Credit Constraints in the Demand for Education: Evidence from Survey Data

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Abstract

How important are liquidity constraints in the demand for college education in the U.S.? Who is most likely to be affected? Persistent credit constraints can lead to inefficient skill allocations and, given the wide gap between college and high school earnings, can work to perpetuate imbalances in the distribution of economic well-being. Unfortunately, empirical evidence regarding the pervasiveness of credit constraints in the demand for college education has not been consistent in part because constraints tend to be inferred indirectly and approaches for gauging them differ. In contrast with existing studies I use a measure that is more direct, namely self-reported financial constraints available in the National Longitudinal Survey of Youth. I find that about 13 percent of college-age individuals expect to underinvest in education because of financial limitations. These are the youths from less well-off families who live in areas with no universities in the vicinity. The findings of this paper suggest that liquidity constraints are potentially more pervasive than earlier studies indicate.

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1 Introduction

How important are liquidity constraints in the demand for college education in the United States? Which young adults expect to forgo college because of difficulties paying tuition and living expenses while in school? What subjective self-reports of financial limitations can add to our understanding of this phenomenon?

The issue of credit constraints is important because these constraints violate one of the key economic assumptions of the life-cycle permanent income hypothesis, namely, the assumption of perfect capital markets. Moreover, credit constraints in education are potentially harmful to both efficiency and equity. They lead to an inefficient allocation of resources and may work to perpetuate and widen income inequality across generations. Substantial disparities in educational attainment by family socioeconomic status have been noted in the literature.[1] Given the sharp increase in education wage premiums over the past thirty years, these disparities have worked to widen income gaps and increase inequality.[2] While theory suggests that government intervention can help eliminate the negative impacts of credit constraints, the existing educational subsidies often benefit mostly high- and middle-income groups.[3] In light of these tendencies, the question of how widespread credit constraints are has critical relevance for educational policy.

Nevertheless, despite the potential importance of credit constraints, it is still not clear just how pervasive they are and precisely what impact they have on post-secondary education in the United States. While a wide number of microeconomic studies have addressed the issue, researchers have had to rely on theoretical insights and information on educational outcomes to infer constraints in the absence of direct measures.[4] Some studies, for example, Manski (1992) and Ellwood and Kane (2000), interpret disparities in educational attainment by family income as evidence of credit constraints. Others (e.g., Kane, 1994) infer credit constraints from the greater sensitivity of low-income students to tuition costs. Still others appeal to an observation that marginal rates of return to education appear higher than average rates

[1] See, for example, Manski (1992), Ellwood and Kane (2000), Cameron and Heckman (1998), and Carneiro and Heckman (2002).

[2] Goldin and Katz (2007).

[3] Fender and Wang (2003) provide a detailed theoretical discussion on educational policies to remedy the inefficiencies resulting from credit constraints. For a comprehensive overview of the distributional effects of financial aid programs, see Dynarski (2002).

[4] Most prominent studies include Manski (1992), Ellwood and Kane (2000), Card (2001), Carneiro and Heckman (2002), Cameron and Taber (2004), Stinebrickner and Stinebrickner (2007), and Cao (2008).

(see Card, 2001). In contrast, Carneiro and Heckman (2002) argue that it is long-run family and environmental influences rather than short-term credit constraints largely determine educational outcomes.[5] To date, our understanding of credit constraints in college education remains limited, due in part to shortcomings of the data and differences in empirical methodologies.

This paper departs from existing studies by employing a measureself-reported difficulties in financing educationthat is arguably more direct than those used thus far. Using a nationally representative data set, the National Longitudinal Survey of Youth 1979 (NLSY79), I classify as constrained those who report that they expect to receive less education than desired for financial reasons. I use regression analysis to determine whether the probabilities to report credit constraints vary in a predictable and systematic way with family resources, educational costs, and individual characteristics. Finally, to evaluate the internal consistency of this definition, I examine differences in educational outcomes between constrained and unconstrained youths.

About 13 percent of young adults in the United States can be considered credit constrained by my measure. Regression analysis shows that youths from lower income families and those who live in areas with no universities in the vicinity are more likely to report constraints, as are men who come from large families and Hispanic women. Constrained men and women are more likely to delay college entry and choose lower-quality colleges, and they are less likely to receive a four-year degree. Sizable differences in educational outcomes of those with self-reported constrained status persist across a wide range of schooling outcomes, even after controlling for ability, parental income, and family background characteristics.

The estimated proportion of credit constrained youths is larger than suggested by some studies of educational outcomes (e.g., Carneiro and Heckman, 2002), but smaller than the fraction of the constrained estimated by consumption surveys (e.g., Jappelli, 1990). The results indicate that young men and women behave in accord with economic theory and intuition in reporting constraints. The constraints have a strong association with higher schooling costs and lower family resources. Despite some considerable gender differences, the self-reported measure appears to be internally consistent for both men and women capturing an important aspect of individual heterogeneity potentially overlooked by earlier research.

The present study addresses the growing need for more direct evidence

[5]By conditioning the family background, Belley and Lochner (2007) have found a dramatic increase in the effect of family income on college attendance between the early 1980s and the early 2000s, consistent with the growing importance of credit constraints.

on the role of constraints in college education. My findings contribute to a body of literature indicating that liquidity constraints have a potentially strong adverse affect on education of some college-age individuals in the Unites States. Correctly identifying these individuals will help policymakers craft effective recommendations to reduce persistent gaps in educational outcomes.

2 Evidence of Credit Constraints in the Literature

What evidence does the literature offer regarding the impact of liquidity constraints on the demand for college education in the United States?[6] This section summarizes the literatures most prominent findings and describes my contribution: the use of self-reported educational preferences to empirically identify credit-constrained youths. By focusing on self-reports, this study looks to close the gap created by the lack of direct evidence on the role of constraints in college education.

College education is costly. An average family can expect to spend about one-fourth of its income just to send one child to a public university for one year.[7] However, financing education is not considered the sole responsibility of students and their families (Lee, 1999; Heckman, 2000). A wide range of government and private subsidies aim to alleviate the financial burden associated with college education to encouraging enrollment. To the extent that these subsidies do not fully cover education costs, students themselves are responsible to finance tuition and consumption while in school. In the absence of labor market earnings, they have to rely on private sector loans.[8] As a result, children from low-income families may be more likely be unable to pay for college than children from high-income families.

A number of economic studies have documented sizable gaps in educational attainment by family income. Manski (1992) reports that only 11 percent of high school graduates from the low end of the family income distribution receive a college education within the subsequent five years.

[6]Throughout the paper I use the words liquidity constraints and borrowing constraints synonymously with credit constraints, as does much of the related literature.

[7]The average annual cost of attending a four-year college, including room and board, was $13,589 for a public institution and $32,307 for a private institution in the 20072008 academic year (College Board, 2008). The median household income of individuals under the age of 65 was $56,545 in 2007 (DeNavas-Walt et al., 2008).

