

Student Aid, Education and Credit Constraints

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US Context:

- Rising costs of and labor market returns to college since the early 1980s, coupled with stable real government student loan limits, suggest that borrowing constraints may be more salient today

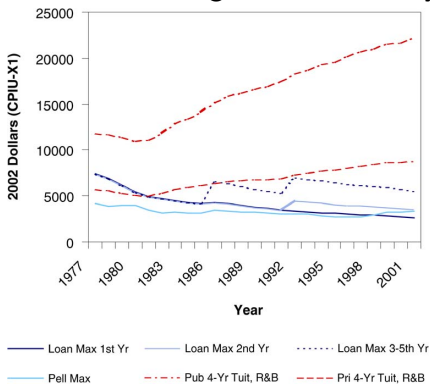


Figure 2. Federal financial aid maxima and four-year college tuition, room and board.

US Context:

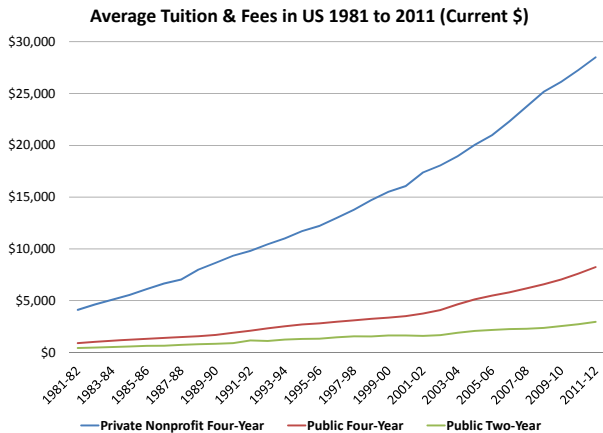
- Rising costs of and labor market returns to college since the early 1980s, coupled with stable real government student loan limits, suggest that borrowing constraints may be more salient today
- 26% of all dependent undergraduate students at 4-year public schools borrowed the max from the Stafford Loan Program in 1999-2000, compared to under 4% in 1989-90
- Private student credit increased rapidly from virtually zero in the early 1990s to 9% of all student loan dollars distributed in 1999-2000
- Growing concern about rising student debt levels and capacity to repay (especially given current economic situation)

Overview:

- discuss college costs and financial aid in US (and Canada)
- discuss U.S.-based evidence on the impacts of credit constraints on college-going, as well as consumption and work during college
- Highlight some important open questions/areas

Education Costs and Student Aid in the US

US Tuition Levels



Source: College Board, *Trends in College Pricing 2011* (Table 4a).

Types of Aid in US

- Merit aid and scholarships
 - federal and state governments (e.g. HOPE Scholarships)
 - institutional aid
- Tax-based aid
- Need-based grants & institutional aid
- Student loans

Tax-based Aid in US

- Tax-advantaged savings:
 - Section 529 College Savings Accounts
 - Coverdell Education Savings Account
- Income-based tax deductions and credits:
 - Tuition and fees deduction
 - Lifetime Learning tax credit: 20% of tuition expenses up to \$2,000
 - American Opportunity tax credit: undergraduates only, up to \$2,500

Main Federal Need-Based Grants (US)

- Pell Grants
 - up to \$5,550/yr for 4 years
 - undergraduate and vocational students
 - 9 million recipients received \$35 billion (significant ↑ since 2009)
 - 75% of recipients have family income less than \$30,000
- Supplemental Educational Opportunity Grant
 - up to \$4,000/yr
 - 1.3 million recipients received \$758 million
 - ≈60% of dependent undergraduate recipients have family income less than \$30,000

Federal Student Loans (US)

- Perkins Loans
 - undergraduate and graduate students
 - $\approx 500,000$ recipients received \$971 million
 - need-based: $\approx 60\%$ of dependent undergraduate recipients had family income $< \$60,000$
 - 95% of recipients attended 4-year public and private schools
- Stafford Loans
 - undergraduate and graduate students
 - subsidized and unsubsidized
 - 8.7 million undergraduate recipients received \$59 billion
- Parent PLUS
 - parents of undergraduate and graduate students
 - 884,000 undergraduate borrowers totalling \$10.4 billion
- Grad PLUS - directly to graduate students

Current US Federal Student Loan Programs

	Perkins	Subs. Stafford	Unsubs. Stafford	Parent PLUS
Need-based?	yes	yes	no	no
interest rate	5%	3.4/6.8%	6.8%	7.9%
interest subsidy	yes	yes	no	no
loan fees	0	1%	1%	4%
UG ann. limit (\$)	5,500	3,500-5,500	5,500-7,500	none
UG life. limit (\$)	27,500	23,000	31,000	none
G ann. limit (\$)	8,000	8,500	20,500	none
Lifetime limit (\$)	60,000	65,500	138,500	none
Deferment period	school + 9 months	school + 6 months	school + 6 months	school + 6 months

Notes: UG limits for dependent undergraduates. Subsidized Stafford borrowers can take out balance of limits from Unsubsidized Stafford.

