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Borrowers with Large Balances: Rising Student Debt and Falling Repayment Rates

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STATEMENT OF INDEPENDENCE

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ABSTRACT

We examine the distribution of student loan balances and repayment rates in the United States using administrative student loan data. We show that increases in credit limits and expansions in credit availability resulted in rising borrowing amounts, and that the share of borrowers holding very large balances has surged. For instance, the share of borrowers leaving school with more than \$50,000 of federal student debt increased from 2 percent in 1992 to 17 percent in 2014. Consequently, a small share of borrowers now owes the majority of loan dollars in the United States. Although these large-balance borrowers have historically strong labor market outcomes and low rates of default, repayment rates have slowed significantly between 1990 and 2014 reflecting, in part, changes in the characteristics of students, the schools they attended, and the rising amounts borrowed. A decomposition analysis indicates that changes in the types of institutions attended, student demographics, default rates, and increased participation of alternative repayment plans and forbearance largely explain the decrease in student loan repayment.

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I. Introduction

Rising default rates among student loan borrowers have prompted researchers, policymakers, and the general public to ask why borrowers default, whether students have taken on too much debt, and what the implications are for student aid policy (Ionescu 2009; Lochner and Monge-Naranjo 2011; Looney and Yannelis 2015.) In an earlier paper, we showed that increases in the number of new borrowers at for-profit and public two-year community college students lead to a surge in student loan defaults (Looney and Yannelis 2015). For these borrowers, it was not the size of their debts, which were small, but their ability to pay: many had dropped out, or attended programs that failed to lead to a decent job, or were economically disadvantaged to start with. In 2015, half of defaulted borrowers owed less than \$10,000. In many cases, borrowers defaulted at the first instance after leaving school, suggesting they had neither the means to pay nor the wherewithal to enroll themselves in programs to avoid default. The high default rates among low-balance borrowers and low-default rates elsewhere gives the impression that the major problems in the student loan program are isolated among borrowers with relatively small balances.

In reality, the expansion in student lending—and its associated risks to students and taxpayers—was more pervasive across all types of postsecondary education and among graduate students, parents, as well as undergraduates. And problems are apparent if less visible among borrowers accumulating large student debts. In this paper, we draw on administrative data to examine the changing experience of borrowers who accumulate balances above \$50,000. Borrowers rarely accumulate such debts. Only 2 percent of borrowers owed that much in 1990 and only 5 percent in 2000. But higher loan limits, the elimination of limits on PLUS loans, expansions of loan eligibility to online programs (including online graduate programs), and rising costs have allowed many borrowers to accumulate not-before-seen levels of debt. By 2014, the share of student borrowers with balances over \$50,000 had reached 17 percent. Today, they account for the majority of outstanding student debt owed to the government.

Because such borrowers were mostly graduate students, often at selective institutions, or parents who passed a credit check, they are perceived to be low risk. Indeed, default rates are not even published for certain types of such loans. When they are, however, default rates are not by themselves a reliable measure of loan performance because many borrowers use income driven repayment plans, long deferrals, or forbearances to postpone or avoid default even in the face of unmanageable debts. For example, while default rates began to fall in the mid-2010s, rather than signaling improvements in loan payments, repayment rates (the share of the original balance students had repaid after 3 or 5 years) fell. Today, for the first time, more large-balance borrowers are falling behind on their payments than are making progress reducing their debts.

The increase in borrowing among graduate, parent, and high-balance undergraduate borrowers has many troubling similarities to the increase in borrowing at for-profit and public two-year community colleges that resulted in high rates of default. A growing share of large-balance borrowers took-out loans to attend for-profit schools, which have poor repayment outcomes and worse labor market outcomes compared to other institutions

(Looney and Yannelis 2015). For borrowers starting to repay loans in 2000, less than 5 percent of borrowers with repayment balances above \$50,000 borrowed to attend for-profit institutions. In 2014 that share surpassed 20 percent. Historically, most large borrowers were graduate and professional borrowers. Today, they are increasingly likely to be parents and independent undergraduate borrowers, whose economic outlook tends to be riskier, and less likely to support substantial borrowing over time.

Beyond the types of borrowers and institutions involved, loan sizes and loan performance have changed in worrying ways. The sheer dollar amounts owed by these students is well above historical norms, and given the long amortization schedules typical of large-balance borrowers, the total costs of these loans, including principal and interest, are consuming a rising share of some borrowers' lifetime incomes. Many large-balance borrowers who are not in default have low repayment rates, and repayment rates have slowed over time. The median borrower who originally owed less than \$50,000 in the early 2000s paid off his or her debt within ten years of entering repayment, while the median borrower who had borrowed more than \$50,000 in debt while in school still owed about 75 percent of the original balance. A potentially worrying trend starting in the early 2010s is that large-balance borrowers, for the first time, owe more than their initial repayment amount in the first years of repayment—on average they are falling behind rather than making progress. In addition to the recession, this trend coincides with the introduction of new repayment options, such as income driven repayment, and take-up of forbearances, policies that allow borrowers to reduce or suspend their payments without defaulting.

Looking beyond the aggregate trends, the variation in repayment rates across individual institutions for graduate and parent borrowers is just as broad as the variation in undergraduate outcomes, suggesting that even though average outcomes for borrowers may be positive, many borrowers at higher-risk institutions are experiencing much worse outcomes. Thus, a relatively small share of borrowers may have large impacts on aggregate repayment and taxpayer burden.

These trends have outsized implications for the budgetary effects of the loan program and the well-being of students. Despite the fact that large-balance borrowers have low default rates and represent only a small fraction of defaulted borrowers, they now account for almost half of all dollars in default. Those defaults impose costs both on the students themselves as well as on taxpayers from uncollected loans and costs of collection.

To examine the factors contributing to the increase in loan non-repayment between 2001 and 2011, we perform a Blinder (1973) - Oaxaca (1973) decomposition. The results indicate that approximately 90 percent of the change in repayment rates between 2001 and 2011 is associated with changes in observables: shifts in the types of institutions borrowers attend, increases in default rates, and changes in borrower demographics are each associated with approximately 10-20 percent of the decrease in student loan repayment. About 40-50 percent of the decrease in repayment rates is associated with changes in repayment options, such as alternative repayment plans and loan forbearance, with forbearance playing the largest role.

The results of this paper have implications for policies designed to improve student outcomes and reduce risks to students and taxpayers associated with unpayable loans. Because a small subset of borrowers accounts for the majority of dollars in default, changes targeted to a small number of individuals and institutions could have large implications for taxpayers and the students involved. Screening large-balance borrowers, restoring limits

on credit, eliminating certain types of loans, and applying institutional accountability rules to graduate or parent loans would reduce adverse outcomes improve economic welfare. (Lochner and Monge-Naranjo 2011; Lochner and Monge-Naranjo 2015; Cox 2016). This paper also contributes to a growing literature that documents facts about the student loan market, which is now the largest source of non-mortgage household debt in the United States (Avery and Turner 2012; Brown et al. 2014; Looney and Yannelis 2015). The paper is closely related to Lochner and Monge-Naranjo (2014), who study alternative repayment measures for student loan default. However, our paper emphasizes the distribution of loan balances and the impact of large-balance borrowers on repayment.

Section II discusses the administrative data used in the paper and provides a brief overview of student loan programs in the United States. Section III presents new facts about the rise of large-balance borrowers and how increases student loan borrowing limits allowed borrowers to accumulate those balances. Section IV discusses changes in the characteristics of large-balance borrowers and the institutions they attended. Section V presents new facts about the labor market and repayment outcomes of large-balance borrowers. Section VI presents a decomposition of repayment balances. Section VII concludes.

