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Article

Student borrowing: Debt, default, and repayment

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series analyses further show that firms' cash reserves rise in times of high aggregate volatility. At such times, credit line initiations fall, their spreads widen, and maturities shorten.

The Role of Liquidity When Capital Markets Collapse

The relation between corporate liquidity and real activity came to the forefront of the academic and policy debate during the global financial crisis. The credit market breakdown started in 2008 and became acute in the spring of 2009. Firms' inability to obtain external funding allowed researchers to look at corporate liquidity management at a time of acute liquidity scarcity.

In the fall of 2008, as the crisis started to engulf the economy, John Graham, Cam Harvey, and I sent out survey questionnaires to thousands of CFOs in 39 countries asking them about their corporate plans for the coming year.⁹ These data provided us uniquely forward-looking information about corporate liquidity management, and they revealed that managers thought of internal liquidity as a way to guard against a crash that was about to happen. We found that, in anticipation of a severe liquidity contraction, financially constrained firms put together plans to cut their cash stocks by as much as 15 percentage points, compared to only 2 percentage points, on average, among financially unconstrained firms. These planned cuts in liquidity were accompanied by other major changes. In particular, constrained firms reported plans to reduce employment (by 11 percent), technology spending (by 22 percent), capital investment (by 9 percent), as well as cash dividend payments (by 14 percent) in the year ahead. Financially unconstrained firms, in contrast, reported much milder changes in their planned policies for 2009. Notably, firms reported plans to resort to their bank credit facilities — drawing unprecedented amounts of cash from their lines — as a way to insulate against the effects of the crisis.

After gathering information on how access to funds modulated corporate plans during the crisis, Graham, Harvey, and

I teamed up with Erasmo Giambona to assess how firms chose between different liquidity instruments.¹⁰ We used a new series of CFO surveys to gauge how firms' cash positions and cash flow impacted their access to credit lines and their plans with regard to saving. Pre-2008 cash positions proved to be of paramount importance. For firms coming into the crisis with healthy cash balances, cash flows had no bearing on their access to bank credit lines. Only the firms with low cash exhibited a positive correlation between operating cash flows and credit line access. Notably, firms with more cash had their investment plans boosted by greater access to credit lines. At the same time, lack of access to credit lines forced firms to choose between saving and investing. In the absence of pre-crisis savings, access to credit lines was crucial in allowing firms to invest and to survive in the years ahead. Our work extended to Europe, where bank-based economic systems made credit line access particularly important for corporate financing during the global downturn.¹¹ These analyses show that corporate liquidity management should not be restricted to the study of corporate cash, and that credit lines can play a fundamental role in insuring firms' access to liquidity in difficult times.

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³ H. Almeida, M. Campello, and M. Weisbach, "Corporate Demand for Liquidity," *NBER Working Paper No. 9253*, October 2002, and *Journal of Finance*, 59(4), 2004, pp. 1777–1804 (published as "The Cash Flow Sensitivity of Cash").

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⁴ See, for example, I. Khurana, X. Martin, and R. Pereira, "Financial Development and the Cash Flow Sensitivity of Cash," *Journal of Financial and Quantitative Analysis*, 41(4), 2006, pp. 787–808.

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¹⁰ M. Campello, E. Giambona, J. Graham, and C. Harvey, "Liquidity Management and Corporate Investment during a Financial Crisis," *NBER Working Paper No. 16309*, August 2010, and *Review of Financial Studies*, 24(6), 2011, pp. 1944–79.

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[Return to text](#)

Student Borrowing: Debt, Default, and Repayment

Lance Lochner

Three significant economic trends in the United States and other developed countries have altered the landscape of higher education substantially in recent decades, with important implications for student borrowing and repayment behavior, Alex Monge-Naranjo and I argue in a series of recent papers.¹ First, the costs of college have increased markedly, even after accounting for inflation and expansions in student aid. Second, average returns to college (net of tuition payments) have increased sharply. Third, labor market uncertainty has increased considerably, highlighted by the Great Recession.

