The Economics of Student Loan Borrowing and Repayment

BY WENLI LI

Reports in the popular press and policymakers' concerns about student loans have greatly intensified in recent years because of rising student loan balances and defaults. Even greater cause for concern arose as student loans outstanding passed credit card debt to become the single largest nonmortgage household debt in 2012. Worries about the risk of massive default have even prompted a comparison with the subprime mortgage crisis.[1]

Existing theoretical and empirical work by economists on student loans can shed light on the economics behind this trend and, therefore, help provide answers to a number of important questions: What determines whether and how much a household borrows for student loans, and what determines whether and when a household repays these loans? What factors account for the widely noted increase in student loans outstanding and defaults? What are the implications of the trend for households' consumption and for the broader economy?

A SIMPLE THEORY OF STUDENT BORROWING AND REPAYMENT

What Makes Student Loans Different? Student loans are made solely for the purpose of financing higher education; that is, they are designed to help students pay for college tuition, books, and living expenses. They are different from other consumer loans, including credit card debt, auto loans, or mortgages; for those types of loans, households borrow to purchase goods they consume immediately, such as clothes, a car, or a house. Economists often view student loans as a means of financing investment in human capital. In other words, student loans help borrowers, through their college experience, to acquire knowledge as well as social and personal attributes that may enhance their ability to later perform in the economy and, thus, gain higher earnings.[2] It is in this sense that student loans are analogous to investment in physical capital such as an MRI machine purchased by a clinic. Unlike a pill given to a patient, the machine is not consumed immediately; rather it is used for future production (scanning patients), and with each use, it generates income from the fee a patient pays for each test.

Both Supply and Demand Factors Affect Student Borrowing. A household's decision to take out a student loan — the demand side — is obviously tied to its decision about whether to attend college. The majority of people in the U.S. go to college shortly, if not immediately, after high school. These people are often in their late teens or early 20s and lack the financial resources to pay for college, even with the help of their parents. Therefore, they need to borrow to cover the cost. Put simply, for a large fraction of the U.S. population, the decision about whether and when to take out a student loan is closely tied to the decision of whether, when, and

[1] For example, Steven Eisman titled his presentation on student loans at the Ira Sohn Conference "Subprime Goes to College."

[2] Of course, education serves other important purposes that are not captured by a narrow look at graduates' earning power, but in this article I focus solely on the economics of student loans.

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where to attend college. As a matter of fact, according to the *Chronicle of Higher Education*, about 60 percent of Americans who attend college borrow annually to cover costs.

As with any other economic decision, the decision of whether, when, and where to attend college depends on the difference between the benefits and the costs. The economic benefits of going to college are captured by the gain in future earnings, and the costs include the earnings a student forgoes while in school, in addition to tuition, books, and living expenses. Described this way, the prospective student's decision sounds very simple. But even if we imagine, as most economic analyses do, that the student has the ability to rationally calculate costs and benefits, the decision is actually fraught with uncertainty.

First, think about costs. While some of the costs — tuition, books, and living expenses — are immediately observable and are relatively easier to calculate and predict over, say, a two- or four-year period, real borrowing costs may fluctuate as interest rates and inflation rates fluctuate. In addition, students' forgone earnings may be very difficult to measure with any precision. The income gains from a college education are entirely in the future and need to be estimated and, thus, can be very imprecise. For example, a computer science major not only needs to figure out job prospects and prevailing salaries in four years' time, but he must also project job prospects and wages over the rest of his working life. To complicate the matter further, he also needs to factor in the possibility that he may end up disliking the field and taking up a different career with lower potential earnings.

The lender's decision — the supply side — would be relatively simple if students borrowed in a perfect capital market. The concept of a perfect capital market is an ideal benchmark used by economists, in which many real-world difficulties are assumed away. The concept is useful because it forces us to think carefully about the factors that may limit a student's capacity to borrow. In a perfect capital market, lenders can sign a contract that makes the payments conditional on borrowers' future earnings and can at no cost to themselves compel borrowers to work and earn enough to repay the loan. The factors that affect a lender's decision about whether to extend a student loan will thus be the opportunity cost of the funding (the interest the lender could have earned on other loans) and the riskiness of the gains (mainly due to the uncertainty about the borrower's income).

Two factors complicate our ideal world. First, human beings, not machines, are the ones producing earnings. In a civilized society, humans cannot serve as collateral because lenders cannot enslave borrowers, nor can they buy and sell them.[3] Second, although lenders can garnish borrowers' earnings when borrowers do not make payments, borrowers' earnings also depend on their effort. This is very different from machines, whose value depends mainly on their resale value, which is largely outside the control of the owners who use it as collateral. For example, a computer software engineer living in New Jersey can go to work for an investment house in New York City and make $60,000 a year with a commuting cost of $8,000 a year, or she can work for $50,000 for a local firm that has better work schedules and does not require any commute. Suppose the engineer has to give half of her income to the lender to service student loans. In the first case, it means that the engineer pays $30,000 to the lender and has $22,000 for herself after taking out commuting costs. In the second case, it means that the engineer pays $25,000 to the lender and the same amount to herself. The engineer will choose to work locally, since she makes the same amount of money in either case, but the lender will lose $5,000 if the engineer chooses to work in New Jersey rather than in New York City.