II. Data and Context

The main analysis data consists of a random sample of federal administrative data from the National Student Loan Data System (NSLDS). The NSLDS is the main database used to administer federal direct and federally guaranteed student loans, and contains billions of loan observations on more than 70 million student borrowers from 1970 to present. The vast majority of student loans are administered under federal programs, so the NSLDS gives an accurate overview of the U.S. student loan market.¹ The analysis sample is drawn from a random 4 percent of administrative student loan data. To ensure randomization and that the same borrowers are followed over time, the sample selected using the last four digits of borrowers' social security numbers. This sample is matched to de-identified earnings records from tax data.² It consists of approximately 46 million annual observations on 4 million borrowers.

Balance sizes are measured in the year a borrower enters repayment. "Repayment year" is the year in which a borrower's last loan enters repayment. We focus on loans made under the Federal Direct Loan Program (DL). The DL program began in 1992, and since 2010, all new federal student loans were made under DL. The unit of analysis in our sample is a borrower separating from an institution and starting to repay a loan.

Student Loans in the United States

While small institutional and federal student loan programs have existed in the United States prior to the 1960s, the modern federal student loan program began with the Higher Education Act of 1965. By 2014 there were over 40 million student loan borrowers in the

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1. See Baum and Johnson (2015), Brown et al. (2014) and Ionescu (2009) for an overview of the US student loan program.
2. Specifically, we matched loan information from the NSLDS to de-identified tax data. We obtained students' demographic information from the Free Application of Federal Student Aid (FAFSA). For further discussion of the NSLDS and our sample construction, see Looney and Yannelis (2015). Variables are defined analogously to Looney and Yannelis (2015) unless noted otherwise.

United States, with an outstanding loan balance of over \$1.1 trillion. In 2014 the outstanding volume of student loan debt was surpassed only by mortgage debt.³

The vast majority of student loans in the United States are federal loans. Borrowers must fill out the Free Application of Federal Student Aid (FAFSA) in order to be eligible for federal student loans. Congress sets interest rates, and in recent years those rates have been fixed at rates between 3.4 and 8.5 percent, depending on the type of loan and year of origination. Because the terms on federal loans are favorable, only a small share of loans are issued by private lenders.

Undergraduate and certain graduate federal loans fall into two general categories, subsidized and unsubsidized loans.⁴ Borrowers are eligible for subsidized loans based on a needs test, and the main difference between the programs is that interest does not accrue while borrower are enrolled for subsidized loans. Loan limits are determined by students' academic level and dependency status. The Department of Education classifies borrowers as "dependent" or "independent" from their parents for financial aid purposes. All borrowers above the age of 24, as well as graduate borrowers, military veterans, married borrowers and borrowers with children are automatically classified as independent. Graduate students and parents may be eligible for "PLUS" loans for costs that are not met by other loan types. These loans are limited by cost of attendance rather than a statutory limit. Parent borrowers face a credit check to determine eligibility. Loan limits have been increased periodically; the last increase was in 2007.

When borrowers exit school, they typically enter repayment following a six-month grace period.⁵ The standard payment plan is a ten year fixed plan but borrowers may elect alternative repayment plans. Borrowers with high balances are eligible for extended repayment, which offers borrowers 25 years to repay the loan. Borrowers also may choose from a variety of income-driven repayment plans. Under these plans borrowers pay only 10 or 15 percent of their disposable income. Some of the plans offer loan forgiveness after a specified duration of 20 or 25 years.⁶ Take-up of these plans was low until the introduction of the Income Based Repayment plan in 2009. Currently about one fifth of borrowers are in some form of income-driven repayment plan, and their aggregate balances account for roughly two fifths of balances. Borrowers are always able to prepay the loan in full.

Borrowers are also eligible for deferment and forbearance programs that suspend payments (but not necessarily interest accrual) while in school or when students face circumstances like unemployment, financial hardship, or during military service.

A borrower is in default if a payment is more than 270 days late. If a borrower defaults, their wages above a threshold can be garnished and they may be placed into the Treasury Offset Program, in which certain federal payments like tax refunds are allocated to paying loans and fees. Student loans are effectively non-dischargeable in bankruptcy.

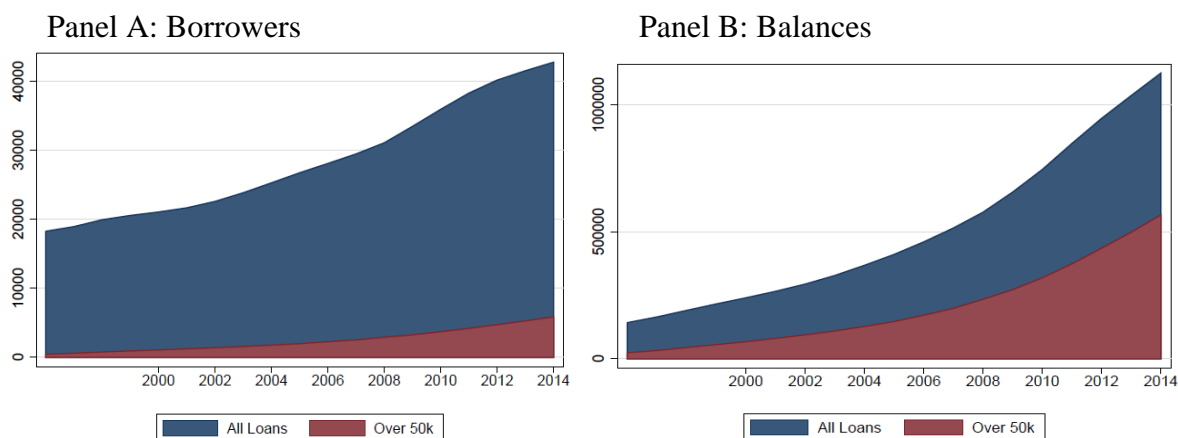
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3. Bleemer et al. (2017), Looney and Yannelis (2016) and Lochner and Monge Naranjo (2011) provide detailed discussions of trends and institutional details regarding federal student loan programs in the United States. Isen, Goodman and Yannelis (2018) discuss the liquidity effects of student loans.
4. Graduate borrowers ceased to be eligible for subsidized loans after July 1, 2012. Parents are not eligible for subsidized loans.
5. Parent loans enter repayment immediately on issue, but may be deferred (with interest accruing) while their children are in school. In practice, many parent borrowers choose deferral, often for long durations.
6. Borrowers eligible for Public Sector Loan Forgiveness are eligible after 10 years of payments.

III. The Increase in Borrowers with Large Balances

An increasing share of students owe high loan burdens with the fraction of borrowers owing more than \$50,000 more than doubling between 2000 and 2014 (Figure 1). Both the share of large-balance borrowers and the share of dollars they owe increased. The left panel of figure 1 shows the number of large-balance borrowers each year. In 2014, only about 5 million of the 40 million outstanding student loan borrowers owed more than \$50,000. The right panel shows that these borrowers account for the majority of student loan dollars outstanding. This is comparable to mortgage lending, where a subset of high-income borrowers hold the majority of outstanding balances (Adelino, Schoar and Severino 2016). A relatively small share of borrowers accounts for the majority of outstanding student loan dollars, so the outcomes of this small group of individuals has outsized implications for the loan system and for taxpayers.

