Abstract Title Page
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Title:
CREDIT CONSTRAINTS FOR HIGHER EDUCATION

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Abstract Body

Limit 4 pages single-spaced.

Background / Context:

Description of prior research and its intellectual context.

Credit constraints and family background have been confronted to explain the gap on college enrollment by family income. The former suggest that the existence of incomplete financial markets that do not offer uncollateralized loans for investment in human capital prevent poor students from financing their human capital investments while students from rich families can rely of their family endowments. The latter argues that the observed gap is a consequence of long run differences in educational investment, both at home and in schools, in which higher-income parents give their children habits, preferences for education, better quality schools, etc., that increase their readiness for college.

Testing the hypothesis of credit constraints has mainly relied on indirect methods since credit status is not observed, and other variables that affect enrollment decisions are not observed or difficult to measure (ability, preferences for college education, expectations about performance in college and future income, etc.) (See Cameron and Taber (2004), and Stinebrickner and Stinebrickner (2008)). Therefore, the evidence found for different authors have been controversial and heterogeneous. Measuring the causal effects of credit constraints require an exogenous source of credit markets access that eliminates the biases from these unobserved variables.

Purpose / Objective / Research Question / Focus of Study:

Description of the focus of the research.

This paper exploits a natural experiment that produces exogenous variation on credit access to determine the effect on college enrollment.
The paper assess how important are credit constraints to explain the gap in college enrollment by family income, and what would be the gap if credit constraints are eliminated.
Progress in college and dropout rates are also investigated

Setting:

Description of the research location.

95% of high school graduates in Chile participate in the national admission process, taking the admission test, PSU.

Population / Participants / Subjects:

Description of the participants in the study: who, how many, key features, or characteristics.

On each year, an average of 211,000 students took the PSU test and participate in the college admission process. To estimate the RD parameters I am able to use a very small window around the threshold. To be conservative, all the RD results shown in the paper consider 2 PSU points around the threshold, that implies 6, 000 students around the cut-off.

Intervention / Program / Practice:

Description of the intervention, program, or practice, including details of administration and duration.

Two financial programs in Chile give access to college tuition loans to students who score above a given cut-off in the national college admission test (PSU, Prueba de Seleccion Universitaria).

The first loan program is the State Guaranteed Loan program (Credito con Aval del Estado), which allows private banks to give loans to eligible students that are guaranteed by the State of Chile and by higher education institutions. The second loan program, the Traditional University Fund (Fondo de credito solidario) gives tuition loan to students enrolling in the traditional universities (the oldest and of best quality). To be eligible for both loans students need to belong to the lowest four income quintiles and scoring at least 475 points in the national College Admission Test, PSU

The PSU test consists in two mandatory tests on language and mathematics and two optional tests. The average on the mandatory tests is referred as PSU score which is considered for loan eligibility. The tests contain only multiple choice questions which are answered on a special sheet that is graded automatically by a photo optical device. The test is taken simultaneously in all of the country once a year and is used as a selection mechanism for almost all higher education institutions in the country.

Research Design:

Description of the research design.

Two college tuition loan programs are available to any student who belongs to the lowest four income quintiles scoring at least 475 points in the national College Admission Test (Prueba de Seleccion Universitaria, PSU hereafter) which allows the implementation of a regression discontinuity design (RDD).

Since scoring a few points above or below the cut-off is mainly random the treatment is assigned "as good as randomly" around the cut-off, and therefore addresses the problems of unobserved omitted variables and self-selection that allows the estimation of the causal effect of credit constraints on college enrollment.

Additionally this paper benefits from a rich and detailed data that present several advantages with respect to previous data sets used in the literature to identify the effects of credit constraints on college enrollment. First, it comes from a centralized national admission process, and therefore contains enrollment status, program (in case of enrolled students), and higher education institutions for all students participating in the process. Roughly 95% of all high school graduates take the PSU each year. Some students take it even when they decide not to go to tertiary education, because sometimes is required as a high school graduation certificate. It also provides an objective measure of family income, provided by the tax authority for the group of students that apply for benefits.