Over the years, the federal government has become the dominant supplier of student loans, first through its loan guarantee programs and more recently through direct loans.[4] *The Structure of the Student Loan Market* provides a brief discussion of the role of government in the student loan market. Therefore, a full account of the supply side of the market would require us to discuss the underlying political forces, since the total loan amount and interest rates are set by Congress. That is beyond the scope of this article.

The Repayment Decision. The student loan payment decision, like all other consumer loan payment decisions, depends on the borrower's ability to pay and the costs and benefits associated with default. The ability to pay depends on the borrower's income and assets. If a borrower loses his job or suffers a big loss in the stock market or a decline in the value of his primary residence, he may not be able to service his debt. The benefits of not paying one's student loans are the resources that are freed and that can be used for consumption purposes or to service other debt. Felicia Ionescu and Marius Ionescu show that households

[3] Prior to the mid-19th century, debtors' prisons were a common way to deal with unpaid debt. The father of the British writer Charles Dickens was sent to Marshalsea debtors' prison. As a result, Dickens used Marshalsea as the model for debtors' prison in his novels.

[4] Prominent arguments for government involvement are that social returns to education are greater than private returns. Furthermore, employers tend to underinvest in generalized training, since they do not fully capture the returns in the event the trained employees leave the firm.

The Structure of the Student Loan Market

There are three types of student loans: federally guaranteed loans made by banks and other lenders; federal loans made directly by the government; and private loans, which are essentially the same as other consumer loans from banks and companies. In the case of guaranteed loans, the government pays a subsidy to lenders that make the loans and also guarantees the amount loaned.*

Effective July 2010, in response to the changing market and the debate about the federal government's role in supporting student financing, Congress expanded federal aid to college students while ending federal subsidies to private lenders through loan guarantees.

The interest rate paid by students on both guaranteed loans and direct loans is fixed and set by Congress. The government pays the interest that accrues while the borrower is in school. Congress in 2007 temporarily reduced interest rates for low- and middle-income undergraduate borrowers to 3.4 percent from 6.8 percent until July 1, 2012. Congress then extended the freeze in interest rates until July 2013, at which time it pegged rates to the 10-year Treasury yield.

Private loans usually have worse terms than either type of federal loan, and interest rates on private loans can change over time. Because most students have limited credit histories, private lenders often require cosigners. The borrower is responsible for paying the interest that accrues.

* The top 10 holders of government guaranteed loans (FFELP loans) in the third quarter of 2010 were SLM Corporation, Nelnet, Wells Fargo, Brazos Group, JPMorgan Chase Bank, the Pennsylvania Higher Education Assistance Agency, College Loan Corporation, CIT, PNC, and Goal Financial. SLM Corporation had the largest market share (close to 60 percent), and each of the other institutions had under 10 percent of the market share.

have incentives to default on student loans first, before defaulting on credit card debt. By keeping their credit card account current, they can continue to use it as a transaction account or for borrowing purposes. Economists call this phenomenon "preserving liquidity."

The benefits from defaulting on student loans are, by contrast, limited. Unlike credit card debt, car loans, and other consumer loans, student loans cannot be discharged or reduced by a judge (known as "cramming down") under personal bankruptcy. Instead, borrowers who are late with their federal student loan payments have to enter into a repayment plan that can last 10 to 15 years, and during that time, a fraction of their earnings will be garnished, similar to what occurs in a Chapter 13 repayment plan under personal bankruptcy. The government can also garnish the borrower's tax returns and benefits. Other costs of defaulting on one's student loans include limited future access to the credit market, since the borrower's decision to default will affect his credit score from the credit bureau. Evidence from bankruptcy filers may give some sense of the order of magnitude of these costs. For instance, using data from the Federal Reserve's triennial Survey of Consumer Finances, Song Han and Geng Li find that bankruptcy filers are more than 40 percent less likely to have credit cards than comparable households that did not file for bankruptcy. If they do have cards, their lines of credit have far lower limits (by $12,000) compared with those who did not file for bankruptcy. Moreover, bankruptcy filers pay higher interest rates (1.2 percentage points higher) than people who did not file.[5]

With this theory in mind, we can now turn to the empirical evidence and discuss how and why student loans outstanding and defaults have increased sharply and the implications for the broader economy.

