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Connecting Student Loans to Labor Market Outcomes: Policy Lessons from Chile[†]

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Publicly subsidized student loans are a key part of the effort to expand access to higher education. Students in the United States borrowed $119 billion to finance higher education in the 2011–2012 school year, equal to 24 percent of revenues at higher education institutions (HEIs).[1] Rising student loan default rates and protests over debt burdens suggest that many students make choices they regret (US Department of Education 2014a). Students from low-income, college-inexperienced backgrounds may have little information on relative returns and costs of degrees, and they may choose degrees based on potentially biased HEI marketing.[2] Current policy proposals aim to address these issues by collecting and disclosing information on HEIs, and by tying access to subsidized loans to academic and financial outcomes for past students (US Department of Education 2014b, 2014c).

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[1] See College Board (2014) and National Center for Education Statistics (2013, tables 333.10, 333.40, and 333.55).

[2] See, e.g., Hoxby and Turner (2013); Scott-Clayton (2012); Hastings, Neilson, and Zimmerman—henceforth, HNZ—(2015a); and Government Accountability Office (2010).

These policy issues are not unique to the United States. In 2014, the Chilean Ministry of Education (Mineduc) began to phase in a reform capping student loan amounts based on earnings outcomes for past enrollees. The goal was to limit the money students could borrow to an amount they could likely pay back given their degree choice (Mineduc 2014a), while keeping distortions in the higher education market to a minimum. The policy shares similarities with proposed student loan regulations in the United States, as well as with existing home mortgage regulations (Consumer Financial Protection Bureau 2013). As in the United States, loan reform in Chile grew out of student protests and concerns about low repayment rates in a higher education market where public, private nonprofit, and private for-profit HEIs set tuition, curriculum, and admissions standards to compete for students.[3]

This paper describes how loan repayment varied with degree characteristics prior to the introduction of the new loan caps, the design of the loan reform, and how the loan amounts available for use at different types of degrees change under the new policy. We focus on challenges facing policymakers seeking to tie loan availability to labor market outcomes. We draw on our experience advising Mineduc on this and other higher education policies as part of the Proyecto 3E research initiative (HNZ 2013, 2015a,b).

I. Loan Repayment by Degree Characteristics

Table 1 presents descriptive statistics for tertiary degrees in Chile in 2013. We consider

[3] See World Bank (2011) for details on student protests and state-backed loans. Chile resembles the United States in terms of tertiary completion rates for young adults, loan subsidy rates, and higher education market structure. See Mineduc (2014b), World Bank Development Indicators (2014), and OECD (2012).

Table 1—Degree Characteristics by 2013 Loan Repayment Status, Weighted by 2013 Enrollment

	On-time repayment rate		Default rate
	Above median	Below median	Above median
Percent 2013 enrollees from low-SES backgrounds	35.5	51.0	59.1
Average entrance exam score, 2013 enrollees	545	500	478
Percent enrolled in professional/technical institutions	30.3	54.6	69.4
Degree graduation percent ('00–'05 cohorts)	62.4	49.5	50.5
Total expected tuition costs (on-time graduation)	10,874	7,084	5,660
Average annual past enrollee earnings (2–7 exp. years)	7,402	4,914	4,270
Percent in science/health/tech/business degrees	66.0	55.8	56.1
Percent in humanities/education/arts/ag. degrees	15.5	26.1	25.2

Notes: All degree-level characteristics are weighted by 2013 enrollees. Above median default rate column includes only degrees in the below-median repayment rate group; the median default rate in that sample is 39 percent. Repayment begins 18 months after drop-out or on-time graduation. Therefore, shorter, less selective degrees are over-represented in this sample relative to the population of enrollees. See online Appendix Table A.1. Online Appendix B contains a detailed description of variable construction.

three groups of degrees: degrees with above- and below-median rates of on-time loan repayment, and, within the low-repayment group, degrees with above-median default rates. Degrees are defined at the institution-major level.[4] The median degree has an on-time payment rate of 50 percent and a default rate of 33 percent.[5] We use administrative records of college enrollment, high school enrollment, student test scores, demographics, loan origination, and loan repayment. Earnings data come from tax records.[6]

Low-repayment, high-default degrees are more likely to enroll students from low-socioeconomic status (SES) backgrounds and students who have lower scores on college entrance exams.[7] They have lower graduation rates, and serve a higher fraction of education, humanities, art, or agriculture majors as opposed to providing degrees in higher-earning science, health, technology, and business fields. They are disproportionately likely to be offered by technical or professional institutions, which unlike universities may have for-profit status. Past enrollees in low-repayment degrees earned substantially less during their first several years in the labor market. Online Appendix Table A.2 presents estimates of degree "value added" by repayment and default group, conditional on entrance exam scores, gender, and SES. Low-repayment degrees have lower value-added than high-repayment degrees. They also have lower long-run expected earnings.