The first two trends, rising costs and returns to college, have contributed to a dramatic increase in demand for student loans. Annual student borrowing levels doubled in the 1990s and then again over the next decade.² Combined government and private student debt levels in the U.S. quadrupled from \$250 billion in 2003 to \$1.1 trillion in 2013, reflecting sizeable increases in both the incidence of debt and debt levels among borrowers.³

Figure 1 documents the changing distribution of cumulative debt among U.S. baccalaureate recipients since 1989–90. The fraction of college graduates borrowing less than \$10,000, including non-bor-

rowers, declined from over 70 percent to less than 40 percent, while the fraction of college graduates borrowing more than \$30,000 rose from 4 percent to 30 percent.⁴

The steady rise in student borrowing over the late 1990s and 2000s masks the fact that government student loan limits remained unchanged (in nominal dollars) between 1993 and 2008. Adjusting for inflation, this reflects a nearly 50 percent decline in value. In 2008, aggregate Stafford loan limits for dependent undergraduate students jumped from \$23,000 to \$31,000, although this value was still less than the 1993 limit after accounting for inflation. Not surprisingly, the share of full-time/full-year undergraduates that maxed out Stafford loans increased more than five-fold from 1989–90 to 2003–04.⁵ Undergraduates turned more and more to private lenders to help finance their education prior to the 2008 increase in federal student loan limits and contemporaneous collapse in private credit markets. Undergraduate borrowing from non-federal sources peaked at 25 percent of all undergraduate borrowing. Despite this increase in private lending, there are reasons for concern that a growing fraction of youth from low-income and even middle-income backgrounds are unable to access the resources they need to attend college.⁶

At the same time, there are concerns that many recent students are taking on too much debt. Growing levels of debt, coupled with rising labor market uncertainty and the last recession have led to a sharp increase in student loan default rates after more than a decade of decline. Borrowers who are 270 days or more (180 days or more prior to 1998) late on their Stafford student loan payments are consid-



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He serves as co-coordinator of the Markets Network of the Human Capital and Economic Opportunity Global Working Group, an international research network devoted to studying issues central to financing human capital investment. He is also an editor at the *Journal of Labor Economics* and associate editor at the *Journal of Applied Econometrics*.

Lochner's research is largely devoted to the study of human capital formation throughout the life-cycle and to understanding criminal behavior. Previous and current research explores the interaction between human capital and criminal behavior; financial returns to schooling; human capital acquisition from birth to retirement; the evolution of earnings, skills, and inequality; and issues related to financing education, with a particular emphasis on the role of student loans.

Lochner received his Ph.D. in economics from the University of Chicago in 1998. He lives in London, Ontario, with his wife and nine-year-old daughter, and enjoys playing tennis, biking, and travel adventures with his family.

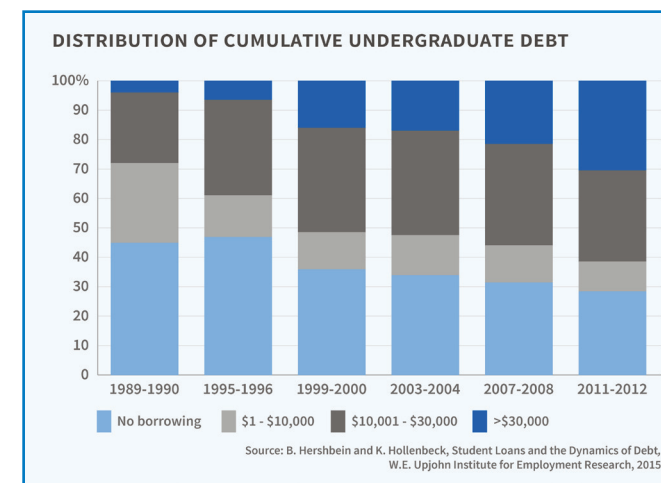
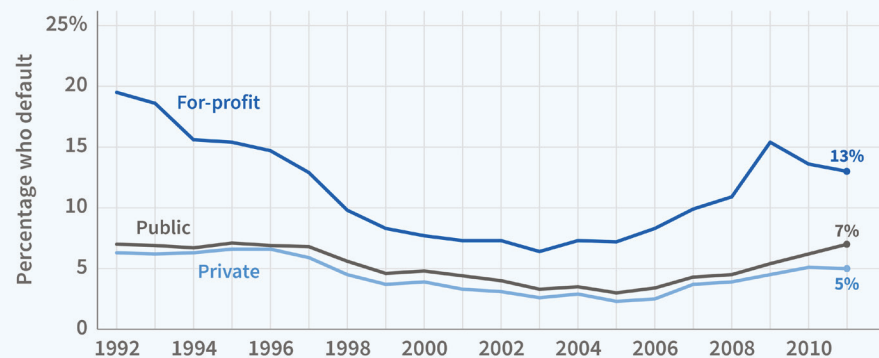