MORE TREND THAN CYCLE

Rising Student Loan Balances. The analysis here draws on the Federal Reserve Bank of New York (FRBNY)/Equifax Consumer Credit Panel dataset, a nationally representative random sample of anonymized credit reports from Equifax, one of three major consumer credit reporting agencies in the U.S., containing borrowers' ages, amounts borrowed, and repayment histories for bank and department store credit cards, car loans, mortgages, home equity loans, etc.[6]

Figure 1 shows the outstanding balances for various consumer loans, credit card debt, auto loans, home equity loans, and student loans. Note that I omit first mortgages because, unlike the other loans discussed here, first mortgages are of much larger value and collateralized.[7] Two observations are worth noting. Student loans have been trending up since the beginning of our sample period (the first quarter of 2003), and they did not come down until very recently. By comparison, credit card debt and auto loans did not

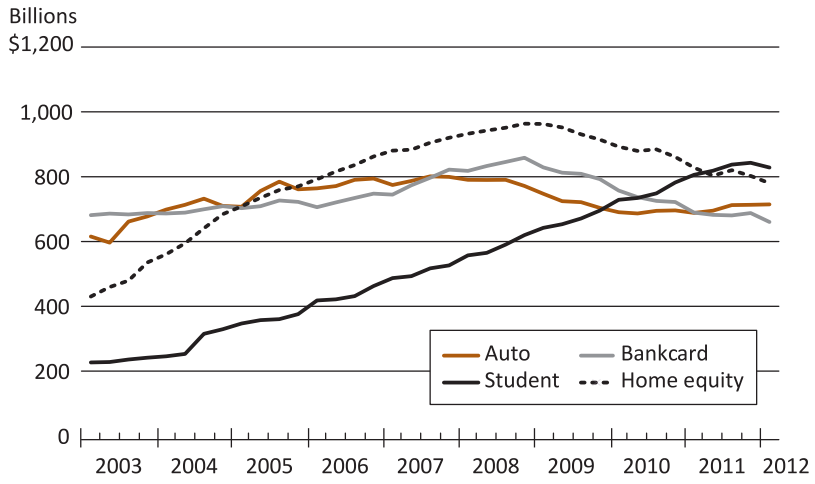
[5] It is likely that those who default on student loans will suffer a larger effect related to access to credit than bankruptcy filers. Bankruptcy wipes out some or all of a borrower's existing debts, a situation that is attractive to new lenders, who will not have to compete with old lenders to be repaid. But default does not wipe out student loans.

[6] The calculation is based on a 1 percent random sample of the FRBNY Consumer Credit Panel, while the panel accounts for about 5 percent of all households that have files with the credit bureau.

[7] Although car loans are also collateralized, cars depreciate much faster than houses. For most car loans, the resale value of the car is not the primary determinant of the loan terms.

FIGURE 1

Trend of Student Loan Balances vs. Other Loan Balances



Source: Federal Reserve Bank of New York/Equifax Consumer Credit Panel

exhibit a comparable long-run trend, and their acceleration and deceleration coincided with the crisis. Home equity loans also experienced a long boom prior to the crisis. But balances came down immediately after the crisis, an immediate effect of the significant decline in house prices and the decline in households' equity in their homes.

The rise in student loan balances comes from the rise in both the number of people who borrowed and the amount each person borrowed. In contrast to other loans, the fraction of people with student loans has been increasing steadily over time and is now about 15 percent of the total population (Figure 2). The average student loan balance has also been moving up over the years for all age groups (Figure 3). In the first quarter of 2012, the average student loan balance for a 40-year-old was $30,000!

The Effects of Supply and Demand Factors. Although we cannot completely separate the effects of demand-side factors from supply-side factors, there are reasons to believe that both have contributed to the phenomenal rise in total student loans outstanding. On the demand side, estimates of the difference in lifetime earnings for those with college degrees versus only high school diplomas range from $650,000 to $1 million.[8] This is because a shift in the production technology over the past decade or two has favored skilled labor over unskilled labor by increasing skilled labor's relative productivity and hence its relative demand. For instance, the adoption of computers in the workplace has posed challenges for many workers. However, it is less costly for more educated, able, or experienced workers to learn to use computers and thus adapt to the new technology. The wage differential for educated workers has certainly not gone unnoticed by high school students deciding whether to enter the labor force. Indeed, more students are now accessing higher education than before. According to the Census Bureau, college enrollment as a fraction of the population between ages 16 and 25 rose from 34 percent in 1990 to 51 percent in 2010.

The rise in student loan borrowing per person reflects to a large extent the rising cost of higher education that has been going on for over a decade. According to the College Board, over the period 1997-98 to 2007-08, published tuition and fees for full-time in-state students at public four-year colleges and universities rose 54 percent in inflation-adjusted dollars — an average of 4.4 percent per year;[9] those for full-time students at two-year colleges and universities rose 17 percent in real terms — 1.5 percent annually; published tuition and fees for full-time students at public two-year colleges and universities rose 33 percent in real terms, 2.9 percent annually. Reduced funding from government is partially responsible for the rise in tuition and fees. According to the annual Grapevine Study, conducted by Illinois State University's Center for the Study of Education Policy with the cooperation of the State Higher Education Executive Officers, state appropriations for colleges and students sank by 7.6 percent in 2011-12, the largest such decline in at least half a century.

Finally, declines in family resources following the recent financial crisis have also driven up demand for student loans in the past five years. According to the Survey of Consumer Finances, between 1998 and 2007,

[8] See the paper by Anthony P. Carnevale, Stephen J. Rose, and Ban Cheah, Keith Sill's *Business Review* article on the skill premium, and http://www.pewsocialtrends.org/2011/05/16/lifetime-earnings-of-college-graduates/.