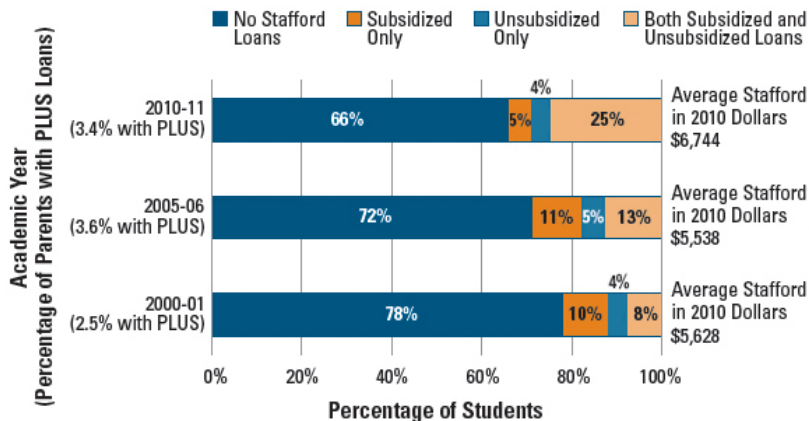
Repaying Federal Student Loans

- Standard Repayment – fixed payments, 10 year term
- Extended Repayment – fixed/graduated payments, 25 year term
- Income-Based Repayment (IBR)
 - 15% of discretionary income (AGI - (1.5 × poverty line))
 - remaining debt/interest after 25 years is forgiven
- Income Contingent Repayment (ICR)
 - pay lesser of
 - 20% of discretionary income
 - standard monthly repayment amount for 12-year term × Income Percentage Factor (≥ 0.5)
 - remaining debt/interest after 25 years is forgiven

Default on Federal Student Loans

- Default
 - 6 or 9 month grace period after leaving school
 - non-payment for 9 months implies default
- Consequences of default:
 - collection costs (20-40%)
 - wage garnishment up to 15% of 'disposable' pay (cannot exceed 30 times weekly minimum wage)
 - income tax refund offset
 - report to credit agencies
 - no additional federal aid, deferments
- Student loans not dischargeable through bankruptcy

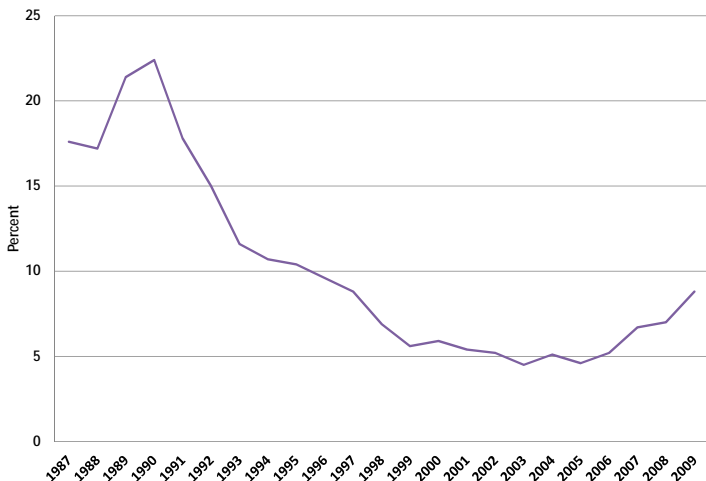
Percent of US Undergraduates with Stafford Loans



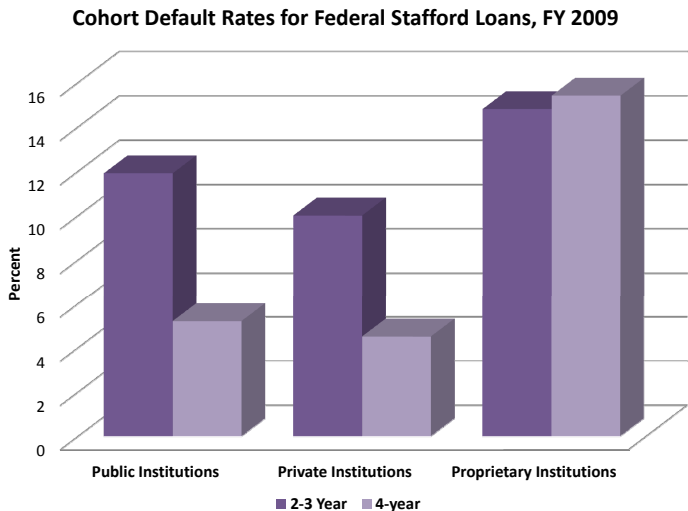
Source: *College Board, Trends in Student Aid 2011 (Figure 6)*.