Figure 1

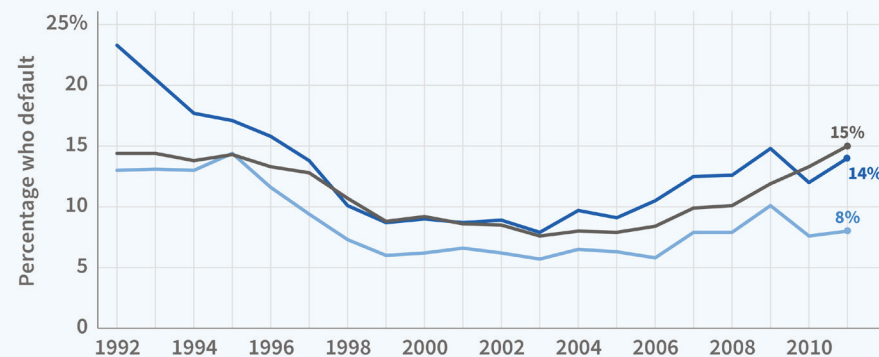
STUDENT LOAN DEFAULT RATES ON THE RISE

Two-year official cohort default rates

Four-year institutions



Two-year institutions



Source: L. Lochner and A. Monge-Naranjo, NBER Working Paper No. 20849

Figure 2

ered to be in default. Figure 2 shows that two-year cohort default rates more than doubled between 2005 and 2011, with default rates increasing most at for-profit institutions and public two-year schools.

Altogether, these trends raise two seemingly contradictory concerns: Can today's college students borrow enough? Or, are they borrowing too much? Growing evidence suggests that both concerns are justified, with important implications for the design of student loan programs.

Can College Students Borrow Enough?

Monge-Naranjo and I document that the rising costs and returns of college, coupled with declining real government student loan limits,

make it likely that credit constraints have become more salient in recent years.⁷ Indeed, one in three full-time/full-year undergraduates in 2003–04 exhausted their Stafford loan options.⁸ While many students have turned to private lenders for additional credit, the increased supply of private student credit was likely inadequate to satisfy the growing demands of many potential students. For example, private lenders typically require a co-signer for undergraduates, which leaves few alternatives for those whose parents have low income or a poor credit record.

Evidence on college-going further suggests an important increase in the extent to which credit constraints discouraged post-secondary schooling over the 1980s and 1990s. My research with Philippe Belley uses data from the National Longitudinal Surveys of Youth

to compare the relationship between family income and college attendance between cohorts completing high school in the early 1980s and the early 2000s.⁹ Consistent with previous studies,¹⁰ we estimate a weak relationship between family income and college-going for the earlier cohort. However, youth from high-income families in the later cohort are 16 percentage points more likely to attend college than their low-income counterparts, conditional on adolescent achievement and family background—roughly twice the gap observed for the earlier cohort. We further estimate that family income has become an important determinant of attendance at four-year (relative to two-year) colleges.

Uninsured labor market risk can discourage education in much the same way as credit constraints. Youth from low-income families may be unwilling to take on large debts to cover the costs of college when there is a possibility that they will not find good jobs after leaving school. By helping former students weather unexpected adverse labor market outcomes, explicit insurance mechanisms like unemployment insurance or student loan deferments and implicit insurance mechanisms such as the option to default on student loans can substantially affect the demand for credit and education.