[9] In economics, the nominal value of something is its money value in different years. By contrast, real values adjust for differences in price levels of those years. As a result of the adjustment, any differences in real values are then attributed to differences in the amount of goods that money income could buy in each year.

while real median household income fell 3.9 percent, real median household net worth went up by 10 percent. Between 2007 and 2010, however, real median household income fell 11 percent, and median household net worth fell 39 percent over that same period.

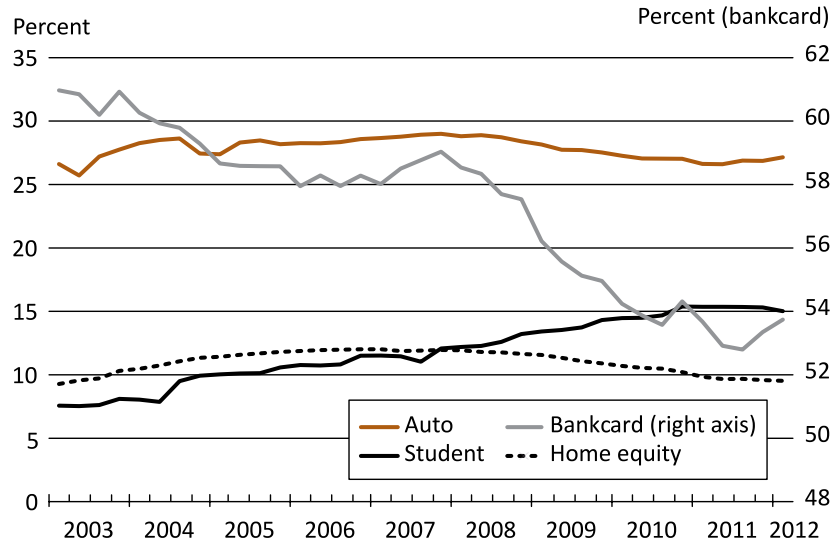
On the supply side, the U.S. government has played an increasingly important role in extending student loans that are cheaper than those the private market would offer, thus crowding out banks from the lending market (Figure 4). Furthermore, starting in July 2010, the government replaced loan guarantees with direct loans and effectively ended all subsidies to private lenders. According to the Department of Education, Federal Student Aid, an office of the department, managed or oversaw $713 billion in student loans in 2011, which accounts for close to 90 percent of the market. Most college students qualify for federal student loans. Students can borrow the same amount of money, at the same loan rate, regardless of their own income or their parents', regardless of their expected future income, and regardless of their credit history. Only students who have defaulted on federal student loans or have been convicted of drug offenses are excluded.

Trends in Past Due and Delinquent Loans. The trend in loans past due closely mirrors the rise in loans outstanding (Figure 5).[10] The total amount of past dues has been trending up since the beginning of our sample period, although the increase in past dues accelerated after 2007. This is again in contrast to the total amount of past dues of other consumer loans, which exhibit more of a cyclical pattern; that is, the amount of past dues for all other consumer loans was more or less flat until right around the crisis. Moreover, after 2009, the past due amount came down for all consumer debt except student loans.

The movement of delinquency rates tells a similar story (Figure 6). In terms of population, the delinquency rate on student loans has exceeded the delinquency rates on all three other types of consumer loans. My

FIGURE 2

Percent of Indebted Households by Loan Type

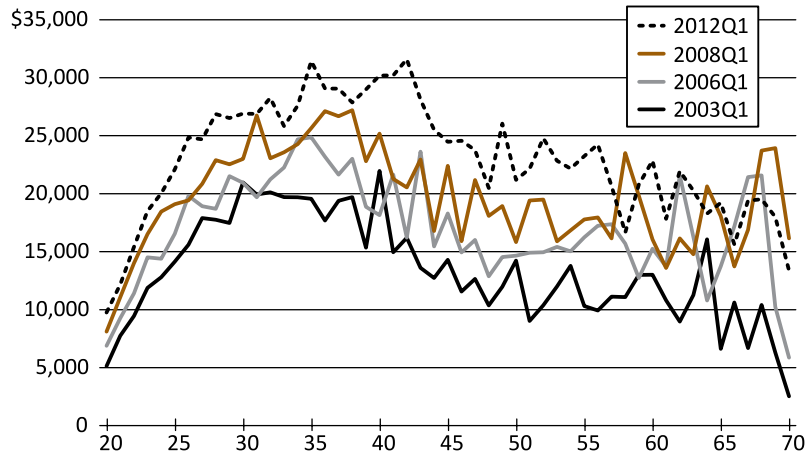


Note: Households includes those with credit histories on file.