FIGURE 1: NUMBER OF BORROWERS AND TOTAL DOLLARS HELD BY SIZE OF DEBT



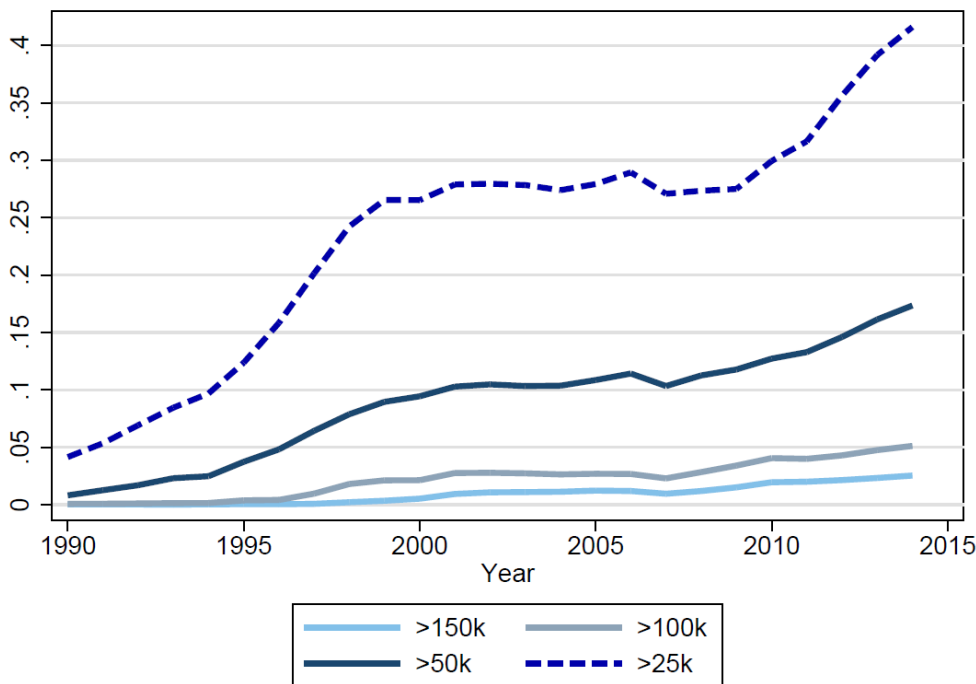
Notes: The figure on the left shows the number of borrowers (in thousands) for borrowers with more than or less than \$50,000 each year. The figure on the right shows student loan dollars outstanding (in millions of 2014 dollars). Source: 4 percent sample of the NSLDS.

Figure 2 shows the share of borrowers with repayment balances above \$25,000, \$50,000, \$100,000 and \$150,000 each year. The figure shows that the share of large-balance borrowers increased rapidly over the past decade and a half, with a particularly sharp increase in the past seven years.

While loan burdens over \$50,000 were once relatively rare—the portion of borrowers with balances over \$50,000 and even \$100,000 has surged. In 1990, fewer than 5 percent of borrowers had loan balances above \$25,000 and almost no borrowers had loan volumes above \$100,000. By 2015, more than 40 percent of borrowers had balances above \$25,000 and more than 5 percent of borrowers had loan balances above \$100,000.

The concentration of debt among a relatively small set of borrowers intensifies at even higher debt levels. For instance, there are roughly 170,000 students and parents who owe more than \$250,000 in federal student loans in 2014. While these borrowers represent only 0.4 percent of all borrowers, they represent almost 5 percent of the total federal portfolio, or almost \$54 billion dollars.

FIGURE 2: SHARE OF BORROWERS WITH LARGE BALANCES



Notes: This figure shows the share of borrowers entering repayment each year with balances exceeding each threshold (in 2014 dollars). Source: 4 percent sample of the NSLDS.

These borrowers represent a high concentration of federal investment and thus may pose large economic and financial risks for the borrower and to taxpayers. For instance, at current PLUS interest rates (6.3 percent) and under the standard 25-year repayment plan, the interest costs over the course of a loan equal the principal balance (i.e. a \$250,000 loan results in almost \$250,000 of interest over the course of a loan). Moreover, large-balance borrowers are likely to represent large beneficiaries of programs like income drive repayment or public-sector loan forgiveness, which involve discharges of debt after a period of years and which have no cap on the amount discharged. As a result, more of these programs' subsidies are directed towards large-balance borrowers than to lower-balance borrowers, which has implications for the total amount of subsidy, how progressive subsidies are, and which kinds of students, institutions, and programs benefit from these lending programs.

Increases in the number of large-balance borrowers is related to loan limit increases for graduate and parent borrowers, and to a lesser extent, undergraduate borrowers. In 1993 and 2007, borrowing limits increased to the levels shown in Table 1. For example, cumulative undergraduate borrowing limits increased from \$37,250 in 1987 to \$46,000 in 2007 (Lochner and Monge-Naranjo 2011).

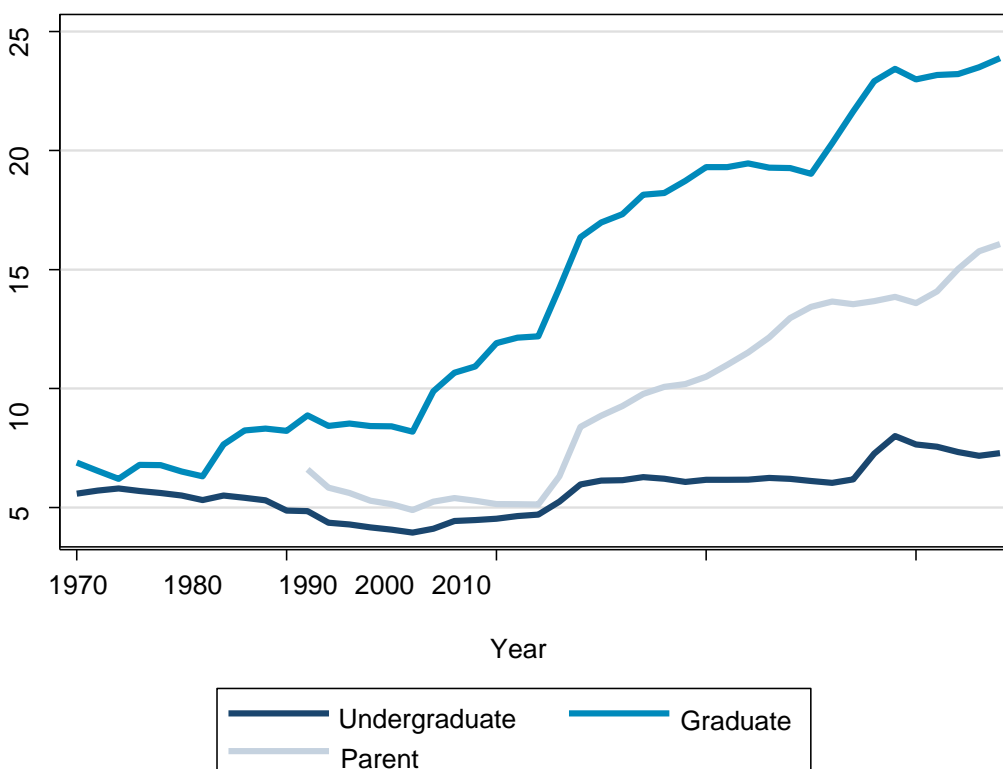
TABLE 1: FEDERAL STUDENT LOAN BORROWING LIMIT

Stafford Loan Limits		
	<u>Dependent</u>	<u>Independent</u>
1987-1992		
Undergraduate Limits		
First Year	\$2,625	\$6,625
Second Year	\$2,625	\$6,625
Third Year	\$4,000	\$8,000
Fourth Year	\$4,000	\$8,000
Total	\$17,250	
Graduate Limits		
Annual	\$11,500	
Total	\$54,750	
1993-2007		
Undergraduate Limits		
First Year	\$2,625	\$6,625
Second Year	\$3,500	\$7,500
Third Year	\$4,000	\$8,000
Fourth Year	\$4,000	\$8,000
Total	\$23,000	\$46,000
Graduate Limits		
Annual	\$18,500	
Total	\$138,500	
2008-2012		
Undergraduate Limits		
First Year	\$5,500	\$9,500
Second Year	\$6,500	\$10,500
Third Year	\$7,500	\$12,500
Fourth Year	\$7,500	\$12,500
Total	\$31,000	\$57,500
Graduate Limits		
Annual	\$20,500	
Total	\$138,500	

Notes: The table above gives borrowing limits for specified federal student loan programs by type of loan. Cumulative borrowing amounts, the maximum amount a student can borrow over the course of enrollment in a degree program, are listed below each panel. Dependent and independent refer to whether borrowers are classified by the department of education as being independent from their parents regarding financial assistance. In 2007, annual undergraduate loan limits were \$2,000 lower and the total limit \$8,000 lower than in 2008-2012. PLUS loans are limited only to the cost of attendance minus other financial aid. The source for the loan limits is Lochner and Monge-Naranjo (2011) and FinAid.org.

