Lecture 12

Credit Constraint Effects

There are substantial differences in college participation rates across family income classes each year.

(e.g. see Carneiro and Heckman, EJ 2002, Figure 1).

Children from families in the highest income quartile are much more likely to attend college than children from families in the bottom quartile (about 75% versus 45%). There are two, not necessarily mutually exclusive interpretations of this evidence. I will add a third later on. The common interpretation and the one that guides much policy is that credit constraints facing families in a child's adolescent years affect the resources required to finance a college education. If families face difficulties or are averse to borrowing to pay for college, than children from lower income families will be less likely to go to college, even if facing the same benefits from it as others from higher income families.

A second interpretation emphasises more long run factors associated with higher family income. Families with high income in the adolescent years may also be more likely to have high income throughout the child's life at home. Better family resources in a child's formative years may be associated with higher quality of education and better environments that foster cognitive and noncognitive skills.

Both interpretations of the evidence are consistent with a form of credit constraint. The first, more common, interpretation is clearly consistent with this point of view. But the second interpretation is consistent with another type of credit constraint: the inability of the child to buy the parental environment and genes that form the cognitive and noncognitive abilitites required for success in school. Relaxing borrowing constraints at the college level will only have an impact under the first case and not the second.

Card argues that a possibility explaining why instrumenting education with college costs yields higher returns than OLS suggests credit constraints may be important in school attainment decisions.

College Proximity:

Is it a valid instrument? College proximity only affects costs of attending college. Underlying assumption is that ability distribution across regions are the same. If you think it helps, Card also adds city indicators, race, and family background controls. Living near a college raises education by .32 years.

Concerns: 1) family selection across regions
2) college proximity also related to primary and secondary school quality
3) unobserved wage premiums by location

Card suggests if these omitted variables were correlated with college proximity, they the instrument should affect college attendance for all family backgrounds similarly.

Whereas, for the instrument to behaving as we think, where it affects costs more for those liquidity constrained, the first stage should be stronger for lower income families.

(of course, if the unobserved selection also varied by family background, we'd still get this result).

Figure 1

Table 4

Two ways to come to this conclusion:

First, everyone has the same marginal returns to education, which are declining with more school.

We can proxy an individual affected by credit constraints as facing a higher discount rate, or, more generally, higher costs associated with school.

The existence of credit constraints will cause those affected to obtain less education.

An instrument for schooling that lowers college costs will lead to a larger drop in costs for the credit constrained.

$$p\lim \beta_{iv} = \frac{E[\beta_i \Delta S_i]}{E[\Delta S_i]}$$

If no one was credit constrained, the instrument should identify the ATE, since every one affected by the cost the same way.

A similar conclusion arises without declining marginal returns if we have heterogeneous ability and individuals that are credit constrained have, on average, higher marginal returns from school

Note, Heckman points out that if psychic costs of going to school are higher for those that tend to be credit constrained, the response from tuition changes or geographic mobility does not necessarily have to be greater for them than non-constrained.

Cameron and Taber, NBER WP#7761

At the margin, reducing direct college costs affects credit-constrained students more than reducing foregone earnings by the same amount.

A fall in college costs leads to a greater increase in schooling for credit constrained individuals more than non credit constrained individuals.

A fall in foregone earnings by the same amount affects schooling outcomes constrained and non-constrained individuals the same.

Cameron and Taber suggest using these predictions as a test for whether the IV>OLS finding really does imply credit constraints.

Cameron and Taber's suggestion is that IV using distance to college > IV using foregone earnings only if credit constraints present.

Cameron and Taber use a sample from the NLSY between 1979 and 1994 to estimate returns to schooling using college proximity and foregone earnings as instruments. College proximity is computed as the presence of a two or four year college in the county of residence at age 17. Foregone earnings are computed as the average log earnings in service/agriculture, and wholesale and retail trade industries by county. Both are related to schooling. The authors discuss the validity of these instruments in the text: the evidence of validity seems very shaky.