Source: Federal Reserve Bank of New York/Equifax Consumer Credit Panel

FIGURE 3

Average Student Loan Balance by Age

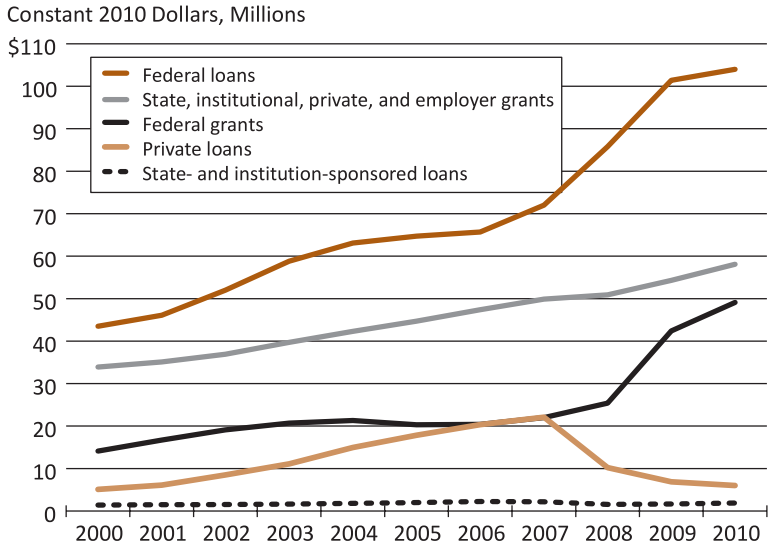


Source: Federal Reserve Bank of New York/Equifax Consumer Credit Panel

[10] For private student loans, past dues are those with one missed payment. For government loans, past dues may include those with multiple missed payments because of their 270-day grace period.

FIGURE 4

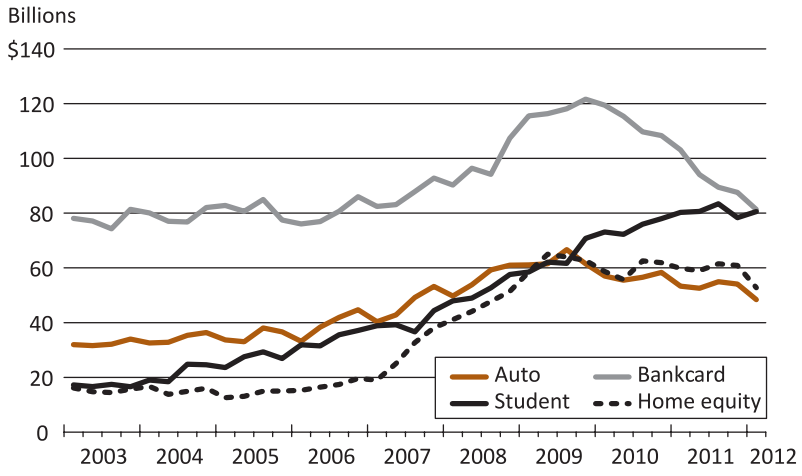
Federal and Nonfederal Student Loans and Grants



Source: The College Board

FIGURE 5

Past Due Balances on Consumer Loans



Note: Includes loans 30 days or more delinquent or charged off.

Source: Federal Reserve Bank of New York/Equifax Consumer Credit Panel

estimate of a 14 percent to 15 percent student loan delinquency rate that we observed in 2012 is probably a lower bound for the actual delinquency rates for student loans. Other estimates by economists at the New York Fed put the delinquency rate as high as 26 percent.[11] Data limitations require the analyst to make assumptions, which I discuss further in the adjacent explanation, *Calculating Student Loan Delinquency Rates*.

Given the long-run factors that have increased the demand for higher education and the factors driving up college costs, in tandem with the slower rise in household incomes, it is not surprising that we saw a rise in student loan defaults long before the start of the crisis. The ensuing economic recession, in particular the weak labor market, nevertheless further drove up the defaults in student loans, as it did with most other consumer loans. For younger adults, particularly those in their 20s, who often hold student loans, the unemployment rates have been especially high (about 16 percent). Finally, part of the rise in student loan delinquency rates may also stem from portfolio adjustments as borrowers stop their student loan payments in order to keep their credit card payments current to preserve liquidity, as I discussed earlier.

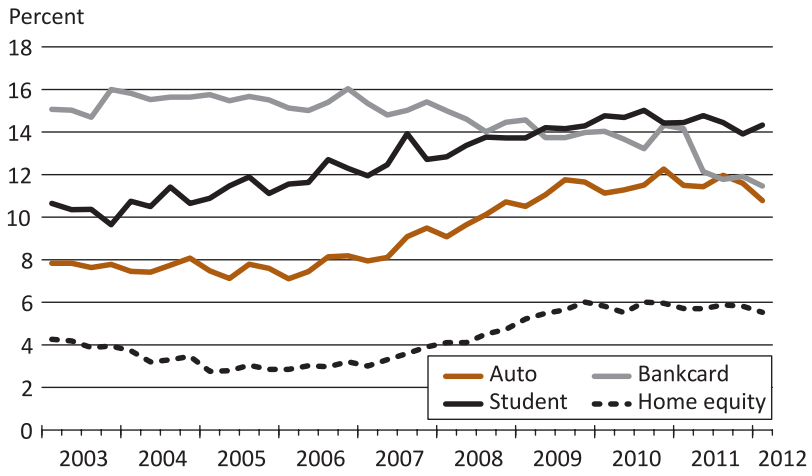
BROAD ECONOMIC IMPACT

Aggregate statistics and averages often mask substantial differences at the individual level. To gain further insight, it is often necessary to examine the differences among individuals in a more disaggregated way. These individual differences can lead to very different policy prescriptions. For example, suppose we find that very young people owe all of the loans and

[11] See the article by Meta Brown, Andrew Haughwout, Donghoon Lee, Maricar Mabutas, and Wilbert van der Klaauw.