Increases in credit availability are associated with increases in borrowing, particularly among large-balance borrowers. To illustrate how these loan limits affect disbursements, Figure 3 shows the average annual loan disbursements per active borrower for undergraduate, graduate, and parent borrowers each year, in real 2015 dollars. The figure shows that annual borrowing amounts among graduate and parent borrowers increased after the elimination of parent PLUS annual and lifetime limits in 1993, the increase in graduate limits in 1993, and the establishment of graduate PLUS in 2008. There were also modest increases in loan limits for undergraduates, especially for independent undergraduate borrowers. Facilitated by these changes, the average parent now borrows more than \$15,000 a year and the average graduate student almost \$25,000. Many of these borrowers borrow for multiple years.

FIGURE 3: ANNUAL BORROWING AMOUNTS BY LOAN TYPE OVER TIME

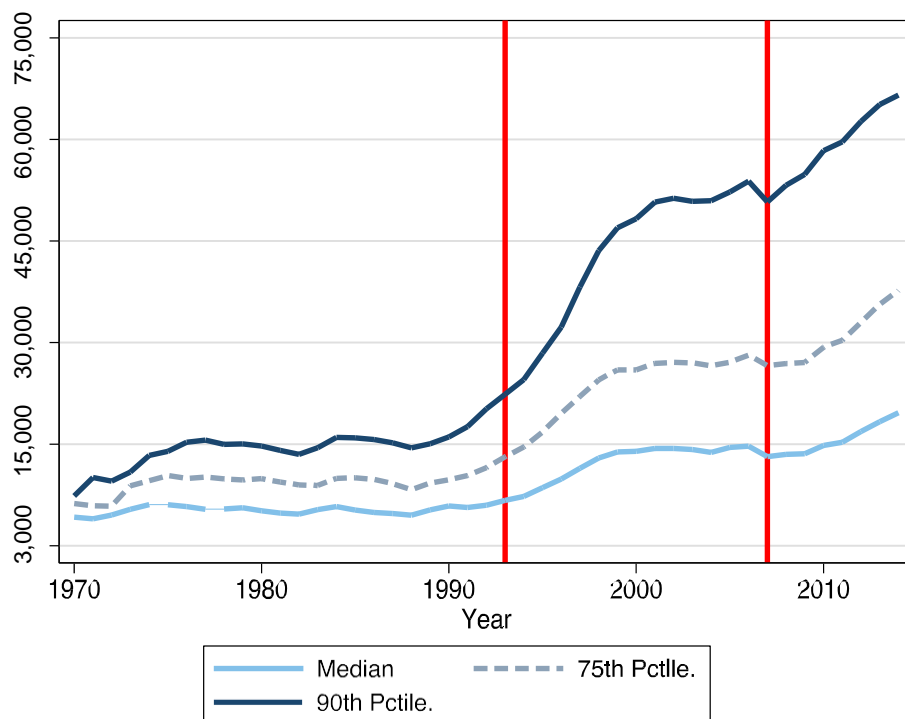


Notes: This figure shows average annual borrowing amounts (loan disbursements) in \$1,000s of 2014 dollars by type of borrower. Source: 4 percent sample of the NSLDS.

To illustrate the rising dispersion of loan balances, Figure 4 compares borrowing amounts for borrowers entering repayment whose loans place them at the median, 75th and 90th percentiles of their cohort's distribution of debt. The vertical red lines indicate the timing of student loan limit increases. After the limit changes, the median debt increases at all levels, but is greater in the 90th and 75th percentiles. For example, before the

1993 increase, the 90th percentile of student borrowing is approximately \$15,000. Afterwards, borrowing more than triples, surpassing \$65,000 in 2014. The experience of large-balance borrowers is increasingly different from those borrowing modest amounts and from the historical experience of those with relatively high balances.

FIGURE 4: THE DISTRIBUTION OF STUDENT DEBT BY YEAR



Notes: The figure shows the median, 75th and 90th percentile of the distribution of debt incurred by student borrowers for each cohort of borrowers in the year they entered repayment. The red solid vertical lines indicate when borrowing limits increased. Source: 4 percent sample of the NSLDS.

IV. Changes in the characteristics of large-balance borrowers

The characteristics of the borrowers who take out large loans have changed in ways that raise risks for borrowers and taxpayers. More large-balance borrowers attend for-profit and less-selective schools, and more large-balance borrowers are undergraduates and parents. Table 2 presents characteristics of borrowers with large balances. The first two columns present characteristics for all borrowers in 2000 and 2014 respectively, while the second two columns present characteristics for borrowers entering repayment in 2000 and 2014.

TABLE 2: CHARACTERISTICS OF BORROWERS WITH LARGE BALANCES

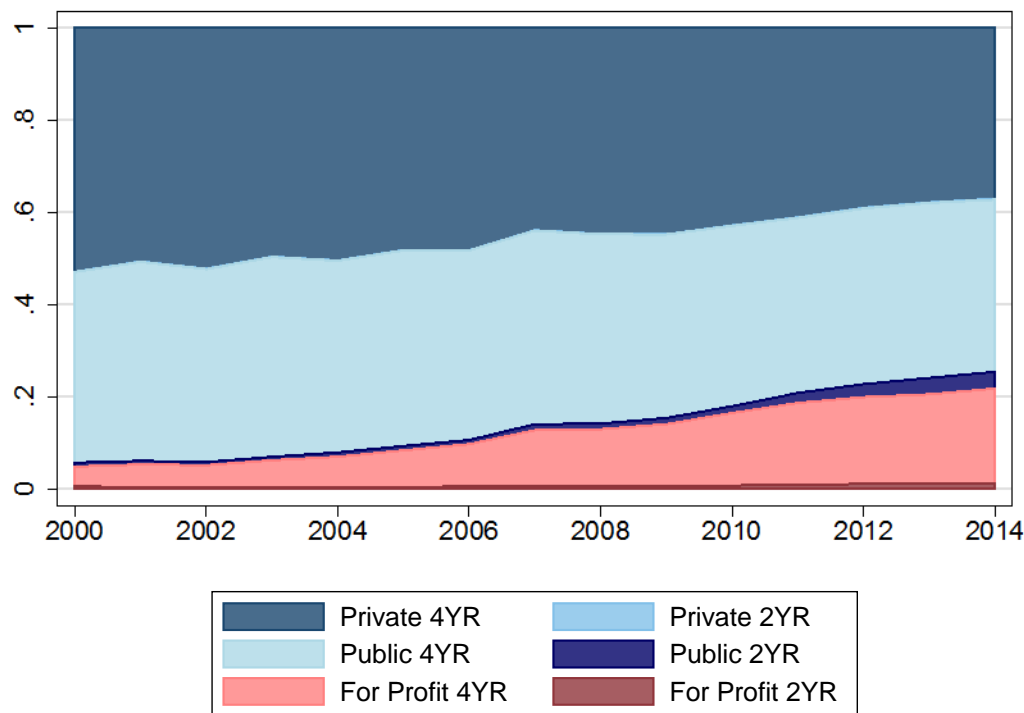
	All Borrowers		Borrowers Entering Repayment	
	2000	2014	2000	2014
Among all borrowers				
Share of borrowers with balances over \$50k	5.1%	13.7%	8.9%	18.4%
Share of undergraduate balances over \$50k	1.3%	6.2%	2.3%	9.1%
Share of graduate balances over \$50k	20.6%	33.8%	29.9%	42.4%
Share of Parent Plus balances over \$50k	3.4%	13.1%	4.3%	25.4%
Share of borrowers with balances over \$100k	1.0%	4.1%	1.9%	5.7%
Share of graduate balances over \$100k	5.3%	14.5%	8.1%	19.7%
Share of Parent Plus balances over \$100k	0.4%	3.7%	0.4%	8.8%
Among borrowers with balances >\$50,000:				
<i>Fraction of Loan Balances by Loan type</i>				
Undergraduate Loans	28%	37%	25%	37%
Graduate Loans	68%	55%	69%	50%
Parent Plus Loans	5%	8%	6%	13%
<i>Fraction of Borrowers by Type</i>				
Undergraduate Only	18%	29%	17%	32%
Graduate Only	27%	14%	29%	11%
Both Undergraduate and Graduate	49%	47%	45%	40%
Parent PLUS Borrower	6%	10%	8%	16%
<i>Institution Type of Last Borrowing (undergraduate and graduate borrowers only)</i>				
For-profit	2%	11%	2%	15%
2-year Public/Private	1%	3%	0%	4%
Non-selective 4-year Public/Private	5%	8%	5%	9%
Somewhat selective 4-year Public/Private	7%	11%	8%	11%
Selective 4-year Public/Private	6%	5%	7%	5%
Graduate School	80%	62%	77%	57%
<i>Fraction of Graduate Borrowers by Type of Program:</i>				
For-Profit	5%	15%	3%	21%
Public	38%	36%	39%	35%
Private	57%	48%	58%	44%