Federal Student Loan Cohort Default Rates

National Student Loan Cohort Default Rates 1987-2009



Federal Student Loan Cohort Default Rates



Private Student Loans

- Many specific private lending programs targeted to students
 - amounts and terms may depend on school, year in school, major, degree, credit score, cosigner, etc.
 - not dischargeable through bankruptcy
 - garnishments require a court settlement
 - may offer lower/longer repayment plans
- Credit cards
- Home equity loans and HELOC for parents

Government and Private Student Borrowing

Table 4. Percentage Borrowing and Average Amounts Borrowed Among All Students and Among Full-Time Students by Dependency and Sector, 2007-08

	Percent Borrowing Any Loan	Percent Borrowing Federal Loans	Average Federal Loan per Borrower	Average Federal Loan per Student	Percent Borrowing Private Loans	Average Private Loan per Borrower	Average Private Loan per Student	Private Loans as Percentage of Total Borrowed
Total All Students	39%	35%	\$5,100	\$1,793	14%	\$6,522	\$931	34%
Total Full-Time Students	54%	50%	\$5,432	\$2,715	19%	\$7,809	\$1,502	36%
Dependency								
Dependent	50%	46%	\$4,781	\$2,212	18%	\$8,411	\$1,516	41%
Independent	65%	62%	\$6,971	\$4,297	23%	\$6,327	\$1,457	25%
Sector								
Public Four-Year	54%	50%	\$5,248	\$2,603	15%	\$6,990	\$1,078	29%
Private Four-Year	66%	62%	\$5,613	\$3,494	28%	\$10,208	\$2,895	45%
Public Two-Year	23%	20%	\$4,094	\$821	7%	\$4,416	\$287	26%
For-Profit	92%	88%	\$6,413	\$5,658	43%	\$7,123	\$3,071	35%

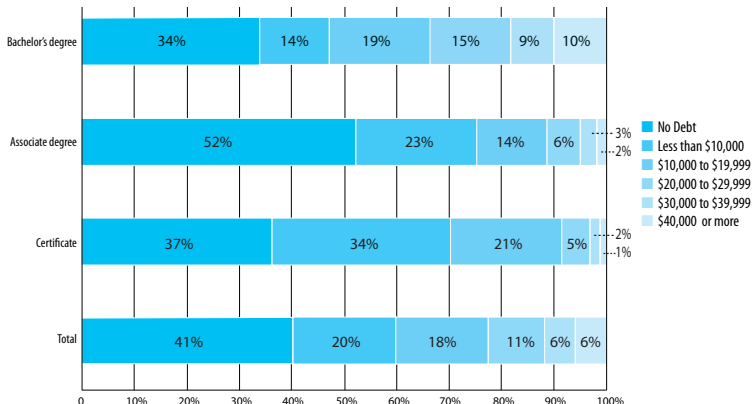
Source: NPSAS 2007-08

Note: Includes U.S. citizens and residents. PLUS loans, loans from friends and family, and credit card debt are not included. Private loan data in this table do not include state or institutional loans.

Source: College Board, "How Much Are College Students Borrowing?" Policy Brief, 2009.

Total Debt Levels Among Recent Graduates

Figure 1. Percentage Distribution of Loan Debt Among Undergraduate Certificate and Degree Recipients, 2007-08



Source: National Postsecondary Student Aid Study (NPSAS) 2007-08

Note: Includes U.S. citizens and residents. PLUS loans, loans from friends and family, and credit card debt are not included. Components may not sum to 100 percent due to rounding.

Source: College Board, "How Much Are College Students Borrowing?" Policy Brief, 2009.

Aid: Who Gets What?

(Belley, Frenette and Lochner 2012)

Determining Financial Aid

- Total Aid = $\min\{\text{Costs} - \text{EFC}, \text{Upper Limit}\}$
 - distributed via grants and loans
- Costs depend on
 - tuition
 - living expenses (\approx \$6,000 in 2003-04)
- EFC includes student and parental contributions
 - Key: EFC increases in parental income/assets above exemption amounts
 - In US, students must contribute 50% of income above a modest exemption amount

Calculating Aid in Canada and the US (2003-04)

- Consider tuition and financial aid
 - annual averages for a 4-year PS 'career'
 - students living away from home
- For US aid and tuition amounts (values PPP adjusted):
 - financial aid forms from NPSAS04
 - 18-24 year-old dependent students in 4-year public schools
 - roughly 80% of US students attend public institutions
- Use federal CSLP and provincial rules for Canada

Measuring Price and Liquidity

- $\text{Net Tuition} = \text{Tuition} - \text{Grants} - \text{Tax Credits}$
 - measures actual price paid
- $\text{Out-of-Pocket Costs} = \text{Net Tuition} - \text{Loans}$
 - measure of liquidity: how much a family must come up with out of pocket, through work, or from private lenders
 - *available* federal loans

Tuition Levels (4-year, 2003-04)

- US 4-year public institutions (in-state):
 - Median: \$4,350
 - Avg. of bottom half: \$3,300
 - Avg. of top half: \$6,000
- Canada
 - Ontario: \$5,600
 - British Columbia: \$4,800
 - Quebec: \$2,500

* These amounts not adjusted for PPP. All graphs that follow adjust for PPP ≈ 1.2 .