[8]Moreover, as pointed out by Stinebrickner and Stinebrickner (2007), a substantial part of college costs is forgone consumption, generally more difficult to finance through private loans than tuition.

This proportion is 39 percent for students from the top of the income distribution. Similarly, Ellwood and Kane (2000) show that only 57 percent of children from the lowest-income quartile attend a post-secondary educational institution after graduating from high school, compared with 81 percent of children from the highest-income quartile. These disparities have been widely believed to provide support for the hypothesis of binding credit constraints.

An alternative explanation for these disparities comes from a strong relationship between family income and other factors, such as scholastic ability and educational preferences, that affect the decision to go to college. Well-off families have more resources to invest in their young childrens development in order to boost cognitive and non-cognitive skills. Children from families with higher socioeconomic status often receive better primary and secondary education, which, among other things, shapes tastes for schooling and career expectations. As a result they are more ready for college on average than students from lower-income families and are more likely to receive a college education. These long-run family factors are highly correlated with parental income and may be more important in explaining the relationship between income and education than short-term borrowing constraints. In support of this alternative explanation, Carneiro and Heckman (2002) show that gaps in educational attainment across income groups almost disappear when controls for family background and scholastic abilities are introduced. Using the same empirical methodology, however, Belley and Lochner (2007) have documented a dramatic increase in the effects of family income on educational attainment between the cohorts of high school students in the early 1980s and the early 2000s. These findings are likely to renew the debate about the relationship between family income and college education.

Although current income is a convenient benchmark for assessing needs, some studies suggest that income in a given year is an imperfect measure of financial resources and the ability to pay for college (see Kane, 2004). Alternative indirect measures that perform better include wealth and short-term income fluctuations. Jappelli (1990), for example, shows that family wealth is a strong predictor of borrowing difficulties, even after controlling for family income. Mayer (1997) finds that children whose families experience a large earnings decline within a two-year period complete fewer years of college education. Similarly, studies that examine the link between changes over time in family income distribution and educational attainment of children show that the effects of income on college attendance are greater than the effects in cross-section studies (e.g., Mayer, 1997; Acemoglu and Pischke, 2001). These findings point toward a stronger impact of credit constraints

on education than is implied by studies using current income levels.

Other evidence in the empirical microeconomic literature that is potentially consistent with credit constraints includes the higher sensitivity of low-income students to tuition costs (Kane, 1994) and longer delays in college enrollment for students in high-tuition states (Kane, 1996).

In the absence of clear consensus about the pervasiveness of credit constraints, a need for more direct evidence has emerged. In contrast to the existing research, this paper relies on a subjective measure to identify credit constrained students. This approach is appealing since it makes use of the information known to a respondent, but not to the analyst. Moreover, this approach is consistent with the general message of a growing body of economics literature: that survey questions can be used to directly elicit important information when alternatives involve making nontrivial assumptions.[9]

3 Data and Operational Definitions

To assess the proportion of young adults facing credit constraints in educational choices, I use data from the National Longitudinal Survey of Youth 1979 (NLSY79). This data set is well suited for this purpose because it contains information that can be used to directly identify liquidity-constrained individuals. Below I present the operational definition of credit constraints and describe the data and analysis sample. According to my definition, 13 percent of respondents in the sample can be classified as credit constrained.

As an operational definition, I denote as credit constrained those respondents who expect to receive less education than the desired level for financial reasons. This definition implies that current or anticipated financial difficulties lower the individuals schooling expectations relative to aspirations. Schooling aspirations refer to the level of education that an individual would ideally like to obtain (Reynolds and Pemberton, 2001; Leigh and Gill, 2003). In the NLSY79, aspirations are captured by a *desired* level of education and are elicited by asking What is the highest grade or year of regular school that you would like to complete? *Expected education* is an answer to the question As things now stand, what is the highest grade or year [of schooling] you think you will actually complete? Let us assume that self-reported schooling expectations are generated by the same process that governs the actual educational choices. Then the answer to the expectations question can be taken to denote the schooling level that, at the date of the interview,

[9] Dominitz and Manski (1996) and Dominitz (1998) are pioneering studies that discuss the use of self-reported information.

has the greatest probability of maximizing the individuals present value of lifetime income, given the constraints.

In the 1982 wave of the NLSY79, those who expect to complete fewer years of schooling than desired are asked: What is the main reason that you expect to complete less regular schooling that you would like to complete? The format of the questions is multiple choice with a wide set of options, including family responsibilities, academic abilities, and financial reasons.[10] Those who expect to receive less than the desired amount of schooling for financial reasons or because of the need to work are classified as credit constrained.

Apart from providing a direct measure of educational aspirations, the NLSY79 data set has a number of advantages that make it especially attractive for this study. It is a rich longitudinal data set that contains family background information and scholastic aptitude measures that are essential for the analysis of educational choices (Carneiro and Heckman, 2002). Moreover, the NLSY79 covers over twenty-five years of data, making it possible to evaluate schooling outcomes of the respondents without imposing an arbitrary cut-off age. This is particularly relevant for contemporary U.S. society, where about a third of college students are age 25 or older (U.S Department of Education, National Center for Educational Statistics, 2007).

In this paper I focus on young adults at around the time when they make post-secondary schooling decisions. The group of interest comprises the youngest respondents in the NLSY79: those who are between ages of 13 and 17 inclusively in January 1978. In 1982, when their educational aspirations and expectations were recorded, they are 17 to 21 years old. Eliminating individuals who are over 17 years old at the initial interview date ensures that retrospectively collected family background information is accurate. In addition, I exclude respondents with missing parental income or other background and personal data.[11] The final sample size is 5,161 individuals. In the 1982 wave, 1,175 respondents, or 23 percent of the sample, report that their expected education is lower than the desired level (see Table 1A in the Appendix). Of these, 667 respondents, or about 13 percent, report financial difficulties as a reason and hence are classified as credit constrained according to the operational definition.

The NLSY79 is a nationally representative data set that oversamples

[10] The exact formulation and distribution of answers is presented in the Appendix. The question is somewhat restrictive as only one answer is permitted.

[11] Excluding the respondents with missing information is routinely done in studies that use the NLSY79 and is unlikely to be an important source of bias. See, for example, Cameron and Taber (2004).