FIGURE 6

Consumer Loan Delinquency Rates



Note: Includes charged-off loans.

Source: Federal Reserve Bank of New York/Equifax Consumer Credit Panel

Calculating Student Loan Delinquency Rates

The calculation of student loan delinquency rates is somewhat involved due to the unique market structure of student loans. The key difficulty lies in the fact that the credit bureau data do not have information on whether a household needs to make student loan payments in the current quarter. The reason is that with federal loans, there is typically a six- or nine-month grace period, depending on the type of loan, after a borrower leaves school during which the borrower does not have to make payments on his loans. We do not want to count these borrowers in the denominator when calculating the default rate, which is defined as the ratio of the number of borrowers who are behind on their student loan payments over the number of borrowers who need to make student loan payments.

One way to get around this issue is to follow the New York Fed's approach* and exclude individuals who owed as much as or more than they did in the previous quarter while maintaining a zero past-due balance. The rationale behind this approach is that presumably those whose balance did not change across two quarters and who did not have student loan past dues do not need to make payments on their student loans yet. If I use this strategy, then the delinquency rates are much higher. For instance, 26 percent of borrowers would have past-due balances in the first quarter of 2012 by this calculation as opposed to 14 percent. However, this method is not perfect. For example, it might miss borrowers who negotiated smaller payments with their lenders through an income-based repayment plan. If their new payments are too low to cover accruing interest, their balances would be higher rather than lower. We wouldn't count these borrowers as being in delinquency using the proposed method even though they clearly need to be there.

* See the article by Brown and coauthors.

that they are the ones defaulting. In this case, we might argue that there is less cause for concern because young people have a long horizon over which to work out their situation. And the policy prescription may be to design programs to help these people find jobs or find better jobs. On the other hand, suppose a large fraction of loans are held by 50-year-olds and that these older households are defaulting in significant numbers. In this case, we might be much more concerned, since these people have much shorter horizons over which to recover from their financial difficulty. The corresponding policy prescription may require some degree of loan forgiveness.

To address questions like these, I reexamine student loan balances, past dues, and default rates by borrowers' age using the FRBNY/Equifax Consumer Credit Panel. Two main observations emerge from the analysis.

First, over time, average student loan balances have increased for all age groups, but more for those between ages 30 and 55. Furthermore, it appears to take longer to pay off loans than in the past. For example, in the first quarter of 2012 the decline in average balances really started after age 32, as opposed to the late 20s in the first quarter of 2003 (Figure 7). Balances didn't stabilize until age 45 in the first quarter of 2012, as opposed to the late 30s in the first quarter of 2003 (Figure 7).[12] Second, the trend toward older households with significant amounts of student debt is confirmed if we look at the fraction of people who have student loans by age. Those between ages 25 and 45 had the larg-

[12] A small part of the balance is accounted for by cosigned loans, and, as expected, cosigned student loans have two peaks: at age 25 (less than 10 percent of the total balance at that age) and at age 55 (less than 20 percent of the total balance). At age 25, borrowers have their parents as cosigners. At age 55, they most likely act as cosigners for their children.

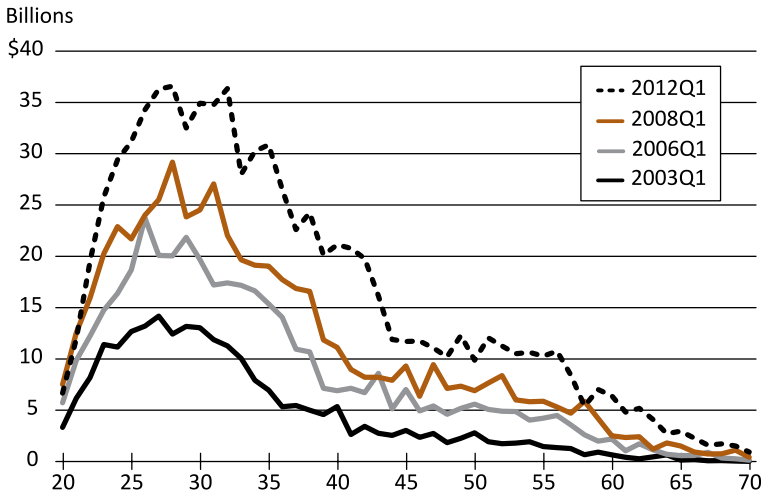
est increase. These two observations are striking, since they indicate that student loans are not just an issue for young borrowers as conventional wisdom perceives, but that the middle-aged (those 40 and above) actually shoulder a lot of the burden.[13]