Note: See the text for further details. Graduate only refers to borrowers who started borrowing at the graduate level. Dollar values are in 2014 dollars. Sources: 4 percent sample from NSLDS. Selectivity data from Barron's.

Changes in the characteristics of borrowers suggests that students are borrowing to attend institutions with lower labor market outcomes and worse loan performance (Mueller and Yannelis 2018). In general, the table shows that the majority of large-balance borrowers took-out loans to pay for graduate school, and individuals with graduate degrees tend to have high incomes and low loan non-repayment rates. However, the share of borrowers taking-out large loan balances to go to graduate school has declined between 2000 and 2014 while there has been an increase in undergraduate and parent borrowing. The share of large-balance borrowers who last attended less-selective schools generally increased. And the share of graduate large-balance borrowers who attended a for-profit institutions for graduate school increased from 5 to 15 percent between 2000 and 2014.

In general, it is difficult for a dependent undergraduate borrower to accumulate a large balance given their lower annual and lifetime loan limits. Independent undergraduate borrowers are an exception. They have larger loan limits, have more unsubsidized loans while in school (resulting in faster interest accumulation), and may take more years to graduate, meaning that they borrow for more years and accumulate more interest. Combined with the fact that the number of independent borrowers has increased in recent years, a surprising number of undergraduates end-up with more than \$50,000 of debt.

Figure 5 shows large-balance borrowers by institution type between 1995 and 2015. Each line shows the fraction of borrowers with balances above \$50,000 by institution type. Historically, most large-balance borrowers attended public or private non-profits. This remains true today, as more than 20 percent of borrowers at public non-profits have loan balances above \$50,000, and approximately 10 percent of borrowers at public institutions enter repayment with over \$50,000 in debt.

FIGURE 5: BORROWERS WITH LARGE BALANCES BY TYPE OF INSTITUTION ATTENDED

Notes: This figure shows the share of borrowers with balances above \$50,000 (in 2014 dollars) by type of institution last attended. Source: 4 percent sample of the NSLDS.

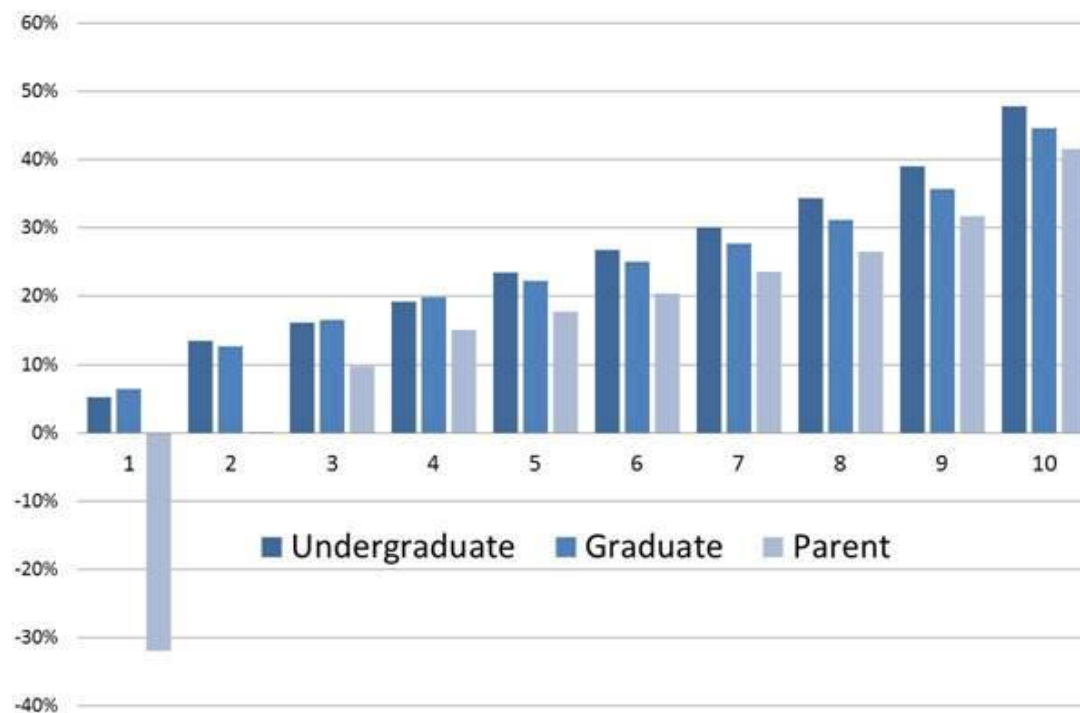
Figure 5 shows the recent growing share of borrowers at for-profit institutions. In 1995, for-profits were the institutions type with the smallest share of students with balances above \$50,000. By 2014, for-profits surpassed public two-year community colleges, and more than 5 percent of for-profit borrowers accumulate over \$50,000 in borrowing by the year that they enter repayment. While the fraction of borrowers with debts over \$50,000 declined at other institution types following the conclusion of the Great Recession, this share continued to rise at for-profits.

The changes in the type of borrower and type of institution have implications for borrower outcomes because, on average, the shift away from graduate borrowers at selective schools and increases in borrowing at for-profit institutions means borrowers are more likely to have worse economic and loan outcomes.

Beyond the average experience, however, it is likely that some borrowers are likely to have outcomes far worse than the typical experience, depending on where they attended school. While this is clear for undergraduate borrowers, these data show that it is also true for parents and graduate borrowers. Figure 6 shows that there is just as much (or more) heterogeneity in repayment rates across institutions for graduate loans or parent loans as there is among undergraduate loans. The chart shows the average 5-year institutional repayment rates, which we define as the average share of the original principal balance entering repayment in 2009 that has been paid down by 2014, by repayment rate decile for

each type of loan. For example, the chart shows that at the bottom 10 percent of institutions, parent PLUS borrowers owed 30 percent more in 2014 than in 2009, while the average parent repayment rate was zero in the second lowest decile.

FIGURE 6: DIFFERENCES IN REPAYMENT RATES ACROSS INSTITUTIONS AND BORROWER TYPES



Notes: This figure shows the average fraction of the initial repayment balance repaid 5 years after beginning repayment for institutions ranked by repayment decile for undergraduate, graduate, or parent PLUS loans. Institutions are divided into deciles defined by the average institutional repayment rate for each borrower type. Within each decile, each bar represents the average 5-year repayment rate for borrowers at those institutions. Source: 4 percent sample of the NSLDS.