There main results come from Tables 3 and 4. They find higher IV estimates than OLS when instrumenting foregone earnings, which is not consistent with a liquidity constrained story. They find smaller IV estimates than OLS when instrumenting college proximity while controlling for foregone earnings (relative to average earnings in the county). They also do not find, as Card does, that the college proximity variable matters more for individuals with low income family backgrounds. They conclude there is no evidence that individuals induced to take more school by lowering college costs are credit constrained.

Other Empirical Evidence against credit constraints

Carneiro and Heckman simply argue that the instruments are not valid.

Table 1:
Proximity to college is strongly related to AFQT (taken before high school), so is local unemployment rate, which Cameron and Taber use.
provide a critique of the IV versus OLS strategy to test for credit constraints. They also accuse the instruments, such as distance to college, as being correlated with ability measures taken during high school.

The paper cites much work by Cameron and Heckman that compare the estimated effects of family background and family income in the child's adolescent years on college attendance with and without controlling for scholastic ability (AFQT). "Measured scholastic ability is influenced by long-term family and environmental factors, which are in turn produced by the long-term permanent income of families. to the extent that the influence of family income on college attendance is diminished by the inclusion of scholastic ability in an analysis of college attendance, one would conclude that long-run family factors crystallised in AFQT scores are the driving force behind schooling attainment, and not short-term credit constraints. Fitting a lifecycle model of schooling to a subsample of the NLSY data on youth with AFQT measured before high school graduation, Cameron and Heckman examine what portion of the gap in school attendance at various levels between minority youth and whites is due to family income, during the adolescent years, to tuition costs and to family background. They find when not controlling for ability measured at an early age, about half of the 11 point gap between black and white college attendance rates is due to family income. When scholastic ability is accounted for, less than half of one point of the 11 point black white gap is explained by family income. They conclude that ability, and not financial resources, in the teenage years accounts for the pronounced minority majority differences in schoolin attainment."

Carmeron and Heckman's idea: the Armed Forces Qualification Test (AFQT) was administered to 15-18 year olds in the NLSY before high school graduation and proxies for the stock of human capital up until high school graduation.

Heckman's approach is essentially to compare the predicted ethnic/race gap in college attendance with and without family background controls.

Pr(college attendance) = f(race)

Being black/white attendance gap is 11% points
Hispanic/white gap is 7% points

Versus

Pr(college attendance) = f(race, family income)

Versus

Pr(college attendance) = f(race, family income, family background)

Versus

Pr(college attendance) = f(race, family income, family background, AFQT)

See Table 4, Cameron and Heckman, JPE , 2001

OLS, but left over omitted variables bias likely upwards

Using a subsample of the NLSY data on youth with AFQT measured before high school, C and H examine what portion of the gap in college attendance between minority youth and whites is due to family income, to tuition costs, and to family background. Not controlling for ability measured at an early age, about half (5 points) of the 11 percentage point gap between black and white college attendance rates is due to family income. More than half of the difference between Hispanics and whites is due to family income. When scholastic ability is accounted for, only about one half of one point of the 11 point black white gap is explained for family income. Equalizing AFQT scores accounts for much of the minority-majority college attendance gaps.

The disincentive effects of college tuition on college attendance are considerably weakened when AFQT is added as a control.

Figure 4 versus Figure 5

Heckman's conclusion: the rate of return on human capital investment much higher at earlier ages (e.g. less than 10).

Conceptual experiment, vary lottery winners by age of child and observe child outcomes.

Counter argument: Ellwood Kane

Heckman continues to push hard on this evidence and others to argue that human capital investments after young ages are worth spit. Ellwood and Kane are the only ones I know that put forth a counter argument:

"Including parental education almost certainly captures more than differences in parental tastes for education. Parental education, probably artificially picks up some of the income effects due to measurement error in income and probably more closely measures a family's long term wealth than a single year of income does. Moreover, if children from poorer families believe they are unlikely to go to school (because of financial constraints) they do not work as hard in school and ahieve lower scores and grades, further obscuring the true impact of family income. Second, even after controlling for parental education, the remaining differences in college-going by family income are hardly 'small'. Our results imply that even when two youngsters have identical school grades and test scores and equally well educated parents, if one is poor and one is well to do, their odds of attending school will differ by nearly 10 percentage points.