II. Challenges in the Design of Earnings-Based Loan Caps

Policymakers translating economic analysis to policy design inevitably face constraints and trade-offs. We describe some of the major challenges and the practical responses that emerged.

A. *Predicting Earnings Using Observational Data: Selection and Incentives*

In the absence of perpetual random assignment of students to degrees, loan caps must be based on observed outcomes for past students. Selection bias may penalize degree programs that offer high returns to students with low baseline earnings levels, and could give loan-dependent HEIs an incentive to discriminate in admissions

[4] Chilean students apply and are admitted to institution-major tracks. Changing majors within an institution is very difficult compared to the United States.

[5] Students are defined as in default if they are three or more payments behind. See online Appendix B for a more detailed data description, and online Appendix Figure A.1 for details on the distributions of repayment and default rates across degrees

[6] This disclosure is required by the Chilean government. Source: Information contained herein comes from taxpayers' records obtained by the Chilean Internal Revenue Service (Servicio de Impuestos Internos), which was collected for tax purposes. Let the record state that the Internal Revenue Service assumes no responsibility or guarantee of any kind from the use or application made of the aforementioned information, especially in regard to the accuracy, validity or integrity.

[7] The college entrance exam in Chile is called the Prueba de Selecion Universitaria (PSU). It is normed to have a mean of 500 and a standard deviation of 110.

based on SES or gender. To address these concerns, Mineduc adjusted earnings to account for differences in observable student characteristics within broad selectivity and field of study categories:

$$\hat{y}_{jt} = \bar{y}_{jt} - \hat{\beta}_{fs}\left(\bar{X}_{jt} - \bar{X}_{fst}\right), \quad (1)$$

where $\hat{y}_{jt}$ is the predicted earnings value for degree j, $\bar{y}_{jt}$ is the observed earnings mean, $\bar{X}_{jt}$ are the average characteristics of students enrolling in j, and $\bar{X}_{fst}$ are average characteristics of enrolling students in the same field f of study and selectivity s group as j. X_{jt} include gender, SES (measured at the high school level), dummies for tax years, and dummies for years of labor market experience. $\hat{\beta}_{fs}$ are estimated effects of student characteristics on earnings. See online Appendix C for a detailed description of this calculation.

Earnings-based loan caps may also affect how HEIs treat students after they are admitted. Loan caps based on outcomes for graduates rather than enrollees may give institutions an incentive to selectively graduate students rather than to add value to likely dropouts. In the United States and in Chile, default rates are highest among dropouts.[8] Calculating loan caps based on enrollees, not graduates, and adjusting loan caps for demographic factors may mitigate the negative consequences of selection, and reward HEIs that add value to traditionally disadvantaged groups.

Selection can also be positive. Prior research yields little evidence that Chilean students select into degrees on the basis of degree-specific comparative advantage (HNZ 2013, 2015b). This is not surprising if students have little information and nonselective HEIs act to maximize enrollment and loan revenue, not student outcomes. If incentivized to do so, HEIs may be better than students at predicting success in particular degree programs because they observe outcomes for many students across many years (Thaler and Tucker 2013). The new loan caps provide such an incentive (Garicano and Hubbard 2009).

[8] See Gladieux and Perna (2005) for US statistics and Comisión de Financiamiento Estudiantil (2012) for Chilean statistics.

B. *Time Horizon for Earnings Measurement*

Loan cap policy incentives and HEI responses depend on how quickly the loan caps incorporate outcomes for recent enrollees. The sooner earnings are measured and incorporated into caps, the greater the incentive for programs to respond. In addition, short-run earnings outcomes may be easier to calculate if historical enrollment and earnings records are not available, and quick adjustments to loan caps may be important as the economy changes. However, measuring outcomes soon after graduation may motivate HEIs to place students in temporary jobs or jobs with low longer-run earnings growth (Courty and Marshke 1997; Barnow and Smith 2004).

To incorporate the long-run benefits to careers with steeper wage profiles (e.g., for college compared to technical degrees), Mineduc considered the first 15 years of students' labor market experience. Earnings predictions $\hat{y}_{jt}$ (equation (1)) were constructed using years two through four of enrollees' post-schooling earnings during the most recent four tax years. Earnings were then projected through experience year 15 using estimated field- and selectivity-group specific slope coefficients. The loan cap policy allows the intercepts and slopes of earnings profiles to vary in a simple way, with the goal of balancing the trade-off between adaptable, feasible short-run measurement and the better incentives provided by long-run measurement. Grogger and Eide (1995) discuss earnings profiles by college major in more detail.