Second, for the admission to traditional universities, the centralized process assign places weighting exclusively two observed variables, PSU score and high school GPA, to determine the

rank of students applying to a given program. Whereas, private universities are not mandated to use this scores, they use it to discriminate the quality of the students, and they use PSU score when the demand for a given programs is larger than the number of seats. These characteristics eliminates in part the omitted variable bias, of processes that consider subjective (not observed by the econometrician) characteristics to determine placement.

Lastly, loan amounts are determined depending exclusively on family income for the traditional loan and defined by the student in the guaranteed by the State programs. In neither case, is determined as an instrument to encourage students to enroll in a given institution. In the US for example, loans and financial aid in general are defined to compete with other universities to attract better students. (See Van der Klaauw, 2002)

Data Collection and Analysis:

Description of the methods for collecting and analyzing data.

The data comes from four data sets from three different institutions. The first data set contain individual level PSU scores and socioeconomic characteristics that are self-reported by the students when they register for the test, such as family income, parent education, household size, city of residence, etc. It also includes high school GPA, school of graduation, and other school characteristics. The data comes from The Council of Chancellors of Chilean Universities (Consejo de Rectores de las Universidades Chilenas: CRUCH), which is the organization that implements the PSU process. It includes eight different PSU processes for the eight years from 2003 to 2010.

The second data set includes data at the individual level on enrollment. It comes from the Ministry of Education and includes enrollment program, and institutions for the period from 2006 through 2009.

The third data corresponds to the FUAS application form which gives individual level information on application to benefits given by the Ministry of Education of Chile, eligibility, income quintile and assignment to eight scholarship programs and the Solidarity Credit. The information has been collected by the Ministry since 2006, but I only have from 2007 onwards.

The last data set corresponds to individual data on State Guaranteed Loan from the INGRESA commission from 2006 to 2009. This commission was created in 2006 to manage this credit system.

Findings / Results:

Description of the main findings with specific details.

Students who are eligible for tuition loans increase their enrollment rate in 26 percentage points relative to the students who did not get access to loans, which implies a 173% increase in the probability of enrollment. (See table 1 and figure 1). The effects are stronger for the poorest quintile. (See table 2)

More importantly, when loan access is granted for students above the cut-off, college enrollment gap by family income disappeared (See Figure 2): The enrollment rate for all income groups is

about 35%. On the other hand, for the group at most two points below the cut-off (control), the enrollment rate for the richest quintile is almost three times larger than for the poorest quintile, which represent the actual college enrollment gap for Chile.

The effects are significant for the enrollment rate in second and third years, and increasing on time (See table 3). For dropout rates I run a bounding exercise that compared enrolled students above the cut-off, with students from higher income families without access to loans. Even though the treatment groups come from lower income families, from mother with less education, and from worse schools, having access to loans allow them to drop out significantly less, reducing the rate to almost zero. (See table 4)

Conclusions:

Description of conclusions, recommendations, and limitations based on findings.

We observed that the elimination of the credit restriction has a significant effect on college enrollment. The effects are stronger for the poorest quintile.

When loan access is granted for students above the cut-off, college enrollment gap by family income disappeared. This evidence suggests that an important part of the gap is a consequence of imperfect access to credit markets among the poorest. These results strongly support programs that grant access to the credit markets to the poor, who may alleviate in some degree the intergenerational inequality.

The effects on medium run enrollment and dropout rates indicate that credit constraints are not only important for initial enrollment, but also play an important role for college progress. Having access to financing may allow students to focus on studying rather than in part-time jobs. The effects are particularly important for the lowest two income quintiles which were expected to be more constrained.

All these evidence put together indicates that credit access have a very important effect on college enrollment, and college attainment, that may explain the big gap by family income. These shed light on the importance of programs that alleviate financial burden for the poor.

Appendices

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Appendix A. References

References are to be in APA version 6 format.

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Appendix B. Tables and Figures

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Table 1: RD for college enrollment for students preselected for loans.