Compared to undergraduate borrowers, repayment rates for parents are lower, largely because parents often defer payments while the student is in school. Similarly, repayment rates for graduate students are lower because they typically choose longer amortization schedules. However, the chart also shows that the variation across institutions in graduate and parent repayment rates is just as large as the variation in repayment rates across undergraduate institutions. In other words, increases in borrowing among graduate students and parents, especially at low-performing institutions, is likely to impose risks on those borrowers and taxpayers.

V. Outcomes for Borrowers with Large Balances

Earnings and Income

Borrowers with large repayment balances tend to have strong labor market outcomes. Table 3 shows that large-balance borrowers have lower non-employment rates and earn more than other borrowers. The typical large-balance borrower earned \$56,339 in 2014. High earnings and strong labor market outcomes place the vast majority of large-balance borrowers in a strong position to avoid missing payments and enter default. However, a rising share are not employed, and their labor market outcomes measured in the various ways have not increased between 2000 and 2014. Hence, with rising levels of debt, the ratio of their average debt to average earnings—one indicator of ability to pay—has increased.

TABLE 3: EARNINGS OF LARGE BALANCE BORROWERS

	Over \$50,000 Debt		Less Than \$50,000 Debt	
	2000	2014	2000	2014
Average Earnings	\$54,802	\$56,339	\$34,500	\$29,000
Median Earnings	\$41,731	\$41,906	\$29,250	\$17,750
Average Total Income	\$69,071	\$68,247	\$44,500	\$35,250
Median Total Income	\$48,575	\$46,530	\$35,000	\$24,500
Not-employed	12%	15%	17%	18%

Notes: The table above shows earnings of borrowers in repayment who owed more or less than \$50,000 when entering repayment. Source: 4 percent sample of the NSLDS matched to earnings records.

The high relative earnings of graduate borrowers has implications for the distribution of the loan burden across income groups. Table 4 shows the distribution of loan balances by quintiles of debt and by total income in 2012. The top panel shows that the 20 percent of borrowers with the largest balances held approximately 60 percent of the total outstanding balance of student loans in 2012. The bottom panel shows that high-income borrowers hold the majority of student debts, as is the case in the mortgage market (Adelino, Schoar and Severino 2016). The fact that large-balance borrowers tend to earn more than other borrowers, and that student borrowers earn more than individuals who did not borrow and did not attend college, have important equity and distributional implications (Hartman 1972; Paracharopoulos and Papakonstantinou 2005; and Looney and Yannelis 2016). Policies such as the student loan interest tax deduction, proposed interest reductions, and loan forgiveness may disproportionately benefit high-income borrowers.

TABLE 4: DISTRIBUTION OF LOAN BALANCES

By quintile of national distribution of Federal Student Debt	Median Balance	Median Earnings	Median Income	Med. FAFSA Income	Share of Total Balance
Bottom 20 Percent	\$2,567	\$19,320	\$27,023	\$24,414	2%
20-40th	\$7,106	\$20,817	\$28,600	\$25,015	6%
40-60th	\$13,606	\$24,729	\$32,887	\$24,941	11%
60-80th	\$26,096	\$30,290	\$38,794	\$26,888	20%
Top 80 Percent	\$61,536	\$39,292	\$49,908	\$23,204	61%
By Total Income					
Bottom 20 Percent	\$9,816	\$0	\$0	\$9,131	15%
20-40th	\$11,283	\$17,092	\$18,151	\$17,078	15%
40-60th	\$14,696	\$33,251	\$35,187	\$26,588	19%
60-80th	\$16,807	\$51,200	\$61,331	\$37,297	23%
Top 80 Percent	\$18,799	\$69,899	\$118,420	\$49,602	27%

Notes: This figure shows characteristics of loan balances by quintiles of debt and income in 2012. Total income is AGI excluding adjustments. Source: 4 percent sample of the NSLDS merged to de-identified tax data.

Default and Repayment

Borrowers with large repayment balances are less likely than other borrowers to default on their loans. In 2009, only about 4 percent of large-balance borrowers defaulted, whereas about approximately 17 percent of borrowers without large balances defaulted within three years of entering repayment. While cohort default rates have fluctuated over time for all borrowers, default rates have remained stable and quite low for large-balance borrowers. This is no surprise as large-balance borrowers have relatively strong labor market outcomes, higher educational attainment, are more likely to attend selective schools, and are likely to be better able to insure themselves against adverse shocks (e.g. unemployment spells or health problems).

Nevertheless, when such borrowers do default, there are larger dollar amounts involved. Figure 7 shows the fraction of borrowers and dollars in default, in bins of repayment balances. Large-balance borrowers account for a large share of dollars in default. Although more than half of borrowers in default have balances under \$10,000, half of all dollars in default are held by borrowers with repayment balances over \$25,000 and almost 30 percent by borrowers with balances over \$50,000.

FIGURE 7: SHARE OF BORROWERS AND SHARE OF DOLLARS IN DEFAULT

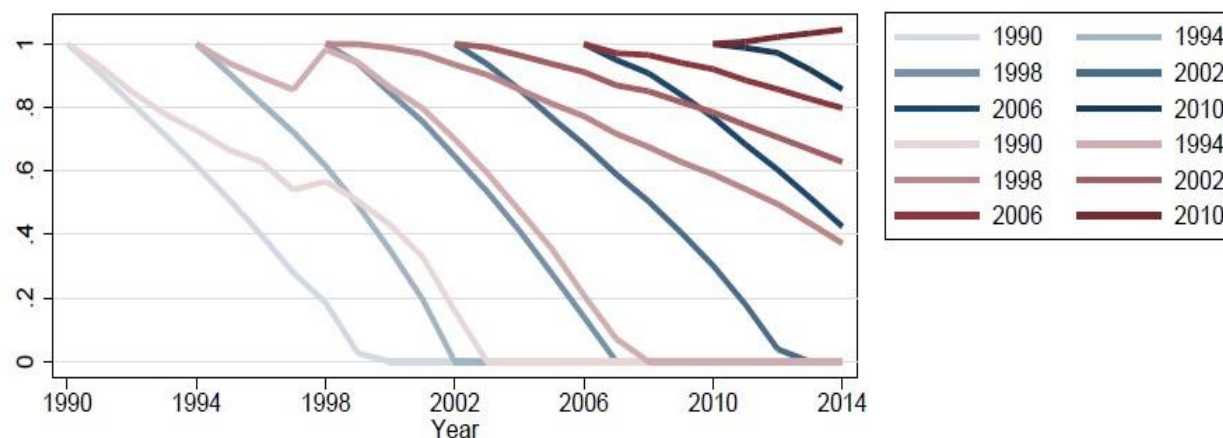


Notes: This figure shows the fraction of student loan borrowers who default and the fraction of dollars in default by balance owed. Source: 4 percent sample of the NSLDS

Despite lower default rates and strong labor market outcomes recent cohorts of large-balance borrowers in the aggregate are repaying their loans very slowly. Figure 8 shows the median fraction of the initial repayment balance repaid over time from 1990 to 2014. We can see that large-balance borrowers are slower to repay their loans: for all repayment cohorts, borrowers who enter repayment with balances greater than \$50,000 take longer to repay their loans compared to borrowers with balances below \$50,000. For cohorts that entered repayment in the 1990s and early 2000s, a majority of borrowers with smaller or moderate balances were able to pay off their balances within ten years of entering repayment—the timeframe of a standard repayment plan. On the other hand, the median large-balance borrower still owed a significant portion of their initial repayment balance a decade into repayment. For cohorts that entered repayment in the 2010s, a new pattern has emerged—large-balance borrowers owe more than their initial repayment amount.

There are several ways in which these borrowers can avoid default, but still not make full payments on their student loans. First, borrowers can participate in income driven repayment or extended repayment plans.⁷ Second, borrowers can delay payments through deferment and forbearance. These alternative repayment options have led to recent borrowing cohorts owing more than their initial repayment balances.