Table 1: Summary Statistics of the Primary Variables

	All (1)		Constrained (2)		Unconstrained (3)		T-stats[b] (4)
Variables	Mean	S.D.	Mean	S.D.	Mean	S.D.	
Female	0.498		0.487		0.499		0.582
Black	0.262		0.246		0.265		1.036
Hispanic	0.168		0.205		0.162		2.786***
Age	19.04	1.36	19.26	1.29	19.00	1.37	4.563***
Number of siblings	3.784	2.598	4.010	2.702	3.751	2.581	2.412**
Avg. public tuition	1,092	377	1,063	378	1,097	366	2.166**
Local earnings	2.460	0.502	2.452	0.495	2.461	0.503	0.428
Local college	0.851		0.868		0.848		1.326
Urban residence	0.758		0.736		0.761		1.386
Ability Test Scores							
Math	11.798	6.123	11.246	5.696	11.880	6.180	2.498**
Word	22.264	8.275	21.759	8.290	22.340	8.271	1.692*
Science	13.684	5.112	13.264	4.876	13.746	5.144	2.273**
Automotive	11.745	5.182	11.582	4.988	11.769	5.210	0.871
Combined AFQT scores	37.424	1.149	34.728	1.015	37.824	0.416	2.694***
Characteristics at Age 17							
Parental income	19,080	15,340	16,580	13,490	19,450	15,570	4.527***
Mother's education	11.981	1.873	11.788	1.782	12.000	1.884	2.422***
Father's education	12.574	2.415	12.347	2.160	12.605	2.447	2.059**
N	5161		667		4494		
Proportion	100		12.9		87.1		

Notes: a) Expressed in 1979 dollars. b) Testing the hypothesis of equality of means between the constrained and the unconstrained.

blacks, Hispanics, and economically disadvantaged youths.[12] To evaluate the proportion of the credit constrained nationwide, one needs to correct for the oversampling by using sampling weights. When reweighted to be nationally representative, the proportion of credit constrained respondents in the sample is only slightly smaller, about 12 percent.

Key characteristics of respondents in the sample are reported in Table 1. Column (1) shows the characteristics of the full sample. Columns (2) and (3) present the characteristics of constrained and unconstrained respondents, with t-statistics for the mean comparison between the two groups reported in column (4). The unconstrained youths come from better-educated families and have fewer siblings. Moreover, parental income of the constrained is 15

[12]The survey also includes 1,280 individuals who served in the military in 1978. This subsample is excluded from the study because of the age restriction I impose.

percent lower than that of the unconstrained: $16,600 a year vs. $19,500 a year in 1979 dollars. Ability test scores of the constrained youths are lower on average than the scores of the unconstrained. They are also about 2 months older, more likely to be of Hispanic origin, and more likely to live in lower-tuition states.

Overall, Table 1 indicates that: (a) constrained respondents come from a lower socioeconomic background than the unconstrained; and (b) the constrained have lower scholastic abilities and hence potentially lower benefits to be gained from education than the unconstrained. This is not surprising, since earlier studies have established that socioeconomic background is strongly correlated with ability.

Figure 1 further explores the relationship between self-reported constraints, socioeconomic background, and ability. It shows the proportion of those constrained by parental income and quartile on the Armed Forces Qualification Test (AFQT), which is a measure of scholastic ability.[13] Youths from wealthier families are less likely to report credit constraints than youths from poorer families across all ability quartiles. Moreover, there is strict ordering by parental income in the highest-ability quartile, where individuals usually have the highest probability of college attendance (Ellwood and Kane, 2000; Carneiro and Heckman, 2002). At the same time, there is no clear ordering in the proportion of credit-constrained across the ability quartiles, which suggests that low-ability youths are not more likely to report credit constraints than high-ability youths when parental income is taken into account.

My definition of credit constraints captures those young adults whose educational expectations are potentially distorted by credit constraints. This includes high school students who anticipate financial limitations and hence may be less likely to plan for college attendance. If these students do not intend to go to college, they are likely to exercise less effort in high school (Morgan, 2002). Hence lower educational aspirations potentially result in lower academic performance. Because of low academic preparedness, individuals who anticipate credit constraints may be less likely to go to college even if these constraints are alleviated. This interpretation is broadly consistent with the long-term impact of credit constraints, as defined by Carneiro and Heckman (2002). Controlling for ability as measured by test scores and the long-term influence of parental background, they estimate that the income gap in college attendance attributable to short-term credit constraints

[13]The composition of the AFQT scores and their link with the Armed Services Vocational Aptitude Battery (ASVAB) scores is described in a later section.

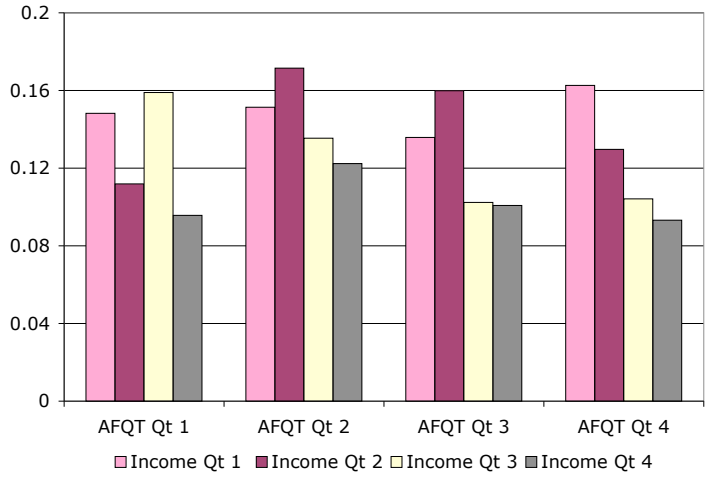

Figure 1: Distribution of Credit Constraints over Parental Income and AFQT Quartile, NLSY79

is no more than 8 percent.

One reason for skepticism about the validity of my measure as a proxy to identify the youths affected by short-term credit constraints is that some respondents may systematically overstate the educational levels they desire or expect to complete.[14] If their true educational aspirations are lower than reported, these individuals are not necessarily bound by credit constraints, in the sense that relaxing them may not lead to an increase in their demand for education. As a result, the estimated proportion of credit-constrained youths in the sample may be biased upward. I illustrate this point more formally in the next section.

[14] A weak link between schooling expectations and realizations has been documented by a number of studies, for example by Reynolds and Pemberton (2001); and Rouse (2004) serves as indirect evidence for potential overreporting.

4 Theoretical Framework and Explanatory Variables

This section presents a conceptual definition of credit constraints using a simple two-period model of schooling choices. The purpose of this model is twofold. First, it sets up a framework for empirical analysis of the characteristics of the constrained individuals by elucidating the pertinent variables. Second, it serves as a warning concerning the extent to which we can interpret the results of this analysis. The limitations arise because binding credit constraints and the demand for education are codetermined.

4.1 Basic Model

In the simple model, assume that individuals are looking to maximize consumption over two periods. The value of consumption discounted back to the initial period is given as:

$$c_0 + \beta c_1 \leqslant Y_S, \tag{1}$$

where c_0 and c_1 are consumption in periods zero and one respectively, β is the time-preference rate, and Y_S is the net preset value of income with schooling S. In the first period, an individual earns unskilled wages w_0 and can choose to attend college, for which she has to pay the direct cost q.[15] Assume that there are only two schooling choices: high school and college. Define an indicator variable $S = 1$ if college is chosen and $S = 0$ otherwise. Having a college education pays w_1 in the second period.

Hence the income stream from high school education discounted to period zero can be expressed as:

$$Y_0 = w_0 + \frac{1}{1+r} w_0, \tag{2}$$

and the income stream from college education as:

$$Y_1 = w_0 - q + \frac{1}{1+r} w_1. \tag{3}$$

The individual chooses a schooling option that yields a higher level of consumption.[16]

[15] This model is very general and assumes that individuals can work during college and earn unschooled wages w_0. The results below do not depend on this assumption.