Dependent Var.: 1(College Enrollment)	2007	2008	2009	07-09 Pooled
	(1)	(2)	(3)	(4)
Eligible for loan	.302 (.076)***	.247 (.067)***	.249 (.057)***	.248 (.037)***
Obs.	2792	2740	2280	6617
Control Mean Enrollment	.110	.184	.142	.149
R^2	.026	.042	.051	.042

Covariates: 1(work), household size, income category, health insurance type, father education, mother education, 1(father work), 1(mother work), high school GPA, and 1(female). Robust standard errors in parenthesis. (***): p⩽1%, (**): p⩽5%, (*):p⩽10%

Table 2: RD College Enrollment by income quintile. By year and all sample. $\epsilon = 2$ PSU points.

	c2007	c2008	c2009	c0709
	(1)	(2)	(3)	(4)
1(PSU>475) x Quintil1	.236 (.032)***	.214 (.037)***	.191 (.031)***	.209 (.019)***
1(PSU>475) x Quintil2	.221 (.062)***	.158 (.054)***	.197 (.049)***	.190 (.031)***
1(PSU>475) x Quintil3	.185 (.064)***	.201 (.065)***	.234 (.072)***	.193 (.039)***
1(PSU>475) x Quintil4	.055 (.078)	.140 (.083)*	.144 (.081)*	.105 (.047)**
1(PSU>475) x Quintil5	-.162 (.124)	.037 (.097)	.182 (.106)*	.034 (.061)
Obs.	2150	2187	2280	6617
R^2	.197	.226	.231	.214

Robust standard errors in parenthesis. (***): p⩽1%, (**): p⩽5%, (*):p⩽10%
$P(Coll_i = 1) = \sum_{k=1}^{5} \theta_k q_i^k + \sum_{k=1}^{5} \beta_k q_i^k \cdot 1(PSU \geqslant 475) + \sum_{k=1}^{5} \pi_k q_i^k \cdot [PSU - 475] +$
$+ \sum_k \phi_k q_i^k \cdot [PSU - 475] \cdot 1(PSU \geqslant 475)$, where $k \in \{1,...5\}$

Table 3: Enrollment in Second and third years of college for all students around the cut-off in 2007 and 2008. $\epsilon = 2$

Dependent Var.:	Enrollment 2nd year in 2008	Enrollment 2nd year in 2009	Enrollment 2nd year pooled	Enrollme 3rd year in 2009
	(1)	(2)	(3)	(4)
Eligible	.296	.378	.325	.288
	(.071)***	(.071)***	(.051)***	(.070)***
Const.	-.173	.083	-.058	-.159
	(.272)	(.232)	(.176)	(.270)
Covariates	Y	Y	Y	Y
Control Mean Enrollment	.098	.175	.140	.087
PSU Process	2007	2008	07-08	2007
Obs.	1268	1352	2620	1268
R^2	.01	.015	.021	.014

Robust standard errors in parenthesis. (***): p⩽1%, (**): p⩽5%, (*):p⩽10%
Covariates are "self reported income", income quintile, mother education, father education, age, female dummy, high school GPA, health insurance system, married dummy, work dummy, dummy for public schools, dummy for voucher schools, household size.

Table 4: Dropout rate in 2nd and 3rd years of college around the cut-off. $\epsilon = 2$

Dep. Variable :	Dropout after 1y of college	Not in 2009	Dropout after 2y of college	Dropout in 2nd y of college
	(1)	(2)	(3)	(4)
Eligible	-.264	-.230	-.249	.036
	(.086)***	(.087)***	(.199)	(.145)
Const.	.359	.339	.443	.064
	(.405)	(.409)	(.571)	(.346)
Covar	Y	Y	Y	Y
Control Mean Dropout	.192	.221	.349	.157
Sample	07-08	All	All07	1(2nd)
Obs.	680	680	298	298
R^2	.032	.049	.068	.065

Robust standard errors in parenthesis. (***): p⩽1%, (**): p⩽5%, (*):p⩽10%.
All regressions 2 point around the cut-off and linear specification.
Covariates are "self reported income", income quintile, mother education, father education, age, female dummy, high school GPA, health insurance system, married dummy, work dummy, dummy for public schools, dummy for voucher schools, household size.

