statistic of less than one. Similarly, .064 of constrained students and .025 of unconstrained students indicate that being in school will be somewhat less enjoyable or much less enjoyable than not being in school (*Sch_unenjoyable*), and a test of the null hypothesis that the difference in the population proportions is zero has a t-statistic of approximately .8.[22]

[22]We are interested in whether differences in answers to this question would exist by constraint status if constrained and unconstrained students had the same consumption. Our answers deviate from this "consumption held constant" situation if constrained individuals believe at the time of entrance that they will have less money for consumption and believe that having less money for consumption will make them less happy in school relative to being out of school. However, if this was the case, the effect of comparing the answers to this question across constraint groups would be to understate how enjoyable constrained students would find school relative to the unconstrained students if the feasible consumption set were the same across groups.

Table Suppl.1: Regressions of first semester grade point average on various measures of ability and motivation

	(1) n=307	(2) n=297	(3) n=296	(4) n=280	(5) n=307	(6) n=307	(7) n=306	(8) n=292	(9) n=297	(10) n=283
Constant	1.296* (.289)	.330 (.319)	2.703* (.090)	2.869* (.361)	2.685* (.084)	2.172* .219	2.893* .0529	1.794* (.428)	.478 (.440)	.132 (.585)
Male									-.172 .090	-.181 (.092)
Black									-.225 (.124)	-.169 (.126)
Faminc/10,000									.005 (.007)	.002 (.007)
ParentEd									.084 (.087)	.107 (.089)
ACT	.065* (.012)								.021 (.014)	.015 (.014)
HSGPA		.736* (.093)							.561* (.104)	.582* (.103)
StudyHS			.029* (.012)					.032* (.012)		.037* (.011)
*StudyHS*StudyHS*			-.0009* (.0003)					-.0009* (.0003)		-.0009* (.0002)
StudyC				-.005 (.211)				.122 (.130)		-.001 (.125)
*StudyC*StudyC*				.0001 (.028)				-.015 (.013)		-.003 (.013)
Pr_GPA3.5					.004* (.0018)			.004* (.001)		.001 (.001)
GPA_study3						.210* .069		.181* (.081)		.080 (.078)
Pr_forced_leave							-.008* (.003)	-.006* (.003)		-.003 (.003)
R-squared	.085	.172	.031	.000.	.012	.030	.020	.10	.215	.280

* significant at 5%

Table Suppl.2 Earnings expectations for entire sample and by constraint status

	Entire Sample mean (std. dev.)	Not Constrained mean (std. dev.)	Constrained mean (std. dev.)	pvalue if <.10 See note
Survey 1 - Time of College entrance	**n=307**	**n=245**	**n=62**	
1. Median earnings age 28 if leave school immediately	29.586 (19.253)	29.576 (18.512)	29.626 (22.118)	N
2. Median earnings age 28 if graduate	51.795 (21.576)	51.100 (20.948)	54.601 (23.932)	N
3. Median earnings age 28 if graduate GPA=3.75	55.463 (22.828)	55.300 (23.253)	56.145 (21.147)	N
4. Median earnings age 28 if graduate GPA=3.0	49.598 (21.000)	49.807 (21.342)	48.739 (19.684)	N
5. Median earnings age 28 if graduate GPA=2.0	43.753 (20.415)	43.571 (19.885)	44.487 (22.587)	N
Survey 2 -End of First year	**n=249**	**n=205**	**n=44**	
6. Median earnings age 28 if leave school immediately	27.883 (14.154)	27.927 (14.237)	27.681 (13.924)	N
7. Median earnings age 28 if graduate				
8. Median earnings age 28 if graduate GPA=3.75	53.375 (23.362)	53.896 (24.276)	50.904 (18.475)	N
9. Median earnings age 28 if graduate GPA=3.0	50.418 (22.214)	50.901 (22.973)	48.119 (18.234)	N
10. Median earnings age 28 if graduate GPA=2.0	46.181 (22.020)	46.483 (22.302)	44.779 (20.849)	N
R1 - Return to schooling - measure 1	.623 (.365)	.623 (.372)	.619 (.332)	N
R2 - Return to schooling - measure 2	.685 (.373)	.682 (.377)	.698 (.358)	N
R3 - Return to schooling - measure 3	.461 (.499)	.476 (.505)	.599 (.391)	N
R4 - Return to schooling - measure 4	.776 (.417)	.763 (.420)	.832 (.405)	N

The last column shows the p-value from the test that the average value of the variable in a particular row is equal across constrained and unconstrained groups if this p-value is less than .1 and shows an “N” otherwise.

Table Suppl.3
Linear Probability Model - The relationship between drop-out and beliefs about returns to schooling.

Constant	.138 (.028)*	.126 (.026)*	.084 (.031)*	.085 (.029)*
R_1 Low	.061 (.043)			
R_2 Low		.094 (.045)*		
R_3 Low			.103 (.043)*	
R_4 Low				.103 (.043)*
Goodness of Fit R^2	.007	.015	.022	.022

Linear probability model of dropout on discretized versions of beliefs about returns to schooling variables R_1, ...,R_4
* significant at 5%

Table Suppl.4 Other information related to preferences for entire sample and by constraint status

	Entire Sample mean (std. dev.)	Not Constrained mean (std. dev.)	Constrained mean (std. dev.)	pvalue if <.10 See note below
Risk Aversion	(n=307)	(n=245)	(n=62)	
Risk Aversion Category 1 - Least Risk Averse	.150	.154	.133	N
Risk Aversion Category 2 - 2nd Least Risk Averse	.244	.246	.233	N
Risk Aversion Category 3- 3rd Least Risk Averse	.270	.252	.333	N
Risk Aversion Category 4 - Most Risk Averse	.334	.343	.300	N
Elasticity of Intertemporal Substitution	(n=275)	(n=217)	(n=58)	
0.0	.574	.566	.603	N
.333	.309	.318	.275	N
.667	.086	.078	.086	N
1	.025	.032	.000	N
>1	.109	.046	.344	N
The Discount Factor, β	(n=156)	(n=127)	(n=29)	
<0	.429	.440	.379	N
=0	.237	.252	.172	N
>0	.327	.308	.448	N

The last column shows the p-value from the test that the average value of the variable in a particular row is the same across constrained and unconstrained groups if this p-value is less than .1 and shows an "N" if the p-value is greater than .1.