[16] The time preference rate can be normalized as $\beta = \frac{1}{1+r}$ for unconstrained individuals, implying that they want to perfectly smoothen consumption across the two periods.

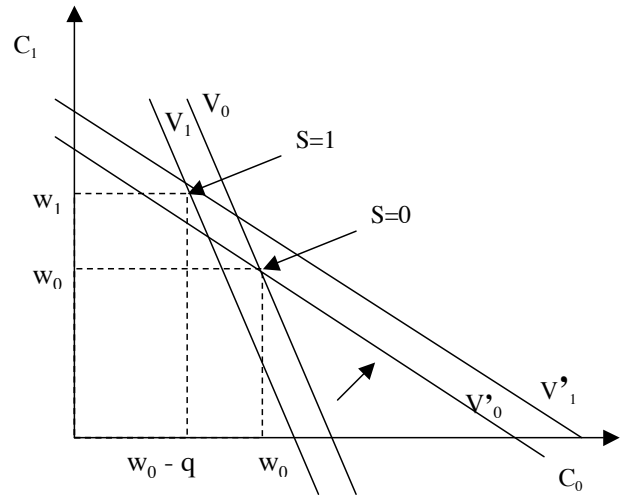

Figure 2: Binding Credit Constraints

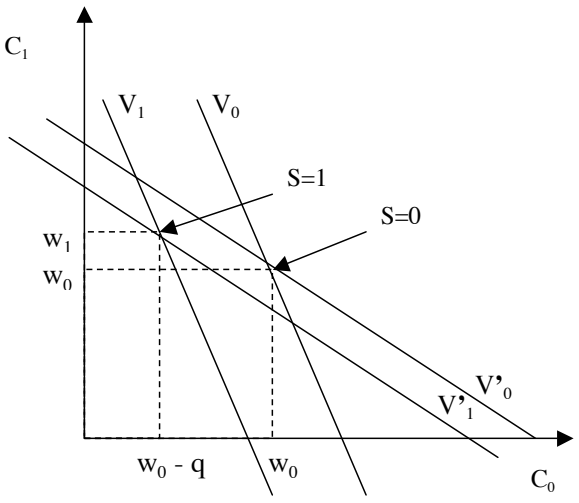

Figure 3: Non-Binding Credit Constraints

Assume that individuals face heterogeneous interest rates. Heterogeneity in interest rates is a common way to model credit constraintssee, for example, Willis and Rosen (1979), Card (1995a), and Cameron and Taber (2004). This assumption follows from a real-world observation that people have very different capabilities to collateralize loans with personal or family assets and differ in their ability to repay. Credit-constrained individuals borrow at a high interest rate, which makes educational financing even more costly.

Figure 2 shows how credit constraints defined in this way can influence the individuals demand for education. It depicts budget lines under the two alternative schooling options $S = 0$ and $S = 1$ for two interest rates, r and r', where $r > r'$. Budget lines V_0 and V_1 correspond to income streams from schooling when the interest rate is r. V_0 lies to the right of V_1 indicating that a high school education yields higher levels of consumption than a college education. When the borrowing rate is decreased to r', the corresponding budget lines are V_0' and V_1'. Under the new lower interest rate, V_1' lies to the right of V_0', implying that a college education now yields higher consumption than high school. In this example, credit constraints are binding in the sense that a change in the interest rate changes the optimal schooling level.

Assume now that w_1 and w_0 are heterogeneous in the population, so that even if the interest rate is low, it does not pay for everyone to go to college. This assumption originates from the notion of comparative advantage in the labor markets popularized by Willis and Rosen (1979) and is consistent with heterogeneity in responses to education, which is an empirically important phenomenon (Heckman, 2000). When returns to education are heterogeneous, whether or not the constraint binds is determined by these returns. Figure 3 illustrates this proposition by showing that a decline in the interest rate does not necessarily imply a change in the budget line ordering. In this figure the benefits to education w_1 are lower and the costs of education q are higher than in Figure 3. As a result, the budget line associated with high school education is higher than the budget line for college education for both interest rates r and r'. Since a decrease in the interest rate in this example does not affect the optimal schooling choice, the credit constraints are not binding.

This simple example demonstrates that whether or not credit constraints bind depends on the costs and benefits of education. When costs are high and benefits are low, credit constraints may not be binding. This implies that the constraints are not necessarily binding for those individuals who overstate their educational aspirations. Although there is no way to formally test for systematic misreporting of desired education levels, it is possible to control for potential costs and benefits by conditioning on local, individual,

and family background characteristics. Variables that capture these characteristics are presented below. Conditional on these variables, we can expect that individuals with higher borrowing costs are more likely to report being credit constrained.

4.2 Explanatory Variables

While I define credit constraints as heterogeneous borrowing rates, the section above shows that whether or not they are binding depends on all the factors that determine individual demand for education. Denote the probability of reporting credit constraints as P. This probability can be expressed as a function of the interest rate r, schooling costs q, and potential earnings w_0 and w_1: $P = f(w_0, w_1, q, r)$. Since none of these determinants is directly observed in the data, I rely on observable individual and labor market characteristics as proxy variables in estimating the probability P. The results can be interpreted as partial correlations and serve to provide information about the characteristics of individuals who consider themselves credit constrained.

The variables introduced in the estimation include the determinants of individual demand for education and the costs of borrowing. These are ability test scores, family financial and background information, local schooling costs, and individual characteristics. Although in most cases it is not possible to identify the impact of these explanatory variables on each of the arguments of P separately, economic intuition and findings of the earlier studies suggest the direction of relationships between the probability of reporting credit constraints and these variables.

1. Ability Test Scores. Ability plays an important role as a determinant of potential earnings w_0 and w_1. To the extent that higher abilities make learning more effective, higher scholastic aptitude may be associated with higher benefits to education.[17] Hence individuals with higher scholastic abilities should display a higher demand for education and a higher probability of reporting credit constraints. At the same time, educational institutions are looking to attract high-ability students, so they offer them substantial tuition subsidies that reduce the price of education. This implies that individuals with higher scholastic abilities should be less likely to expect credit constraints. As a result of these two contradictory influences, the anticipated relationship between the ability indicators and the probability of reporting

[17] A wide range of studies, e.g., Willis and Rosen (1979), Cameron and Heckman (1998), Carneiro and Heckman (2002), provides indirect support for this claim by showing a strong positive correlation between scholastic ability and educational attainment.

constraints is ambiguous.