Figure 4: Expected Family Contribution

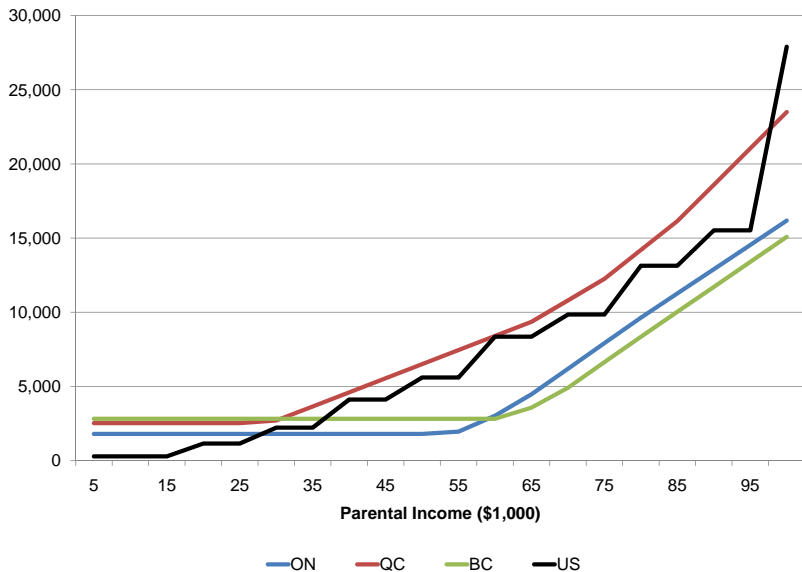


Figure 2: Total Grants and Scholarships

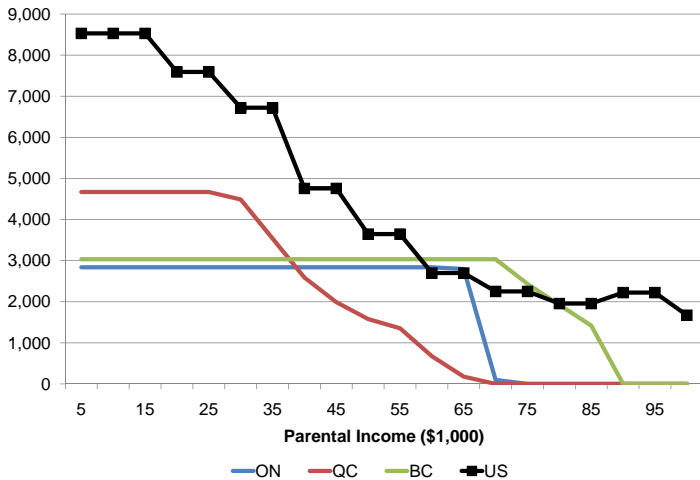


Figure 3: Tax Benefits

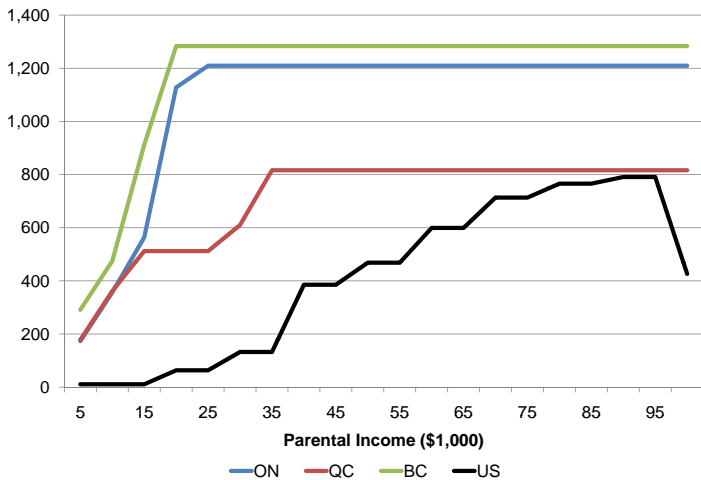


Figure 5: Total Tax Credits, Grants and Scholarships

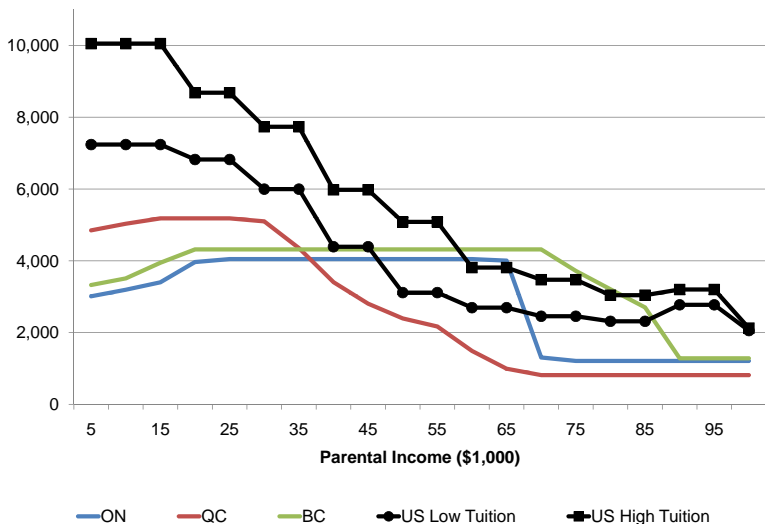


Figure 7: Net Tuition

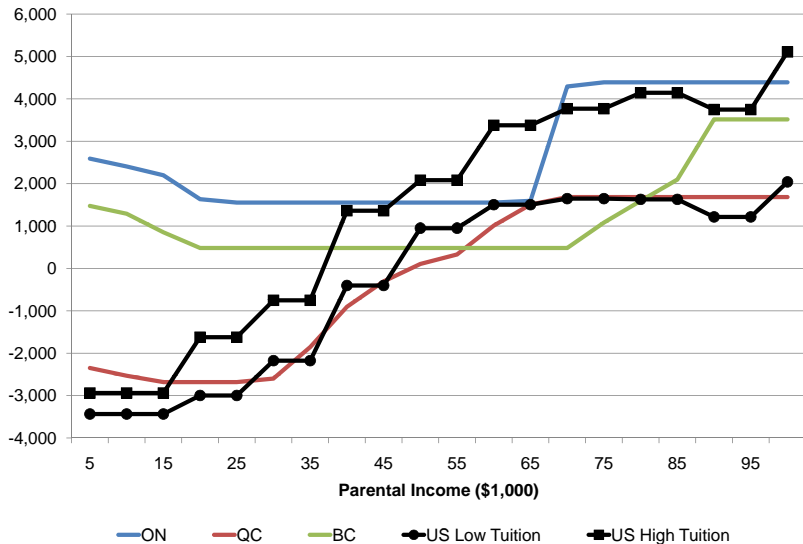


Figure 6: Total Government Student Loans

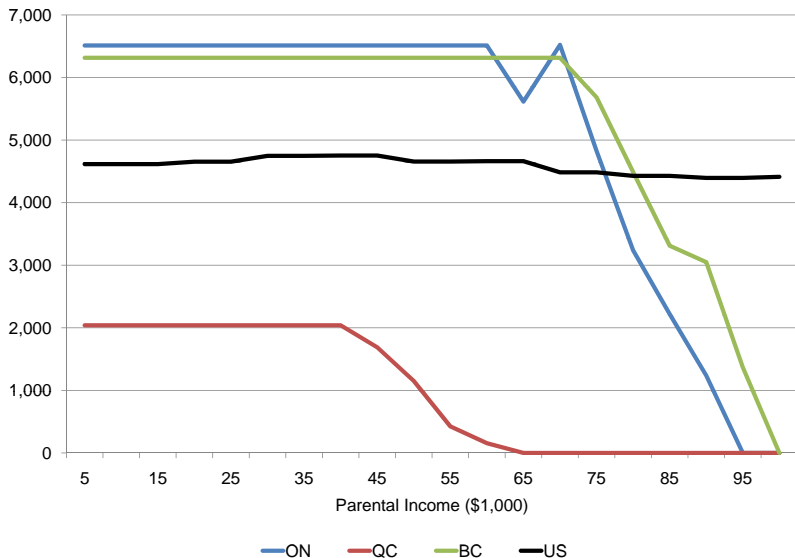
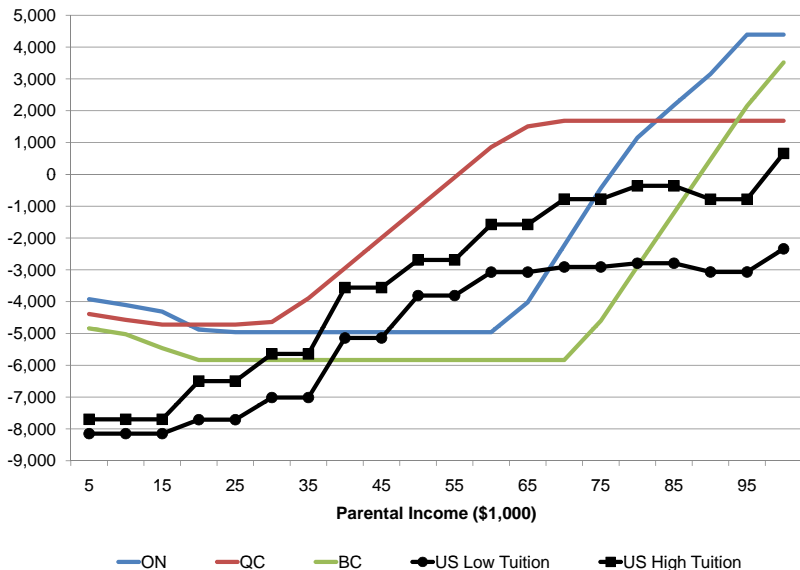


Figure 9: Out-of-Pocket Costs



Credit Constraints

The Canonical Two-Period Model

Consider two-period-lived individuals who invest in schooling in the first period and work in the second

- investments increase future earnings but provide no additional utility benefits/costs
- abstract from the choice of leisure time

- Given financial assets $W \geq 0$ and ability $a > 0$, individuals choose borrowing d and investment h to maximize utility:

$$U = u(c_0) + \beta u(c_1)$$

where

$$c_0 = W + w_0(1 - h) - \tau h + d$$

$$c_1 = w_1 a f(h) - R d$$

- $f(\cdot)$ is positive, strictly increasing and concave
- Education costs:
 - foregone wages: $w_0 \geq 0$
 - tuition costs: $\tau > 0$