III. Earnings-Based Loan Caps in Chile for 2014

New loan caps were calculated for degree j using the formula

$$l_j = \rho \hat{g}_j = \rho\left(\sum_{t=1}^{15} \delta^t \hat{y}_{jt} - OC_j\right), \quad (2)$$

where ρ is the fraction of earnings gains reasonably dedicated to loan repayment and $\hat{g}_j$ is the estimated earnings gain from enrolling in degree j over not enrolling in college. Initially, ρ was set so that the overall amount of loans under the new loan cap system would equal the amount in the existing system given current enrollment. $\hat{g}_j$ is calculated as the present discounted value of earnings conditional on enrolling at degree j, $\hat{y}_{jt}$, over 15 years of labor market participation,

Table 2—Earnings-Based Loan Caps as a percentage of Baseline Loan Caps

	P25	Mean	P75
By 2013 loan repayment and default status			
Above median repayment	59.8	101.2	128.1
Below median repayment	42.6	83.0	113.4
Above median default (given below-median repayment)	39.6	78.4	110.4
By graduation rates			
Above median (> 52 percent)	57.7	96.1	125.6
Below median (<= 52 percent)	42.8	96.8	132.1
By degree type			
Technical/professional	38.8	85.1	117.5
University degrees	56.4	102.8	128.8
By SES			
Low-SES	43.8	89.5	117.6
High-SES	55.4	97.7	126.1
By major			
Science/health/tech/business	63.2	111.2	139.8
Humanities/edu/arts/ag.	30.4	47.6	60.1

Notes: All values stated as percentages. P25 and P75 are the twenty-fifth and seventy-fifth percentiles of percent changes at the degree level for the type listed in the row label, weighted by 2013 enrollment. See online Appendix Table A.3 for further discussion and analysis. Low SES and High SES rows reflect changes in loan caps at degrees weighted by low- and high-SES student enrollment, respectively.

discounted at rate δ, less OC_j, a measure of forgone earnings for students enrolling in degree j. In practice, OC_j was set equal to the present discounted value of 15 years of mean earnings for students who complete high school but do not enroll in college for every degree. For the small fraction of degrees where OC_j exceeded the present discounted value of earnings, the l_j were set to zero.[9]

Table 2 compares earnings-based loan caps to existing loan caps, which were based on past tuition and cost values. Recall that the earnings-based loan caps shift funds between degrees, but do not affect the total quantity of loans holding enrollment choices constant. Loan caps for degrees at technical or professional institutions decrease on average. Caps rise in degrees focusing on traditionally high-earning subjects such as science, health, and business, and fall in degrees focusing on low-earning subjects such as the humanities and the arts.[10] Looking at quantiles of loan cap changes, we find that even at degree types where loan caps fall on average, degrees remain where loan caps stay flat or increase.

IV. Discussion

The earnings-based loan caps limit the implicit subsidy (through non-repayment) that student loans provide to lower earning or higher cost degrees. They reduce loan funding to degrees with low repayment and high default rates without relying on sharp eligibility thresholds. An important goal of this policy was to separate what can reasonably be considered a loan from the nonrepayment subsidy. This distinction is particularly important for degrees in arts, education, and the humanities, which may have higher social than private returns but which would see reduced loan funding under the new caps. Grants may be a better approach to funding these degrees than personal loans. With grants, subsidy levels for public-goods degrees can be set explicitly and without imposing the cost of default on beneficiaries.

Even with adjustments for SES, the loan caps reduce funding on average at degrees where low-SES students enrolled in 2013. HNZ (2015b) show that conditional on admissions score

[9] See online Appendix C for more detail on the loan cap calculation.

[10] Online Appendix Table A.3 presents loan cap changes by selectivity, earnings, cost, and value added groups. Caps rise on average at high earnings, high value added, and high selectivity degrees. Average changes are similar across cost groups.

and background, low-SES students have less information on degrees and make enrollment decisions that lead to lower short- and long-run earnings returns. Earnings-based loan caps combine disclosure and regulation policies together and in one statistic. They rise for degrees offering higher returns serving low-income students, are salient to income-constrained students (HNZ 2015b), and provide incentives for HEIs to add value in admissions selection and during enrollment. Online Appendix Table A.3 shows that the earnings-based loan caps expand loans to high-value-added degrees.

Finally, differences in loan cap changes by graduation rate are small. This reflects a trade-off: making degrees more challenging may reduce graduation rates but raise earnings for completers. Earnings-based loan caps give HEIs an incentive to trade off value added and graduation rates with higher earnings for enrollees as the objective. Policies that use only graduation rates or combinations of graduation thresholds and debt levels may induce unwanted changes in curriculum and training.

The new loan caps were incorporated into existing loan caps at a 5 percent rate in the 2014 school year, with the plan of raising the weight to 33 percent by 2017. In March 2014, a new government was elected in Chile on a platform that included a proposal to make college free to students (Michelle Presidenta 2014). If government reimbursements to HEIs are funded through income taxes, this is similar to a switch from debt to equity financing. Earnings and value added outcomes conditional on enrollment can provide guidance for reimbursement rates under equity financing by helping to clarify the subsidies provided to or penalties imposed on different degree programs, and incentivizing degrees to produce students who succeed in the labor market.

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