In the NLSY79, scholastic ability is captured by the Armed Forces Qualification Test (AFQT) scores. The AFQT scores have been widely used by social scientists as a measure of cognitive ability and scholastic aptitude (see, e.g., Cawley et. al., 2000; Carneiro and Heckman, 2002). The score is a weighted average of the Armed Services Vocational Aptitude Battery (ASVAB) test results. The ASVAB measures knowledge and skill in ten different areas, including general science, word knowledge and reading comprehension, math, and mechanical comprehension. In this study I use the combined AFQT test scores as well as the scores from the four separate sections of the ASVAB test: math, word knowledge, science, and automotive ability. While the AFQT scores measure general scholastic aptitude and trainability, the separate test scores capture a wider range of specific abilities. Capturing specific abilities is important since they are associated with different areas of competitive advantage in the labor markets. A young person with higher automotive scores may have a stronger potential as a plumber than as a lawyer, whereas higher word knowledge scores indicate the opposite. Students in the sample took the test in the summer of 1980 when they were between 15 and 18 years old. The averages of the raw scores are presented in the first column of Table 1.

2. Family Background Characteristics The family background characteristics that I use in this paper are parental income, parental education, and number of siblings. The probability P is expected to decrease with parental income and education, and increase with number of siblings.

Because of a well-documented link between family financial resources and childrens education, parental income has received considerable attention in education research.[18] To the extent that parents are willing to provide their children with access to funds, higher parental income implies lower costs of borrowing. Moreover, parental income can serve as collateral when young adults use private lenders to borrow for school. As a result, children from poor families may face higher interest rates on private loans or may lack access to private lending sources altogether.

At the same time, parental income serves as a benchmark for financial need assessment. Need-based grants (e.g., a Pell Grant) and subsidized loans (e.g., Perkins) reduce the out-of-pocket cost of college education for low-income students. The amount of financial aid decreases as income increases, which implies a positive correlation between the cost of educa-

[18] See Carneiro and Heckman (2003) for a detailed discussion of the link between parental income and educational outcomes.

tion and parental income for low- and middle-income families. Belley and Lochner (2007), however, show in their recent paper that a positive relationship between out-of-pocket schooling costs and parental income does not translate into a negative relationship between income and education if individuals are limited in the amount they can borrow. This implies that we can anticipate an inverse relationship between parental income and the probability of reporting credit constraints.

Parental income is measured when the respondents are age 17, to make sure they are still living with their parents.[19] Mean parental income in the sample is $19,900 in 1979 dollars, which is equivalent to $56,800 in 2007 dollars.

The expectations regarding the influence of parental education on the probability P are similar. As parental education is a good indicator of the familys socioeconomic status and the childs preferences for education, the probability of reporting credit constraints, conditional on potential benefits to education, should decrease with an increase in parental education. We can expect this because higher socioeconomic background is associated with lower costs of borrowing. Parental education is measured in years of schooling completed by the respondents parents.

The number of siblings is expected to have a positive relationship on the probability of reporting credit constraints, conditional on potential benefits to education. The number of siblings influences the portion of the family financial resources available to an individual: having fewer siblings implies access to a bigger share.

3. Local Characteristics. Local characteristics include state public tuition costs, the presence of a two- or a four-year college in the county of residence, binary variables for Census geographic regions, and a binary variable for residence in a metropolitan statistical area. The first two variables serve as proxies for direct schooling costs. The higher the schooling costs, the more individuals may need to borrow, and the more likely they are to be affected by credit constraints. Hence the probability of reporting credit constraints is expected to increase with the average public tuition and decrease with the presence of a college in the county of residence.

Although the exact costs of college education may vary with the type and location of the university, as well as the specific financial aid package, they can be approximated by characteristics of the locality in which the person lives. Local supply-side variables should perform well in this study, as young

[19] For a small fraction of individuals in the sample with missing parental income at age 17, it is recorded at age 16 or earlier.

people are likely to evaluate schooling costs using the information available to them locally and from public sources. A number of earlier studies have used average public university tuition and the presence of a college nearby to control for schooling costs.[20] State governments subsidize public universities to reduce tuition costs and to ensure equal access to higher education for students of all income levels. Hence average public tuition is a good proxy for individual tuition costs in the analysis of credit constraints. At the same time, living expenses account for a substantial portion of educational costs at the university level.[21] So an opportunity to live at home or with parents results in a sizable reduction of expenditures associated with college attendance, which is especially important for low- and moderate-income families.

The local schooling cost variables are merged from the Department of Educations Higher Education General Information Survey (HEGIS) using the restricted Geocodes state and county identifiers.[22] About 87 percent of individuals live in a county with a two- or a four-year accredited college nearby.

Average public university tuition varies substantially across the states: from $365 per-year in Washington, D.C., to above $2,000 in Vermont, with a sample mean of about $1,100 in 1979 dollars (see Table 1).

4. Individual Characteristics. Individual characteristics included in this study are race, ethnicity, and gender. Race and ethnicity have an ambiguous relationship to the probability of reporting credit constraints. Non-white or Hispanic individuals potentially face higher costs of borrowing because of discrimination. Jappelli (1990), for example, shows that non-whites are about 5 percentage points more likely to be rejected when applying for loans than whites. If lenders ration credit more severely for these groups, we can expect to see a positive relationship between being non-white or Hispanic and the probability of reporting credit constraints. At the same time, affirmative action policies may make college education more affordable for minority groups by offering targeted financial aid packages. As a result, the relationship between self-reported credit constraints and ethnic/racial minority group membership is ambiguous.

Gender has always played an important role in educational attainment

[20] Kane (1994) and Van der Klaauw (2002) used tuition costs, and Card (1995b) and Cameron and Taber (2004) used presence of a college in the county of residence.

[21] Lee (1999) estimated that living expenses constitute about 70 percent of the total cost of one year at a public four-year college and over three-quarters of the cost at a public two-year institution.

[22] See the Appendix for a description of the HEGIS and the restricted Geocodes data.

Table 2: Summary Statistics, Constrained Men and Women

	Men		Women		T-stats[b]
Variables	Mean	S.D.	Mean	S.D.	
Black	0.278		0.212		1.965**
Hispanic	0.178		0.234		1.774*
Age	19.29	1.31	19.23	1.27	0.671
Number of siblings	4.246	2.880	3.763	2.480	2.313**
Avg. public tuition	1,052	364	1,074	369	0.820
Local college	0.877		0.858		0.713
Urban residence at 17	0.769		0.702		1.979**
	Ability Test Scores				
Math score	10.500	5.643	12.031	5.654	3.498***
Word score	20.716	8.680	22.855	7.721	3.356***
Science score	13.377	5.177	13.145	4.541	0.269
Automotive score	13.325	5.421	9.748	3.693	9.908***
Combined AFQT score	32.029	26.123	37.560	26.014	2.736
	Characteristics at Age 17				
Parental income	1,684	1,342	1,630	1,357	0.512
Mother's education	11.748	1.932	11.830	1.932	0.500
Father's education	12.271	2.219	12.422	2.103	0.719
N	342		325		
Proportion	13.19		12.65		

Notes: a) Expressed in 1979 dollars. b) Testing the hypothesis of equality of means between the constrained and the unconstrained.

analysis. Historically, men received more years of education than women. However, the educational attainment of women has been increasing at a faster pace, and from the beginning of the 1990s more young women than men have been receiving college degrees (U.S. Census Bureau 2007). Some studies have shown that non-pecuniary motives in education are more important for women than men (Reisburg, 2000). Moreover, womens college attendance decisions have been less influenced by competing opportunities than have mens college attendance decisions (Averett and Burton, 1996). Table A-1 in the Appendix shows substantial gender differences in answers to the question about the aspirations-expectations gap. Women are more likely than men to report financial reasons and family responsibilities as the source of the gap, whereas men are more likely to report the need to work and difficulties in learning.