Borrowing Constraint:

$$d \leq \bar{d}$$

- A threshold level of assets $W_{\min}(a)$ determines who is
 - constrained: $W < W_{\min}(a)$
 - unconstrained: $W \geq W_{\min}(a)$
 - $W_{\min}(a)$ is increasing in ability
- Being 'unconstrained' may require greater wealth than is needed to cover tuition, since individuals also borrow to smooth consumption

Empirical Predictions for Investment

- 1 Constrained individuals under-invest in their human capital:

$$h^X(a, W) < h^U(a)$$
- 2 Unconstrained investment is independent of wealth, while constrained investment is strictly increasing in wealth and the borrowing limit \bar{d}
- 3 Marginal return on human capital $MR(h) \equiv \frac{w_1 a f'[h]}{w_0 + \tau}$
 - equals return on savings for unconstrained individuals
 - strictly greater than return on savings and strictly decreasing in wealth for constrained individuals
- 4 Direct vs. opportunity costs
 - Constrained investment decreases more with an increase in direct costs than with an equal increase in opportunity costs (i.e., $-\partial h^X / \partial w_0 < -\partial h^X / \partial \tau$)
 - Unconstrained investment responds equally to both costs (i.e., $\partial h^U / \partial w_0 = \partial h^U / \partial \tau$)

Tastes for Schooling

- Can introduce non-pecuniary benefits/costs of education ξ , so

$$U = u(c_0) + \beta u(c_1) + \xi h$$

- Implies that unconstrained investment is not generally independent of wealth W
 - If $\xi > 0$, then $\frac{\partial h^U}{\partial W} > 0$ and $MR(h^U) < R$
 - If $\xi < 0$, then $\frac{\partial h^U}{\partial W} < 0$ and $MR(h^U) > R$
- Results 2 and 3 no longer imply simple 'tests' for borrowing constraints
 - Low-wealth individuals may acquire low levels of schooling (and have a high marginal return to investment), because they are more likely to be constrained or because schooling offers non-pecuniary benefits
- Result 4 continues to hold

Changing returns to school:

- Absent borrowing constraints, the correlation between family resources and the probability of attendance should *weaken* (or become negative) as the net financial returns to college increase
 - an increase in the return to college raises the relative value of college less for individuals with high wealth due to diminishing marginal utility of consumption
- This need not be true when borrowing constraints limit the consumption of low-wealth individuals
 - Constrained youth may benefit little from an increase in future labor market returns to school

Other Margins: Consumption, Leisure, Delay, and School Quality

Constrained youth:

- are likely to have low levels of consumption during school
- may substitute leisure for work to alleviate the negative impacts of constraints on consumption and investment
- may delay college entry (and its labor market rewards) to accumulate savings
- should attend lower quality institutions
 - implies that wage returns from college attendance may be lower for constrained youth

US Evidence on Borrowing Constraints and College

Differences in Schooling Decisions by Family Income/Wealth

- In the early 1980s (NLSY79), family income played little role in college attendance decisions after controlling for adolescent ability and family background (Cameron & Heckman 1998, 1999, Carneiro & Heckman 2002)
- Comparing the [NLSY79](#) with the [NLSY97](#), Belley and Lochner (2007) find that family income is a much more important determinant of college attendance in the early 2000s
 - Youth from high income families in the NLSY97 are 16 percentage points more likely to attend college than are youth from low income families conditional on adolescent cognitive achievement and family background
 - Roughly twice the effect observed in the NLSY79
- In the NLSY97, the combined effects of family income and wealth on college attendance are roughly double the effects of income alone

Role of Tastes for College

- One explanation for the observed positive relationship between family income and schooling is that higher income families place greater value on education
- Not clear why this relationship would have strengthened so much since the early 1980s
- Increase in net returns to schooling should have *weakened* the income – attendance relationship in the absence of borrowing constraints (if the relationship between ‘tastes’ for college and family income had remained stable)

Housing Wealth (Lovenheim 2011)

- Uses the PSID to estimate the impacts of exogenous changes in housing wealth (driven by local housing booms and busts) on post-secondary enrollment decisions
- Estimates suggest that an additional \$10,000 in housing equity raises college enrollment by 0.7 percentage points, with much larger effects among lower income families
 - wealth – schooling correlation not just a wealth – tastes correlation
- Impacts of housing wealth have become more important in the 2000s
 - increased liquidity of housing wealth or a general increase in the effect of family resources on schooling?