FIGURE 8: SLOWING REPAYMENT RATES FOR HIGH-BALANCE BORROWERS



Notes: The figure shows the fraction of the initial repayment balance remaining for the median borrower for cohorts entering repayment between 1990 and 2010. Borrowers owing less than \$50,000 (in 2014 dollars) are indicated by the blue lines. For instance, for the cohort starting repayment in 1998, the median borrower owing less than \$50,000 had repaid the loan by 2007, while the median large-balance borrower still owed almost 40 percent of the original balance in 2014. Source: 4 percent sample of the NSLDS.

...

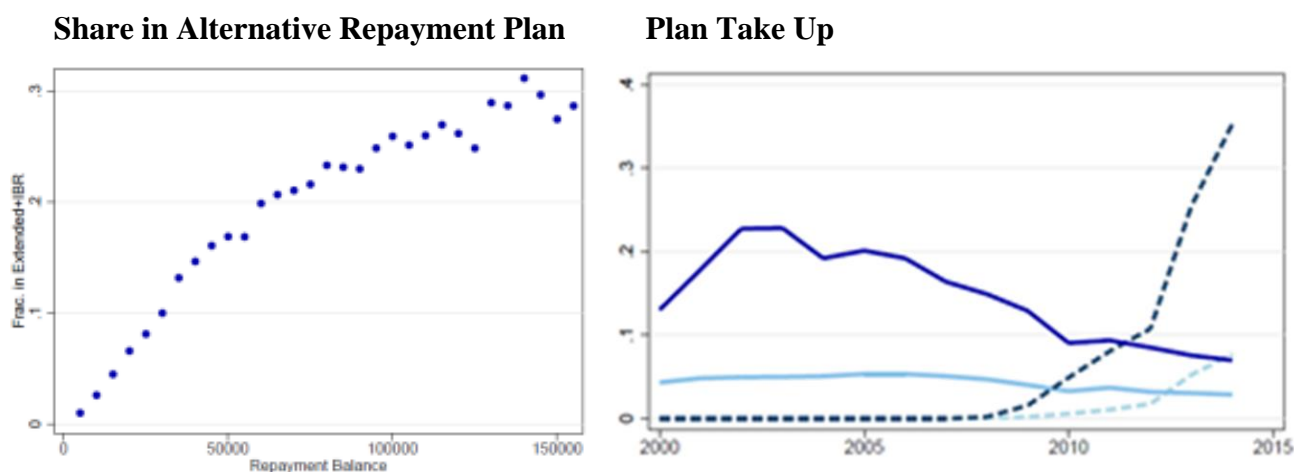
7. See Ji (2016) for a discussion of income driven repayment programs. Income based Repayment was introduced in 2009 to replace a similar Income-Contingent Repayment plan, and allows borrowers who pass a means test to pay a portion of their disposable income rather than a standard fixed mortgage style payment. After 25 years in Income Based Repayment, loan balances are forgiven. Forbearance allows borrowers to delay making payments for fixed time periods.

The left hand panel of figure 9 shows the fraction of borrowers in income driven repayment or extended repayment plans, between 2000 and 2014, by bins of repayment balances. The figure shows that borrowers with higher repayment balances are much more likely to enroll in extended repayment plans than borrowers with lower repayment balances. For example, approximately 30 percent of borrowers with repayment balances of \$150,000 enroll in alternative repayment plans, while fewer than 10 percent of borrowers with balances below \$50,000 utilize these repayment options.

Eligibility requirements for these alternative repayment plans partially explain this trend. For extended repayment plans, borrowers must have more than \$30,000 in student loans to be eligible. For income drive repayment plans, large-balance borrowers are more likely to meet the enrollment requirements conditional on income. Borrowers with large repayment balances also have greater incentives to enroll in alternative repayment plans.

The right hand panel of figure 9 shows the fraction of borrowers in income driven repayment and extended repayment plans for borrowers with balances above and below \$100,000. The darker line shows rates for borrowers with balances above \$100,000, while the lighter colored lines show rates for other borrowers. Large-balance borrowers were much more likely to take-up extended repayment in the 2000s, although the difference narrowed after 2009 with the expansion of income drive repayment options.

FIGURE 9: REPAYMENT PLAN ENROLLMENT



Notes: The left panel shows the fraction of borrowers in either extended repayment plans or income driven repayment (IDR) by borrowing amount (in \$10,000 intervals) in 2014. The panel on the right shows the fraction of borrowers in IDR plans (dashed lines), and for borrowers in extended repayment plans (solid line). The darker shades show borrowers with balances above \$100,000.

VI. Why aren't large-balance borrowers repaying their loans?

Why are more recent borrowers repaying their loans at a slower rate than earlier cohorts? In this section we use a Blinder (1973) and Oaxaca (1973) decomposition to analyze why repayment rates have slowed for borrowers. The decomposition aims to illustrate how repayment rates would have changed between 2001 and 2011 under the counterfactual that the observables and repayment options remained constant during that period. The decomposition method uses a basic linear regression model that defines repayment as a function of repayment plan choice, default rates, and other borrowers' characteristics. These characteristics are used to predict how repayment rates would have changed by holding model parameters constant, and applying the estimated model to borrowers from earlier cohorts. The change in explanatory variables over time, multiplied by the estimated coefficient, gives the share of the gap in repayment rates over time that is explained by the model.

The underlying assumption of the decomposition approach is that the relationship between observables and repayment rates remained constant between 2001 and 2011. Under this assumption, we use the model to predict how repayment rates would have changed due to differences in observable characteristics, holding other factors constant. Whether we can draw a causal relationship from the decomposition depends on whether we can make a causal interpretation from the regression model used to predict repayment. For example, the strong estimated relationship between income-driven repayment and repayment rates over time may have a causal interpretation if alternative repayment schedules directly allow borrowers to repay their loans at a slower rate. On the other hand, income-driven repayment may only be correlated with repayment rates through other unobservable channels such as access to family resources or financial sophistication.

The goal of this analysis is to explain why repayment rates have slowed and to determine the relative magnitudes of various factors. For example, what is the relative contribution of the increase in income-driven repayment plans to the slowdown in repayment, relative to changes in the composition of borrowers?

TABLE 5: DETERMINANTS OF NON-PAYMENT

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sample	Full	Full	Full	Full	Full	<50k	>50k	2001	2011
For-Profit 2-Year	0.016 (0.073)					0.008 (0.044)	0.086*** (.005)	0.02 (0.079)	0.212*** (0.007)
For-Profit 4-Year	0.086*** (0.002)					0.098*** (0.003)	0.048*** (0.012)	0.021*** (0.005)	0.079*** (0.003)
Public 2-Year	0.093*** (0.002)					0.065*** (0.003)	0.035*** (0.003)	0.033*** (0.006)	0.057*** (0.002)
Public 4-Year	0.022*** (0.003)					0.042*** (0.003)	0.026** (0.010)	-0.043*** (0.006)	0.026*** (0.003)
Public 2-Year	-0.004* (0.002)					0.002 (0.002)	0.017*** (0.003)	0.003 (0.003)	0.006** (0.002)
Default		0.147*** (0.002)				0.216*** (0.003)	0.112*** (0.005)	0.215*** (0.004)	0.194*** (0.003)
Repay. Balance			0.013*** (0.000)			0.062*** (0.001)	0.004*** (0.000)	0.024*** (0.001)	0.014*** (0.000)
Earnings				-0.010*** (0.001)		-0.010*** (0.001)	-0.005*** (0.000)	0.007*** (0.000)	0.008*** (0.001)
Family Income			-0.006*** (0.000)			-0.004*** (0.000)	0.000 (0.001)	-0.002*** (0.000)	- 0.003*** (0.000)
Depend				0.058*** (0.002)		-0.011*** (0.002)	-0.030*** (0.008)	0.019*** (0.003)	0.010*** (0.002)
Pell				0.000*** (0.000)		0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
IBR					0.057*** (0.004)	0.036*** (0.005)	0.011 (0.006)	0.000 (.)	0.034*** (0.004)
Extended Repay.					0.048*** (0.006)	0.047*** (0.008)	-0.011 (0.008)	0.126*** (0.018)	0.052*** (0.007)
Forbearance					0.188*** (0.001)	0.201*** (0.002)	0.127*** (0.003)	0.179*** (0.003)	0.203*** (0.002)
Observations	168429	168429	168429	162338	168429	142074	20264	44596	117742