Table 2 presents summary statistics for constrained individuals by gender. It shows significant differences in the racial and ethnic composition of the two subsamples, as well as in their ability test scores. About 28 percent

of constrained men are black and 19 percent are Hispanic, while among constrained women, 21 percent are black and 23 percent Hispanic. Constrained women have higher math and word knowledge test scores than unconstrained women, while automotive scores are much higher for constrained vs. unconstrained men. Constrained men are also more likely to come from bigger families and to live in an urban area than constrained women. Although the exact implications of these differences are not clear, they call for separate analyses of constrained men and women.

5 Results

The simple model presented in Section 3 above shows that self-reported credit constraints and individual demand for education are jointly determined. Subsequent discussion has established that the probability of reporting credit constraints should be directly related to schooling costs and the costs of borrowing. This section presents logistic estimates of the probability of reporting constraints as a function of the variables described in the previous section. Although it is not possible to establish the extent to which self-reported credit constraints mirror actual constrained status, the results overall accord with the economic intuition. The probability of reporting constraints varies in a predictable fashion with schooling costs and the costs of borrowing. This suggests that respondents answer the questions carefully and thoughtfully and that the credit-constraints indicator contains valuable information pertinent to actual schooling choices.

The regression coefficients and marginal effects estimated separately for men and women are presented in Tables 3 and 4. In discussing the results it is important to remember that they are purely descriptive and do not bear causal interpretation. They can be interpreted as conditional partial correlations that reveal the characteristics of individuals who perceive themselves as credit constrained in educational choices.

Tables 3 and 4 show that conditional on other covariates, the probability of reporting binding credit constraints decreases with increases in parental income. A ten-thousand dollar increase in parental income is associated with a 1.2 percentage-point decrease in the probability for men and a 1.3 percentage-point decrease for women. This is equivalent to a 10 percent change, since the proportion of credit constrained individuals in both subsamples is about 13 percent. Living in a county with a college nearby is associated with a lower probability of reporting credit constraints. A nearby college is associated with a 3.3 percentage-point (or a 25 percent) decrease

Table 3: Logit Estimates of the Probability of Reporting Credit Constraints, Men

	I		II	
	Coeff.	Marg. Effect	Coeff.	Marg. Effect
Parental income/10,000	-0.114**	-0.012**	-0.117**	-0.013**
	(0.049)	(0.005)	(0.053)	(0.006)
Parental income in 1st Quartile			-0.104	-0.011
			(0.084)	(0.009)
Avg. Tuition/1,000	-0.186	-0.020	-0.193	-0.021
	(0.214)	(0.023)	(0.214)	(0.023)
Local college (d)	-0.332	-0.033*	-0.332	-0.033*
	(0.203)	(0.019)	(0.204)	(0.019)
Black (d)	-0.236	-0.025	-0.251	-0.026
	(0.184)	(0.018)	(0.187)	(0.019)
Hispanic (d)	-0.231	-0.024	-0.258	-0.026
	(0.201)	(0.019)	(0.198)	(0.019)
Math score/10	-0.315**	-0.034**	-0.311**	-0.034**
	(0.149)	(0.016)	(0.151)	(0.016)
Word score/10	0.079	0.009	0.107	0.012
	(0.139)	(0.015)	(0.139)	(0.015)
Science score/10	-0.076	-0.008	-0.105	-0.011
	(0.194)	(0.021)	(0.195)	(0.021)
Automotive score/10	0.087	0.009	0.068	0.007
	(0.151)	(0.016)	(0.152)	(0.017)
Number of siblings	0.043*	0.005*	0.045**	0.005**
	(0.022)	(0.002)	(0.022)	(0.002)
Mother's education	-0.003	-0.000	-0.003	-0.000
	(0.026)	(0.003)	(0.026)	(0.003)
Father's education	-0.019	-0.002	-0.019	-0.002
	(0.020)	(0.002)	(0.020)	(0.002)
Urban residence (d)	0.043	0.005	0.039	0.004
	(0.204)	(0.022)	(0.205)	(0.022)
Constant	-1.117**		-1.106**	
	(0.447)		(0.478)	
Log Likelihood	-985		-982	
Pseudo R^2	0.026		0.026	
N	2,592		2,592	

NOTES: a) For binary variables, denoted as (d) marginal effects are estimated for changes from zero to one. b) Standard errors (in parentheses) are robust to arbitrary correlation across persons who live in the same county. c) Additional controls include cohort indicators and indicators for residence in the four standard census regions.

Table 4: Logit Estimates of the Probability of Reporting Credit Constraints, Women

	I		II	
	Coeff.	Marg. Effect	Coeff.	Marg. Effect
Parental income/10,000	-0.125***	-0.013***	-0.114**	-0.012**
	(0.048)	(0.005)	(0.048)	(0.005)
Parental income in 1st Quartile			-0.215*	-0.023*
			(0.125)	(0.013)
Avg. Tuition/1,000	-0.108	-0.011	-0.108	-0.011
	(0.230)	(0.024)	(0.229)	(0.024)
Local college (d)	-0.481**	-0.045***	-0.486**	-0.045***
	(0.194)	(0.016)	(0.194)	(0.016)
Black (d)	-0.108	-0.011	-0.119	-0.012
	(0.183)	(0.019)	(0.183)	(0.019)
Hispanic (d)	0.412**	0.048**	0.415**	0.049**
	(0.181)	(0.023)	(0.180)	(0.023)
Math score	0.181	0.019	0.171	0.018
	(0.155)	(0.016)	(0.154)	(0.016)
Word score	0.136	0.014	0.091	0.010
	(0.145)	(0.015)	(0.150)	(0.016)
Science score	-0.178	-0.019	-0.179	-0.019
	(0.241)	(0.026)	(0.243)	(0.026)
Automotive score	0.030	0.003	0.016	0.002
	(0.242)	(0.026)	(0.240)	(0.025)
Number of siblings	-0.014	-0.002	-0.014	-0.002
	(0.026)	(0.003)	(0.026)	(0.003)
Mother's education	-0.049	-0.005	-0.049	-0.005
	(0.031)	(0.003)	(0.031)	(0.003)
Father's education	0.016	0.002	0.016	0.002
	(0.021)	(0.002)	(0.021)	(0.002)
Urban residence (d)	-0.549***	-0.065***	-0.549***	-0.065***
	(0.162)	(0.021)	(0.162)	(0.021)
Constant	-1.409***		-1.272***	
	(0.432)		(0.449)	
Log Likelihood	-954		-953	
Pseudo R^2	0.022		0.023	
N	2,569		2,569	

NOTES: a) For binary variables, denoted as (d) marginal effects are estimated for changes from zero to one. b) Standard errors (in parentheses) are robust to arbitrary correlation across persons who live in the same county. c) Additional controls include cohort indicators and indicators for residence in the four standard census regions.

in P for men and a 4.5 percentage-point (or a 35 percent) decrease in P for women.