How to promote access to college?

Kane, NBER WP#5164: goes over more experimental evidence of effects of tuition and means-tested programs on college participation.

Suppose we did decide that removing credit constraints were an important policy objective. We could do this by subsidizing tuition for everyone (we currently do a lot of this) or we can consider a means tested financial aid or scholarship program. our goal is to lower direct college costs to reduce $b(s,\tau,X)]$ for low income families, subsidizing tuition is an expensive way to do it. Much of these subsidies are pure transfer from tax payer to students that would have attended college in the absence of public support. Why should I subsidize your education if I get nothing from it and you simply end up receiving the transfer? It is the marginal group we are more concerned with: those who not have entered college without the subsidy. Kane estimates only 11 to 30 percent of the money invested in keeping public tuition low goes to marginal entrants, although it's not clear to me how he gets this number.

"In theory, means tested programs are better targeted at marginal youth, "but an important piece of evidence should give one pause. After the establishment of the Pell Grant program in the mid-1970s, there was no disproportionate growth in enrolment by low income youth. Since Pell Grants represent the primary source of means-tested grant aid in the country, this is troubling. One might offer several different hypotheses to reconcile the results. For instance, the establishment of Pell Grants coincided with an increase in college enrolment by minorities. Supply constraints in colleges and universities may have muted the enrolment response of low-income youth. The marginal student may simply have been unaware of the process of applying for Pell Grants. Marginal youth may be more aware of the 'sticker price' published in the newspapers than they are capable of anticipating their financial aid eligibility."

Kane concludes, "rising college costs do seem to be related to the growing gap in enrolment between high and low-income youth and between white an minority youth. But the states cannot afford to continue paying three-quarters of the cost of attendance at a public university. Means tested aid is abetter targeted but, it seems, less effective in promoting college enrolment."
1 examples of the effects of grant eligibility on college enrolment:

Dynarski: 2003 (AER): Does Aid Matter?

This was Sue's MIT job market paper.

Starting in 1965, the Social Security Administration subsidized 18-22 year old children of deceased, disabled, or retired SS beneficiaries monthly payments while in college full time. The subsidy worked out to be about $6700 in 1980 dollars. At the program's peak, 12 percent of full time college students received these benefits.

In 1982, the program was stopped, with arguments that there was already federal aid from other programs and the Pell Grant program had been introduced.

Empirical strategy: diff in diff, access for eligible vs. non eligible before and after (79-81) versus 82—83 (Q, why not just show longer term graph?).

Diff in diff equation (3).

Note, effect is intent to treat: effect from eligibility, rather than from receipt.

Population of eligible children are children with a father that passed away before turning 18. Disabled or retired children dropped: parents have some 'choice' on becoming disabled or retired, and these incentives go away after 82, so there could be sample selection.

Data from NLSY and identify these variables of interest. (why not look at earnings?)

Note, Dynarski did look at retired father's as eligibility, and footnotes results were similar. Probably her advisors said the results were redundant and not as clearn.

Table 2, 'raw diff in diff'

Table 3, with covariates

Table 5, smaller effect on highest grade completed, but still almost 1 year!

Figures 2A and 2B: nice.

Kane, NBER WP 9703

This paper uses regression discontinuity to identify the effects of the CalGrant program in California. Eligibility of these grants required students to meet minimum thresholds, one was for GPA. No one knew the GPA threshold when they applied. Kane uses data from all people that applied to examine whether there was a discontinuous change in college enrolment at the point of the GPA threshold. (show table). Note, this evidence does not test whether credit constraints exist – only tries to examine effectiveness in program in raising enrolment.

Could apply, but didn't know GPA threshold. Those with GPA's around the threshold would not have had a good sense of whether they would get the scholarship or not.

Figure A and B: messy

Table 6: Standard error issue: should show aggregated results.