Do Some Students Borrow Too Much?

An efficient student lending scheme should yield the same ex ante expected return from all borrowers even if ex post returns differ due to unpredictable labor market outcomes.¹¹ While the focus of considerable attention, default during the first few years following school provides only a limited picture of lifetime payments and expected returns to lenders, since many students cycle through repayment and nonpayment states such as default and deferment during the first few years after school.

Using data from the 1993–2003 Baccalaureate and Beyond Longitudinal

Study (B&B), Monge-Naranjo and I analyze several different repayment and nonpayment measures to learn about the long-term expected returns/losses on student loans taken out by different types of college graduates.¹² Our analysis simultaneously controls for individual and family background factors, college major, postsecondary institution characteristics, student debt levels, and post-school earnings.

Our results reveal considerable differences in ex ante expected losses across borrowers from different backgrounds and across those choosing different college majors. Most notably, race is correlated with student loan repayment and nonpayment. Ten years after graduation, black borrowers owe 22 percent more on their loans, are 9 percentage points more likely to be in nonpayment, and are in nonpayment on roughly 16 percent more of their undergraduate debt than white borrowers. These significant gaps cannot be explained by differences in choice of major, college type, or student debt levels.

While modest in comparison to differences between blacks and whites, there are also important differences in repayment or nonpayment across college majors. Students in engineering, health, and business programs perform well; humanities and social science majors perform relatively poorly. Differences in default by school type (public, private, for-profit) were insignificant for our sample of college graduates.

Although student debt levels and post-school income are both important determinants of repayment problems—an additional \$1,000 in debt can be roughly offset by an additional \$10,000 in income—differences in these factors explain surprisingly little of the observed variation in repayment/nonpayment rates by race and college major.

While rarely acknowledged, personal savings and family assistance can serve as important sources of insurance for some student borrowers,

influencing their post-school repayment behavior. Combining administrative data on student loan amounts and repayment with data from the Canada Student Loan Program's (CSLP) 2011–12 Client Satisfaction Surveys (CSS), Todd Stinebrickner, Utku Suleymanoglu, and I empirically examine the links between a broad array of available resources—income, savings, and family support—and student loan repayment in Canada.¹³

More than one-in-four CSLP borrowers in their first two years of repayment were experiencing some form of repayment problem at the time of the CSS. CSLP borrowers earning more than \$40,000 per year had non-payment rates of only 2 to 3 percent, while borrowers with annual incomes of less than \$20,000 were more than ten times as likely to experience a repayment problem. These sizeable gaps remain even after controlling for differences in demographic characteristics, educational attainment, views on the consequences of non-payment, and student debt.

Despite high nonpayment rates for borrowers with low post-school income, more than half of this group continued to make their standard student loan payments. Personal savings and family support are crucial to understanding this. Fewer than 5 percent of low-income borrowers with both savings and family support experienced a repayment problem, compared to 59 percent of low-income borrowers with negligible savings and little or no family help. Consistent with the hypothesis that savings and family transfers are important insurance mechanisms, we find that the likelihood of repayment problems is unrelated to post-college earnings for those with modest savings and access to family assistance. By contrast, among borrowers with negligible savings and little or no family assistance, the effects of income on repayment are extremely strong. This signals important gaps in the insurance provided by current student loan programs. Finally, we demonstrate that

measures of parental income when students first borrow are a poor proxy for these other forms of self- and family-insurance, suggesting that efforts to measure savings and potential family transfers accurately offer tangible benefits.

Designing Efficient Student Loan Programs

In our most recent work, Monge-Naranjo and I consider the efficient design of student lending programs in an environment with uncertainty and common market imperfections that limit the extent of credit and insurance that can be provided.¹⁴ Efficient student loan programs must perform a difficult balancing act. They must provide students with access to credit while in school and help insure them against adverse labor market outcomes after school; however, they must also provide incentives for students to report their income accurately, exert efficient levels of effort during and after school, and generally honor their debts. They must also ensure that creditors earn an acceptable rate of return on their loans.