Although the results for men and women are quite similar overall, there are some important differences. For example, higher math scores have a strong negative association with the probability of reporting credit constraints for men, but not for women. For women, ability test scores do not play an important role as credit constraint determinants. Similarly, for men, having an additional sibling is associated with an increase in the probability P of about 0.5 percentage points (or 4 percent), whereas for women the number of siblings is not statistically significant. Hispanic women are about 4.8 percentage points (or 37 percent) more likely to report credit constraints than non-Hispanic women. Women living in urban areas are half as likely to report credit constraints as their counterparts in rural areas (a 6.5 percentage-point difference). At the same time, race/ethnicity and urban residence are not significant for men. These gender differences indicate that schooling expectations are formed differently for men and women. A low significance of ability scores, for example, may indicate that women put more weight on the non-pecuniary benefits of education.

Section II of Tables 3 and 4 presents estimation results for the same model with additional controls for the differential impact of parental income in the bottom of the income distribution. The results show that parental income has a much stronger inverse relationship to the probability of reporting credit constraints for low-income women than for high-income women. For men, this relationship is not affected by the location in the parental earnings distribution. This result is not necessarily intuitive, since a lot of financial aid is geared specifically to low-income students, independent of their gender. Two potential explanations can be offered for these findings. One is that parents of low-income women may be less willing to help them finance their education than parents of high-income women. Another is that low-income high school students in general are poorly informed about financial programs and/or find the non-monetary costs of applying to be too high. This may make them less likely to consider need-based financial aid in reporting credit constraints.

6 Educational Outcomes of the Constrained

Human capital accumulation theory indicates that credit constraints can adversely impact individual schooling decisions. The panel nature of the NLSY79 data allows us to test this prediction, by comparing a battery of

educational outcomes for constrained and unconstrained youths. Although one should be careful in ascribing causality to the results, they do provide important insights about the internal consistency of the measure. The findings of this section indicate that there are substantial gaps in the outcomes of the constrained, which persist even when controls for scholastic ability and parental income are introduced. The results appear more robust for men, however. Overall, the findings of this section imply that my measure captures a dimension of credit constraints not addressed by the earlier studies.

Most of the earlier analysis of credit constraints in the literature focuses on a single dimension of schooling, such as college enrollment rates or educational attainment. Credit constraints, however, can affect individual schooling decisions on a number of margins, such as timing of enrollment, quality of the university, or employment while at school.[23] For this study it is especially important to examine an array of schooling outcomes to evaluate internal consistency of the measure. If the measure is internally consistent, we can expect to see systematic and persistent differences between the constrained and the unconstrained along more than one outcome margin. Conditioning of observables helps to isolate the repercussions of credit constraints not captured by differences in parental income and personal characteristics.[24]

In this paper I use six dimensions, or *margins* of education, to comprehensively evaluate the differences in outcomes between the constrained and the unconstrained youths. These dimensions are expressed as binary outcomes to make interpretation more straightforward.[25] I measure enrollment using a binary variable for whether or not an individual is a full-time student at age 19. The rest of the outcomes come from the 1994 wave of the survey, conducted when the respondents were between the ages of 39 to 43 and had completed the bulk of their schooling. Two binary variables capture educational attainment: an indicator for completing a four-year degree and an indicator for completing a two-year degree (for those who do not complete a four-year degree). For those who received a two- or a four-year degree,

[23] Carneiro and Heckman (2002) are the first ones to examine the impact of credit constraints on multiple dimensions of schooling.

[24] Focusing on a wide variety of schooling outcomes is also important to ensure that the differences between the constrained and the unconstrained are not driven solely by the differences in unobservables, such as preferences for college education.

[25] The first five are the dimensions employed by Carneiro and Heckman (2002) to evaluate the link between family income and short-term credit constraints. They employed enrollment in a four-year vs. a two-year college as a measure of quality of education.

another binary indicates if the degree was received without a delay. Quality of education is captured by two indicators: enrollment in a four-year vs. a two-year college, and enrollment in a college with competitive admissions standards.

Raw and adjusted gaps in these outcomes between the constrained and the unconstrained men and women are presented in Tables 5 and 6 respectively. The adjusted gaps are estimated conditional on parental income, parental education, number of siblings, race, ethnicity, and geographic and cohort controls.

Table 5: Gaps in Educational Outcomes of Constrained Men

Total		Bottom AFQT		Middle AFQT		Top AFQT	
Raw	Adjusted	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
Panel A - Enrollment in College							
-0.100***	-0.058**	-0.034	-0.024*	-0.013	-0.018	-0.163***	-0.154**
(0.026)	(0.024)	(0.022)	(0.014)	(0.041)	(0.043)	(0.057)	(0.063)
Panel B - Complete 4-Year College							
-0.097***	-0.053***	-0.014	-0.011	-0.072**	-0.052** *	-0.121**	-0.093
(0.022)	(0.015)	(0.010)	(0.008)	(0.029)	(0.020)	(0.057)	(0.059)
Panel C - Complete 2-Year College							
-0.047**	-0.030	-0.018	-0.011	-0.032	-0.027	-0.062	-0.052
(0.021)	(0.018)	(0.019)	(0.012)	(0.033)	(0.027)	(0.052)	(0.049)
Panel D - Proportion of People not Delaying College							
-0.090*	-0.057	-0.111	-0.083	-0.004	-0.017	-0.133**	-0.056
(0.049	(0.051)	(0.092)	(0.098)	(0.082)	(0.086)	(0.059)	(0.072)
Panel E - Enrollment in a 4-Year vs. 2-Year College							
-0.067	-0.051	-0.018	-0.007	-0.046	-0.015	-0.086	-0.076
(0.046)	(0.048)	(0.071)	(0.073)	(0.082)	(0.087)	(0.081)	(0.089)
Panel F - Enrollment in a Competitive College							
-0.063	-0.038*	-0.077	0.064	-0.082	-0.032	-0.166*	-0.171**
(0.044)	(0.043)	(0.059)	(0.060)	(0.074)	(0.074)	(0.093)	(0.082)

Notes: Standard errors in parenthesis. All results are presented relative to the unconstrained men. Adjusted gaps are marginal effects form logit regressions.