Figure 1: Probability of college enrollment around the cut-off. $\epsilon = 2$. Students that belong to the four poorest quintiles and applied to benefits.

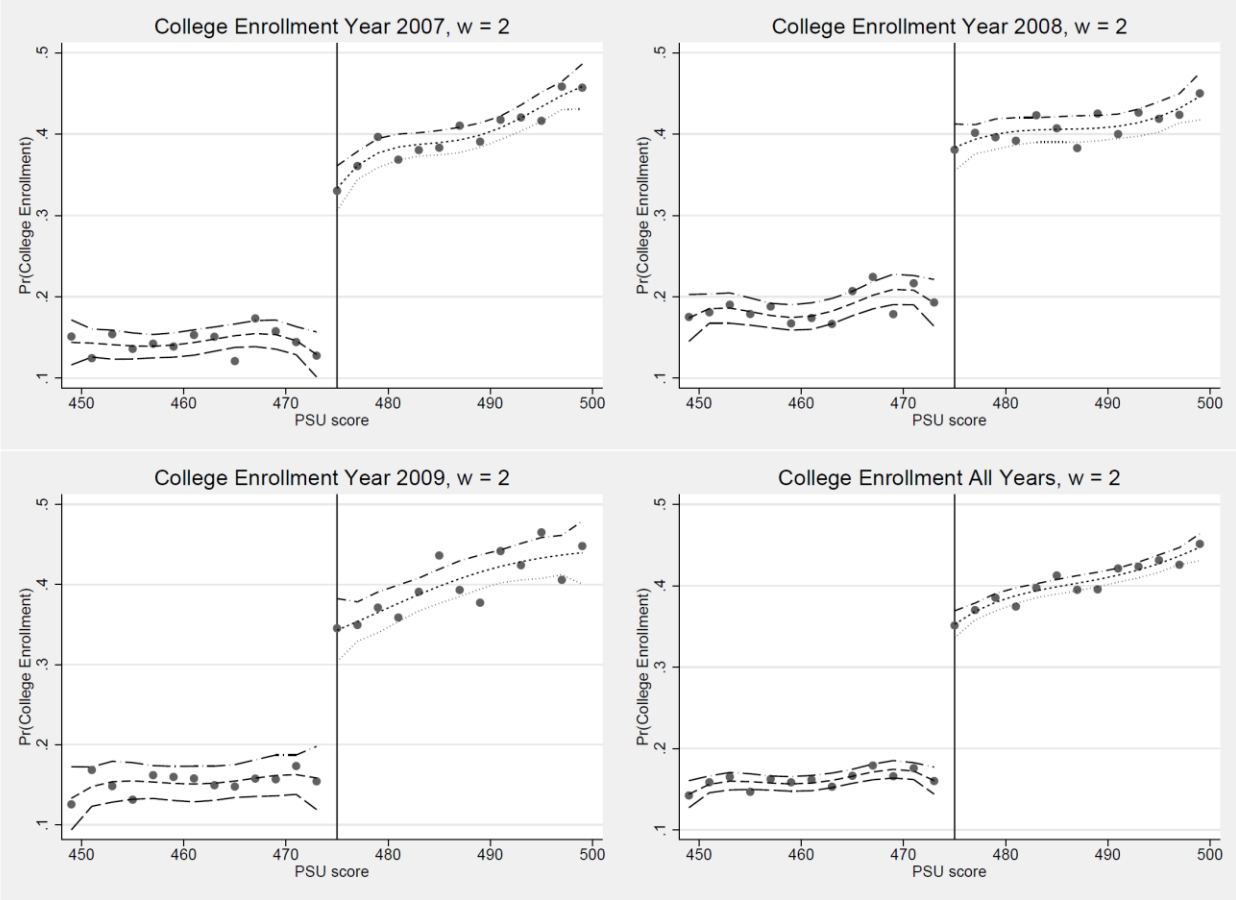

Figure 2: Enrollment rate by quintile years 2007 to 2009 pooled together. $\epsilon = 2$