An examination of the total amount of past dues by age confirms that it is indeed the middle-aged who are struggling with their student loan repayments (Figure 8).[14] To some extent, this trend is not surprising, since the growth in student loans has outstripped the growth in income for some time, as discussed earlier. The housing crisis obviously exacerbated the situation by further reducing households' net worth.[15]

Looking just at average borrowings obscures the fact that there are also substantial differences in the amount they borrowed. A high average balance might mean that the typical individual's balance is high. At the same time, it could mean that most individuals have very low balances, while a relatively small number of individuals have very burdensome debt levels. One way to think about this is to consider the difference between the mean and the median. The mean is simply the average: the total amount divided by the number of people. The median is the amount at which half of the population has more and half has less. A classic example to illustrate the difference between mean and median is that after Bill Gates walks into a bar that already has four unemployed people whose income is zero, everyone in the bar is, on average, a millionaire, since the mean income is over $1 million but the median is still zero (since half of them are still unemployed).[16]

FIGURE 7

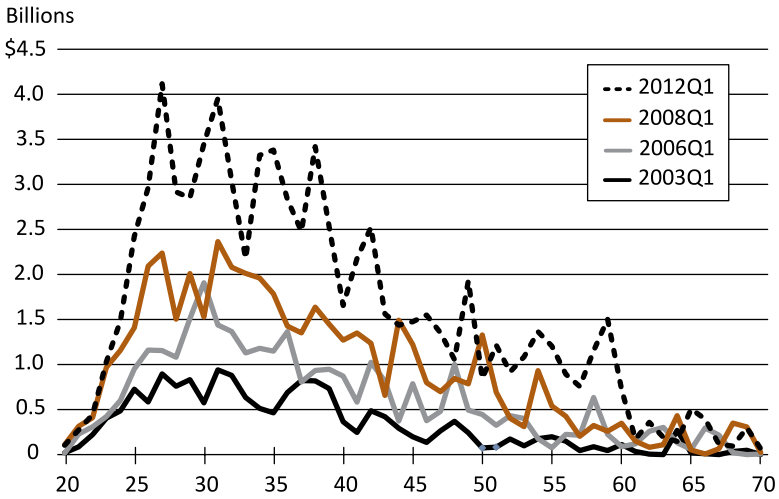
Student Loan Balances by Age of Borrowers



Source: Federal Reserve Bank of New York/Equifax Consumer Credit Panel

FIGURE 8

Past Due Student Loan Balances by Age of Borrowers



Source: Federal Reserve Bank of New York/Equifax Consumer Credit Panel

[13] This may be due to a trend in the proportion of parents cosigning on loans while they are still paying down their own. Identifying this would require analyzing the individual trade lines, which appears to be out of scope for this paper.

[14] Brown and coauthors have also documented similar findings in their 2012 article.

[15] The harder question that we cannot pinpoint with the data is why so many people are still borrowing so much to finance their education. It could be that individuals are slowly learning about the change (lower) in expected income. Or it could simply be that receiving an education is a decision that involves a lot more than just having a higher income in the future.

[16] See a different version of the story at http://introductorystats.wordpress.com/2011/09/04/when-bill-gates-walks-into-a-bar/.

Although not as extreme, in our data, in the first quarter of 2012, the median balance at age 35 is $14,000, while the mean is close to $25,000. About 10 percent of borrowers have balances over $56,000, and 5 percent of the households have student loan balances over $81,000, suggesting that a relatively small number of households are seriously burdened by their debt level.

The Broad Economic Implications. One of the major concerns about ballooning student loans and student loan defaults is that these loans will have a negative impact on borrowers' consumption, since the borrowers need to devote a large fraction of their income to making loan payments. Furthermore, those who default on student loans will have more restricted access to credit because their credit scores will be lower. For credit-constrained families, such as those who need to borrow to buy a car, repair a roof, etc., this drop in credit scores may make all of this additional consumption infeasible. Indeed, the credit card utilization rate (credit card balance divided by credit limit) for those with student loan balances over $56,000 is 55 percent, compared with 39 percent for the general population in the first quarter of 2012. Economists have found that high credit card utilization rates are indicators of liquidity or income shocks.[17]

Andrew Glover, Jonathan Heathcote, Dirk Krueger, and Jose-Victor Rios-Rull show that older people will fare worse than the young after the recent financial crisis, since they do not have as long a horizon as the young to recover from the losses they have suffered: loss in income, loss in stock market investment and, more important, loss in their housing asset. My finding that middle-aged and older households are much more indebted by student loans than they used to be (the mean age of those with student loan balances over $56,000 is 38 years old, and the median age is 36 years old) and to a surprising extent before the crisis suggests that if we take student loan borrowing into consideration, middle-aged and older people may be even worse off.