The results of Table 5 show substantial differences between constrained and unconstrained men along most of the schooling outcome dimensions. The first two columns of the table present the gaps estimated for all men. All the gaps, except for the gaps in quality, are statistically significant at conventional levels, indicating that men who report credit constraints are less likely to be enrolled in college at age 19, to receive a two-year or a four-year degree, and are more likely to delay enrollment. Conditioning on individual and family background characteristics reduces these gaps, but

Table 6: Gaps in Educational Outcomes of Constrained Women

Total		Bottom AFQT		Middle AFQT		Top AFQT	
Raw	Adjusted	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
Panel A - Enrollment in College							
-0.026	0.007	0.041	0.060*	-0.043	-0.040	-0.077	-0.011
(0.028)	(0.030)	(0.033)	(0.035)	(0.047)	(0.045)	(0.051)	(0.055)
Panel B - Complete 4-Year College							
-0.036	-0.010	0.033	0.021	-0.014	-0.005	-0.128***	-0.086*
(0.023)	(0.019)	(0.019)	(0.016)	(0.033)	(0.029)	(0.051)	0.052
Panel C - Complete 2-Year College							
0.006	0.018	0.012	0.035	-0.014	-0.004	-0.016	-0.011
(0.024)	(0.025)	(0.030)	(0.028)	(0.042)	(0.039)	(0.049)	(0.051)
Panel D - Proportion of People not Delaying College							
-0.074**	-0.030	0.016	0.051	-0.155***	-0.097	-0.068	-0.033
(0.038)	(0.037)	(0.074)	(0.064)	(0.062)	(0.070)	(0.054)	(0.046)
Panel E - Enrollment in a 4-Year vs. 2-Year College							
-0.103***	-0.082**	-0.066	-0.059	-0.159**	-0.160**	-0.099*	-0.053
(0.039)	(0.042)	(0.066)	(0.065)	(0.071)	(0.071)	(0.060)	(0.064)
Panel F - Enrollment in a Competitive College							
0.042	0.072*	0.043	0.045	0.083	0.099	0.001	0.039
(0.036)	(0.040)	(0.052)	(0.053)	(0.064)	(0.072)	(0.067)	(0.074)

Notes: Standard errors in parenthesis. All results are presented relative to the unconstrained men. Adjusted gaps are marginal effects form logit regressions.

does not eliminate them for college enrollment and completion of a four-year degree. Self-reported credit constraints account for a 5 percentage-point gap in college enrollment and completion for men.

The rest of Table 5 presents the gaps estimated by the AFQT terciles. Depending on their location in the AFQT distribution, individuals vary in their demand for education and perception of credit constraints. Unsurprisingly, there are no gaps in schooling outcomes for men at the bottom of the AFQT distribution. Low-ability individuals have a low demand for college education and hence are less likely to be affected by credit constraints. At the same time, there are large and significant gaps in college enrollment, completion, and quality for high-ability men. Constrained men at the top of the AFQT distribution are 16 percentage points less likely to be enrolled in college at age 19 and 13 percentage points more likely to delay if they do choose to enroll. They are also 12 percentage points less likely to complete a four-year degree and 17 percentage points less likely to enroll in a competitive university. Controlling for individual and background characteristics does not affect the gaps in college enrollment and quality. The persistence

of these gaps indicates that the self-reported credit constraints reveal important information about the college choices of men, beyond that captured by parental income and ability measures.

For women the picture is less clear. As Table 6 shows, constrained and unconstrained women differ only in college delays and enrollment in a four- vs. two-year college. Similar to the results for men, credit constraints have a stronger predictive power for women at the top of the AFQT distribution. Constrained women in the third AFQT tercile are 10 percentage points less likely to enroll in a four-year institution and 13 percentage points less likely to complete a degree than unconstrained women. Overall the results indicate that self-reported credit constraints are a good predictor of college delays and degree completion for high-ability women.

7 Conclusions

United States are constrained in their educational choices. This proportion is larger than the numbers suggested by the analysis using educational outcomes, but smaller than the fraction of credit-constrained consumers estimated from self-reports. Using outcome information, for example, Carneiro and Heckman (2002) evaluated the proportion of credit constrained in the United States to be below 8 percent. In contrast, a study by Jappelli (1990) puts the fraction of constrained consumers, defined as rejected and discouraged borrowers, at about 20 percent. Stinebrickner and Stinebrickner (2007) arrive at a similar number using responses of a survey conducted at a small private college.

Descriptive regression analysis reveals that self-reported credit constraints are sensitive to the factors deemed pertinent by the theory, such as family resources and the costs of attending college. Everything else held constant, young people from wealthier families are less likely to report being constrained, as are those who live in the vicinity of a college. These results are similar for men and women. Ability test scores and the number of siblings are important predictors of credit constraints for men, but not for women, which suggests that perceptions of constraints in education differ by gender.

A comparison of educational outcomes shows that constrained men and women are more likely to delay enrollment and are less likely to graduate with a four-year degree than their unconstrained counterparts. These differences persist even after conditioning on parental income and a variety of personal characteristics, including ability test scores.

The results suggest that although self-reported credit constraints need

to be treated with caution, they can serve as a valuable source of information regarding individual decision making. Subjective measures allow researchers to observe additional aspects of population heterogeneity that facilitate econometric analysis and reduce the need for arbitrary assumptions.

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8 Appendices

8.1 Survey Questions

Question S03D0766: Reason highest grade completed respondent expects is less than respondent would like. What is the main reason that you expect to complete less regular schooling than you would like to complete?

Table A-1: Distribution of Answers to Question S03D0769.

	Men		Women		Difference
Answer	N	Percent	N	Percent	T-stats.
Financial reasons	228	0.396	259	0.432	1.395
Family responsibilities	25	0.043	121	0.202	8.552***
School too difficult	38	0.066	16	0.027	3.195***
Have to work	114	0.198	66	0.110	4.149***
Health problems	1	0.002	0	0.000	1.015
Not necessary for job	27	0.047	19	0.032	1.311
Don't like school	38	0.066	31	0.052	1.002
Other	105	0.182	87	0.145	2.129**
Total	576	1.000	599	1.000	

8.2 The National Longitudinal Survey of Youth Geocodes Restricted-Access Data Supplement

In this project, the Geocodes Restricted-Access data are used to identify state and county of residence of the respondents at age 17. These data contain sensitive information that makes it possible to identify individual respondents. To ensure confidentiality, the Bureau of Labor Statistics (BLS) only grants access to Geocodes data to researchers in the United States who agree in writing to adhere to the BLS confidentiality policy. To gain access to the data, an application must be submitted to the BLS describing the project's goals, methodology, and security policies to protect the data. After the application is approved, Geocodes data can be used to conduct statistical analysis, but never to identify individual respondents.

8.3 Higher Education General Information Survey Data

The Higher Education General Information Survey (HEGIS) was designed to provide comprehensive information on various aspects of postsecondary ed-

ucation in the United States. The study domain includes all post-secondary institutions operating in the United States and its territories. The data used in this paper come from the Institutional Characteristics module. The module contains annual data on type of institution, tuition, location, and other characteristics of colleges and universities in the United States. The study excluded federal institutions and colleges with enrollment of fewer than 100 students. The data are available from University of Michigan data repository, and can be accessed at *http://www.icpsr.umich.edu/cocoon/IAED-SERIES/00030.xml?token=6*.