Work and College Entry Delay (Belley & Lochner 2007)

- Among lower ability groups, weak effects of income on work (during the school year) for both NLSY cohorts
- Among the most able, effects of income on work increase substantially over time
 - In the NLSY97, the most able youth from low-income families work more weeks and nearly twice as many hours per week during the school year than their higher income counterparts
- Estimated effects of family income on college entry delay are weak for both NLSY cohorts

College Type/Quality

- Relationship between family income and attendance at 4-year (relative to 2-year) institutions strengthened considerably from early 1980s to early 2000s (Belley & Lochner 2007)
- Relationship between family income and attendance at selective high quality institutions weakened (Kinsler & Pavan 2010)
 - among top (often private) schools, both tuition and need-based aid increased dramatically
 - effectively increased the price of college quality more for high-income students

Differential (Marginal) Returns to Schooling

- Cameron & Taber (2004) Examine returns to schooling, basing their analysis on predictions 3 and 4
- Argue that the set of individuals whose college-going is affected by a change in direct costs should disproportionately include more credit constrained youth than the set of individuals affected by a change in opportunity costs
- Measure direct costs by 'college in county' indicator and opportunity costs by local low-skill wage rates
- IV estimates of the return to schooling using 'college in county' as an instrument should exceed those using 'local low-skill wages' if borrowing constraints are important
 - ignores differences in college quality
- no evidence in support of credit constraints for NLSY79 men

Structural Models

- A few studies estimate lifecycle schooling models
- Exploit data on schooling choices, earnings, and in some cases, assets and family transfers, to identify the role of borrowing constraints

Cameron & Taber (2004)

- Estimate a lifecycle model with a discrete set of schooling options
- Test whether individuals face different interest rates when making their schooling decisions
- Evidence that some individuals face high interest rates relative to others would imply that borrowing constraints distort their education decisions
- Main source of identification is potential asymmetry in impacts of opportunity costs and direct costs
- Finding: no heterogeneity in interest rates (NLSY79 men)

Keane & Wolpin (2001)

- Estimate a dynamic model of schooling, work, and consumption
- Incorporate borrowing constraints and (exogenous) parental transfers
- Panel data on schooling and work (full-time and part-time), wages, and assets (white males, NLSY79)
- Allow for unobserved heterogeneity in the ability to acquire human capital, tastes for work and school, and borrowing limits

Keane & Wolpin (2001)

Key findings:

- Estimated borrowing limits are very tight (ranging from \$600 to \$1000 across individuals, in 1987 dollars)
 - less than 1/3 the estimated cost of a single semester of school (about \$3,700)
- Important role for parental transfers and part-time work in enabling school attendance
 - parents provide between \$3,300 and \$10,000 in transfers while enrolled in school
 - transfers increasing in parental education
 - transfers are substantially lower when students are not enrolled in school
 - transfers act as a subsidy for education (larger for children with more educated parents)

Keane & Wolpin (2001)

Conclusions:

- Conclude that nearly all of the (sizeable) differences in educational attainment by parental education are accounted for by
 - higher enrollment-contingent parental transfers from educated parents
 - unobserved heterogeneity
- Increases in available credit
 - have negligible effects on schooling
 - reduces work during school
 - increases consumption during school

Johnson (2011)

- Estimates a similar model to Keane & Wolpin
- Some key differences:
 - recent male high school graduates in the NLSY97
 - explicitly models government student loan programs and a private credit limit
 - allows for differences in tuition across states
 - incorporates need- and merit-based grants
 - allows for exogenous unemployment
 - exploits additional data on avg. tuition by state, self-reported grant aid and parental transfers
- enables him to infer consumption during and after school, helping identify who is constrained

Johnson (2011)

Key findings:

- Parental transfers (esp. that schooling-contingent transfers are greater for higher-income families) and unobserved heterogeneity are important determinants of schooling
- Estimated borrowing limits are modest relative to college costs; substantially greater than those of Keane & Wolpin
- Estimates a stronger, though modest, impact of increasing loan limits
 - an additional \$1,500 in credit per year in school would increase college completion rates by 4.5%
 - allowing students to borrow up to the total costs of schooling would increase completion rates by nearly 8%

Role of Borrowing Constraints

- Borrowing constraints have small to modest impacts on schooling choices in these two studies for very different reasons
- Estimates from Keane & Wolpin suggest that most students are constrained but that consumption and leisure are distorted rather than schooling
 - lack of effects on schooling consistent with other NLSY79 studies
- Johnson estimates that few youth borrow up to their limit
 - risk aversion, coupled with the possibility of very low income (associated with post-school unemployment), prevents individuals from taking on much debt
 - his estimates suggest that very few would choose to borrow more than \$6,000

Interpreting Keane & Wolpin (2001) and Johnson (2011)

- Results suggest that many youth would not attend college without schooling-contingent transfers from their parents even if credit were abundant
- Why do wealthier parents effectively subsidize so much schooling if their children are not willing to pay for it themselves?
 - Parents must value their children's education more than their children do
 - Why do schooling-contingent transfers increase in parental income?
- Not clear how these results explain the dramatic increase in family income – attendance gaps over the past few decades

Navarro (2010)

- Explores importance of heterogeneity, uncertainty, and borrowing constraints as determinants of college attendance in a lifecycle framework
- Uses schooling and earnings data from the NLSY79 and PSID
- At each age, borrowing constraints are given by the lowest possible discounted future income ('natural' limit of Aiyagari (1994))
- An important innovation is the methodology used to identify *ex ante* heterogeneity in abilities (and tastes for college) separately from uncertainty about future income