Aside from these immediate economic concerns, researchers have found some longer-term social concerns. For example, researchers have found evidence that high debt burdens make students less likely to choose lower-paying careers such as teaching. Jesse Rothstein and Cecilia Rouse study a "natural experiment" generated by a change in financial aid policy by a highly selective university. The university introduced a "no loans" policy, in which it replaced the loan component of financial aid awards with grants. Interestingly, they find that debt causes graduates to choose jobs with substantially higher salaries, such as those in finance and consulting, and reduces the probability that students choose low-paid "public interest" jobs such as grade-school teacher or social worker.[18]

Additionally, Dora Gicheva suggests that each $10,000 in additional student debt decreases the borrower's long-term probability of marriage by 7 percentage points.[19] A 2010 poll found that 85 percent of college graduates were planning to move back home after graduation (Dickler 2010). The high unemployment rates and low income of new graduates are the leading causes behind these survey results. But having large student loans can certainly make things worse. Although currently there are more open questions than settled answers regarding the extent to which student loans hurt the formation of households, there is no doubt that reduced household formation has obviously hurt the recovery of the nation's housing market. According to the Census Bureau, the homeownership rate of those under age 35 declined from its 2006 peak of 42.6 percent to 36.8 percent in the first quarter of 2012. By comparison, the overall homeownership rate came down only 3.4 percentage points, from 68.8 percent to 65.4 percent. Of course, the reduced homeownership rates for the young also reflect their increased credit constraints that are not related to household formation. Further research is called for.

CONCLUSION

The substantial increase in student loans in recent years is a continuation of a trend that started a decade ago due to technological innovation. But the trend was exacerbated by the Great Recession. As households experienced significant contractions in income and wealth, housing wealth in particular, and as jobs became scarce, more students had to borrow increasingly large amounts to fund their educations. Moreover, student loans became delinquent as borrowers' payment ability declined. This article suggests that any policy to address student loans needs to target both secular and cyclical factors.

[17] See the article by Ronel Elul, Nicholas Souleles, Souphala Chomsisengphet, Dennis Glennon, and Bob Hunt.

[18] Two features of the policy change make this a natural experiment. First, the change was unexpected. This means that any change in students' employment choices was not affected by some expected change in financing policies. In addition, the change in a student's debt load was caused by a decision by the university, rather than a decision by the student. This means that it was the change in debt load that induced the change in students' employment choices, rather than the other way around. As with most natural experiments, though, the precise answers come at some cost to generality. Among other questions, it is natural to ask whether the behavior of students at a highly selective university is indicative of the behavior of students more generally.

[19] To deal with the issue that those with high student loan balances may be those who have less intention of forming a household in the first place, Gicheva uses exogenous changes in limits and eligibility of federal loans as instruments.

REFERENCES

Brown, Meta, Andrew Haughwout, Donghoon Lee, Maricar Mabutas, and Wilbert van der Klaauw. "Grading Student Loans," Federal Reserve Bank of New York, *Liberty Street Economics* (March 2012).

Carnevale, Anthony P., Stephen J. Rose, and Ban Cheah. "The College Payoff: Education, Occupations, and Lifetime Earnings," Georgetown University Center on Education and the Workforce, Washington, D.C. (2011).

Dickler, Jessica. "Boomerang Kids: 85% of College Grads Move Home," CNNMoney (November 15, 2010); http://money.cnn.com/2010/10/14/pf/boomerang_kids_move_home/index.htm.

Eisman, Steven. "Subprime Goes to College," (2010); http://www.scribd.com/doc/32066986/Steve-Eisman-Ira-Sohn-Conference-May-2010.

Elul, Ronel, Nicholas Souleles, Souphala Chomsisengphet, Dennis Glennon, and Robert M. Hunt. "What Triggers Mortgage Default?" *American Economic Review* 100:2 (2010), pp. 490-494.

Gicheva, Dora. "In Debt and Alone? Examining the Causal Link Between Student Loans and Marriage" (2013), manuscript, University of North Carolina at Greensboro.

Glover, Andrew, Jonathan Heathcote, Dirk Krueger, and Jose-Victor Rios-Rull. "Intergenerational Redistribution in the Great Recession," University of Pennsylvania Working Paper (2012).

Han Song, and Geng Li. "Household Borrowing After Personal Bankruptcy," *Journal of Money, Credit and Banking*, 43 (2011), pp. 491-517.

Illinois State University. "Fiscal Year 2011-2012," *Grapevine*, ISU Center for the Study of Education Policy; http://grapevine.illinoisstate.edu/.

Ionescu, Felicia, and Marius Ionescu. "The Interplay between Student Loans and Credit Cards and Amplification of Consumer Default," Colgate University Working Paper (2011).

Rothstein, Jesse, and Cecilia Rouse. "Constrained after College: Student Loans and Early Career Occupational Choices," *Journal of Public Economics*, 95:1-2 (2011), pp. 149-63.

Sill, Keith. "Widening the Wage Gap: The Skill Premium and Technology," Federal Reserve Bank of Philadelphia *Business Review* (Fourth Quarter 2002), pp. 25-32.