Based on our analysis, we discuss important lessons for the design of government student loan programs. For example, efforts to better equate expected repayments across borrowers by linking borrowing limits to observable characteristics and educational choices can improve the efficiency of lending programs and reduce default levels. Integrating the monitoring and collection efforts with other government collections (e.g. Social Security or income taxes) can yield similar benefits by reducing income verification and repayment enforcement costs.

We underscore the importance of recognizing the response of private lenders to changes in public higher education policies. Increased public investments in higher education may be met with additional private student lending if those investments improve post-college labor market opportunities.¹⁵ More importantly, government

loan programs that offer similar terms to borrowers of different ex ante risk levels may be undercut by private creditors, leaving government programs with only the riskier borrowers.¹⁶

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[Return to text](#)

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[Return to text](#)

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[Return to text](#)

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[Return to text](#)

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[Return to text](#)

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[Return to text](#)

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[Return to text](#)

Determinants of Creativity and Innovation — Evidence from Economic History

Petra Moser

Innovation and creativity are the primary source of improvements in human welfare. Yet, due to two major empirical challenges, it is difficult to determine the factors that encourage creativity and innovation. First, modern settings often lack clean experimental variation, because policies designed to encourage innovation adapt in response to lobbying, which makes it difficult to identify causal effects. Second, innovation and creativity are exceedingly hard to measure. For example, patent counts are the standard measure of innovation, but they fail to capture important innovations that occur outside of the patent system, for example in countries without patent laws. Excluding such developments may distort economists’ views on the determinants of innovation.

My research addresses these identification and measurement challenges by exploiting a wealth of historical events that changed intellectual property laws and other policies independently of changes in innovation. In practice, this research approach combines in-depth analyses of historical records with statistical tests of large data sets. For example, I exploit a large amount of credibly exogenous variation in national patent laws in the 19th century — before interest groups had begun to lobby for changes in patent policy — to analyze data on innovations with and without patents that were exhibited at world fairs.¹ Complementary research uses the Nazi’s decision to dismiss all Jewish scientists to examine the effects of high-skilled immigrant scientists on U.S. innovation.² Another proj-

ect exploits variation in the timing of Napoleon’s military victories to examine the effects of copyrights on Italian opera.³

Does Existence of a Patent System Encourage Innovation?

My research addresses a central question in economic history: Has the creation of property rights in ideas encouraged innovation and economic growth? A strong tradition argues that secure property rights built the foundation for the industrial revolution in Britain and the United States.⁴ Innovation is, however, a cumulative process and strong property rights for early generations of inventors reduce payoffs for those in later generations.⁵ These costs are particularly severe if patents are broad and their boundaries uncertain, so that later generations are continuously at risk of infringing on existing patents. Recent patent wars over smart phones and tablet computers have moved these issues to the forefront of policy debates, but the underlying tensions are more general. My research exploits historical variation in 19th century patent laws — when countries such as Switzerland and the Netherlands had not yet adopted patent laws or had abolished them for political reasons — to investigate the effects of patent laws on innovation.

To measure effects on innovation, I construct historical data sets to capture innovations that occur within and outside of the patent system. Patent data fail to capture all such innovations, which compromises their use in empirical analyses of the effects of patent laws. To address this



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Moser combines empirical methods from economic history and applied microeconomics to examine the determinants of technological innovation and artistic creativity. She has used historical variation in patent laws to examine the how patent policies can influence the rate and direction of technical change, as well as the geography of innovation. Her research also examines the role of human capital — in the form of high-skilled immigrant scientists — on innovation. New projects investigate the effects of copyrights on creativity in literature and music, and explore the link between mental disorders and innovation.

Moser received her Ph.D. in economics from the University of California, Berkeley, and an M.A. in international relations from Yale University. As an undergraduate, she studied economics, with minors in politics and European languages, at the University of Tübingen in Germany and as a Fulbright student at the University of Missouri.

Moser grew up in a tiny medieval town in Germany, close to the Moselle Valley, and still enjoys running the local hills. This summer, she and her family have moved to Brooklyn, and are excited to explore their new neighborhood, hot dog stands and all.