Navarro (2010)

Key findings:

- Because individuals would never choose to borrow more than the 'natural' limit, relaxing this constraint by itself would have no effect on behavior in his framework
- Eliminating uncertainty would substantially change who attends college but would have little impact on the aggregate attendance rate
- Simultaneously removing uncertainty and borrowing constraints would lead to sizeable increases college attendance
- Highlights an important interaction between borrowing constraints and risk/uncertainty

General Comments on Uncertainty and Borrowing Constraints

- Assumptions about minimal income (or consumption) levels are crucial for the importance of borrowing limits in lifecycle schooling models with uncertainty
- Demand for credit may be much higher with explicit insurance mechanisms or implicit ones (e.g. bankruptcy, default, deferment and forgiveness)
- Private credit offerings may increase in response to any reductions in risk
- Important to think about insurance and credit together when estimating these types of models

'Endowments' and Adolescent 'Abilities'

- play a central role in determining the relationship between socioeconomic background and education (and earnings) outcomes
 - true in structural models and estimated education gaps by family income
- Most studies treat these endowments as exogenous and invariant to policy
- Some recent work endogenizes these endowments through early investments by families and schools
 - Cunha (2007), Cunha & Heckman (2007), Cunha, Heckman & Schennach (2010), Caucutt & Lochner (2011) Del Boca, Flinn and Wiswall (2011)
 - constraints can have large impacts on early investments

Other Approaches to Identifying Constraints

Stinebrickner & Stinebrickner (2008)

- Directly ask students enrolled at Berea College whether they would like to borrow more if they could (at a 'fair' interest rate)
 - while Berea is 'special' in many ways, its college dropout rates are similar to those for other low-income students in the US
- While many Berea students live on a very tight budget, only about 20% reports that they would like to borrow more
- College drop out rates (by the beginning of year two) are 11-13 percentage points higher (or roughly double) for 'constrained' youth

Brown, Scholz and Seshadri (2011)

- Model intergenerational relationships and derive a new way of identifying which youth may be affected by borrowing constraints
- Assume that youth would be borrowing constrained if they did not receive help from their parents
- Parents cannot write enforceable loan contracts with their children
- Some parents may not want to transfer enough resources to satisfy their children's demand for consumption and schooling
 - parents would provide all their transfers to their children at college ages, but children would under-invest
- Unconstrained families transfer enough resources to their children to support optimal investment and make transfers after their children leave school

- Distinguish between 'constrained' and 'unconstrained' families based on post-school parental transfers
- In their framework, total human capital investment should be more sensitive to a tuition subsidy among constrained youth than among unconstrained youth
- Test this prediction using intergenerational data on educational attainment and family transfers from the HRS (US during 1970s, 1980s, and 1990s)
- Among 'constrained' youth, an additional \$3,600 in aid (i.e., 4 vs. 0 years of sibling overlap) increases average schooling by 0.2 years
- Negligible effects of additional aid on 'unconstrained' youth

Summarizing the Evidence

- Studies analyzing the NLSY79 data find little evidence that borrowing constraints affected college-going in the early 1980s
- Important changes over past few decades point to increased salience of constraints:
 - significant increases in the share of students 'maxing out' their federal student loan opportunities
 - doubling in family income – college attendance gradients for recent cohorts
 - able low-income students work much more than their high-income counterparts in NLSY97
- Changes in family income – college quality relationship mixed
- Small effects on college entry delay
- Differences in parental transfers and labor market risk are also important factors, complicating interpretation of the evidence

Big Questions

- How much credit should individuals get?
 - Do some students receive too little credit?
 - Do others receive too much?
 - What factors should credit depend on?
- How should student credit (and insurance) be structured?
 - extent of *ex ante* heterogeneity vs. *ex post* uncertainty
 - commitment problems
 - moral hazard problems
 - adverse selection
- To what extent should student credit and other social insurance programs be integrated?
- What role should government vs. private lending play?

Figure 2a: College Attendance by AFQT and Family Income Quartiles (NLSY79)

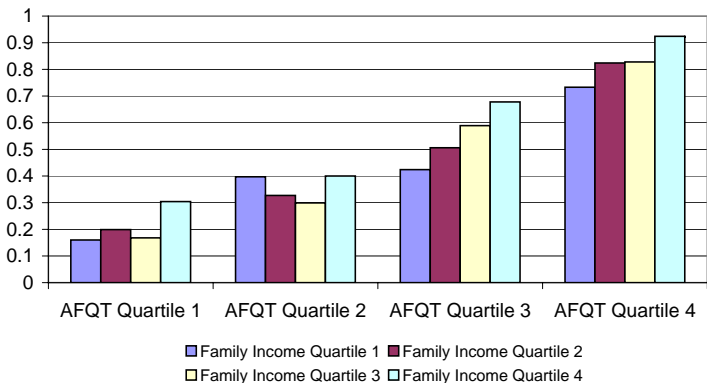


Figure 2b: College Attendance by AFQT and Family Income Quartiles (NLSY97)