Notes: The dependent variable in each specification is the fraction of the initial repayment balance outstanding (unpaid) three years after entering repayment. The sample includes the 2001 and 2011 repayment cohorts. Column (5) restricts the sample to borrowers who owe less than \$50,000 when they enter repayment. Column (6) restricts the sample to borrowers who owe more than \$50,000 in the year that they enter repayment. Column (7) restricts the sample to the 2001 repayment cohort, and column (8) restricts the sample to the 2011 repayment cohort. Source: 4 percent sample of the NSLDS matched to de-identified tax records. *p<.1, **p<.05, ***p<.01

Table 5 presents regression results from the loan repayment model. These are used to generate coefficient to simulate counterfactual repayment rates in the decomposition analysis. The outcome is the fraction of borrowers' initial repayment balance that has been repaid, three years into repayment. Between 2001 and 2011, the fraction of the initial repayment balance that remains after three years increased by 10.6 percentage points, from 79.7 percent to 90.5 percent. The results indicate that school type, default, labor market outcomes and repayment plan choices are all associated with loan repayment. Borrowers at for-profit institutions and public two-year community colleges (non-traditional borrowers) repay a lower fraction of their initial repayment balance three years after entering repayment. Non-traditional borrowers repay on average between three and eight percentage points less than borrowers at four-year private institutions. This is consistent with findings from Looney and Yannelis (2015) that non-traditional borrowers have problems repaying their student loans. Borrowers at four-year public schools tend to repay their balances at a slightly faster rate than borrowers at four year private institutions. Borrowers with higher family income and earnings also repay their loans at a faster rate, which is consistent with previous research (Knapp and Seaks 1992; Field 2014 ; Lochner and Belley 2007).

Unsurprisingly, default is strongly associated with borrowers not repaying loans, and borrowers who default within three years of entering repayment have typically repaid 15 percentage points less than other borrowers. Alternative repayment plans such as IBR and extended repayment are also strongly predictive of lower loan repayment. Forbearance and larger repayment balances are also associated with lower loan repayment. It is worth noting that the coefficient on repayment balances probably underestimates the true relationship between repayment balances and repayment over time. The observed effects are statistically significant at the .05 level or higher. The fact that the initial repayment balance appears both in the denominator of the dependent variable and as a regressor can induce division bias. This attenuates the observed effects of repayment balances on repayment rates over time, leading to a downward bias (Borjas 1980).

Columns (8) and (9) of table 5 split the sample between the 2001 and 2011 periods. The results largely support the identifying assumption that the relationship between observables and repayment rates remained constant between 2001 and 2011. The coefficients on most regressors are similar in sign and magnitude, although in some 2001 estimates are statistically insignificant due to the smaller sample size. Columns (6) and (7) split the sample between borrowers who enter repayment with more than and less than \$50,000 in debt. Again the relationship between the share of the initial balance repaid and changes in explanatory variables remains similar across both samples.

TABLE 6: REPAYMENT DECOMPOSITION

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	Full School	Full Repay	Full	Full Labor	Full Repay	Full	<50k	>50k
Controls	Type	Balance	Default	Market	Plan	Full	Full	Full
Difference 2001-2011	-0.108	-0.108	-0.108	-0.108	-0.108	-0.108	-0.108	-0.068
Endowments	-0.021	-0.011	-0.004	-0.019	-0.049	-0.098	-0.102	-0.059
For-Profit 2-Year	0.000					0.000	0.000	0.000
For-Profit 4-Year	-0.004					-0.005	-0.009	0.000
Private 2-Year	-0.014					-0.008	-0.01	-0.006
Public 4-Year	-0.002					-0.001	-0.003	0.000
Public 2-Year	-0.001					0.001	0.001	0.001
Repayment Balance		-0.011				-0.017	-0.021	-0.003
Default			-0.004			-0.005	-0.001	-0.004
Earnings				-0.009		-0.007	-0.01	-0.006
Family Income				-0.002		-0.001	-0.002	0.000
Depend				-0.007		-0.001	0.001	0.004
Pell				0.000		0.000	-0.001	0.000
IBR					-0.001	-0.001	0.000	0.000
Extended Repay.					0.000	0.000	0.000	0.000
Forbearance					-0.048	-0.051	-0.048	-0.044
Share Explained	19.4%	19.2%	0.3%	17.6%	45.3%	90.7%	94.4%	86.8%

Notes: This table presents results from a linear Blinder-Oaxaca decomposition. The dependent variable in each specification is the fraction of the initial repayment balance outstanding three years after entering repayment. The first row shows the difference in repayment rates between 2001 and 2011. Each following row shows the fraction of the observed change explained by each variable included in the decomposition. The sample includes the 2001 and 2011 repayment cohorts. Column (7) restricts the sample to borrowers who owe less than \$50,000 when they enter repayment. Column (8) restricts the sample to borrowers who owe more than \$50,000 in the year that they enter repayment.

Table 6 presents the results of the decomposition exercise. The results indicate that changes in observables account for approximately 90 percent of the change in repayment rates between 2001 and 2011. Between 2001 and 2011, repayment rates declined by 10.8 percentage points. The first column indicates that approximately 20 percent of the decrease is associated with changes in the types of institutions that borrowers attended. This is largely driven by increased enrollment in for-profits and public two-year community colleges, where borrowers are more likely to default and less likely to repay their loans.

Column (2) indicates that changes in initial repayment balances account for roughly 10 percent of the increase in non-repayment between 2001 and 2011. Again, this may underestimate the true effect due to division bias (Borjas 1980) stemming from measurement error in variables on both sides of the estimating equation. Column (3) indicates that the increase in default rates between 2001 and 2011 accounts for approximately 10 percent of the increase in non-repayment. Although this is not insignificant, much of the policy debate and school sanctions surrounding student loan distress has focused on default rates when changes in default rates account for a relatively small share of changes in actual repayment rates. Default rates may thus not be the right outcome of focus, given that other factors explain larger fraction of the decrease in repayment. Column (4) indicates that changes in family and borrower labor market outcomes and characteristics are associated with approximately 15 percent of the decrease in repayment rates. Column (5) indicates that between 40-50 percent of the decrease in repayment rates is associated with participation changes in repayment plans and forbearance, with forbearance playing a larger role than income-driven repayment and extended repayment plans. This suggests that while many borrowers are avoiding default, they are still finding ways to avoid repaying their student loans.

While we do not observe the reason why borrowers are entering forbearance, there are a number of reasons why forbearance may have increased during this period. First, students can be granted forbearance due to economic hardship, and labor market outcomes deteriorated for students during this time (Looney and Yannelis 2015). Second, students who reenroll in school can delay payments there was a surge in enrollment and borrowing during the period in question, particularly in the for-profit sector. Finally, incentives changed during this period due to the introduction of Public Sector Loan Forgiveness and Teacher Loan Forgiveness, as borrowers who expect forgiveness have incentives to delay payments.

Column (6) includes all explanatory variables, and the results remain largely similar except for the increase in default rates, which is associated with almost a fifth of the decrease in repayment rates. Columns (7) and (8) repeat the analysis, splitting the sample by borrowers with more than and less than \$50,000 in debt at the time of repayment. The results are broadly similar, although default explains almost none of the decrease in repayment for high-balance borrowers, and changes in repayment plans explain a larger share. This is consistent with earlier evidence that large-balance borrowers are able to avoid default, but are more likely to take-up repayment options that allow them to avoid making payments.

VII. Concluding Remarks

This paper shows that a relatively small number of borrowers account for the majority of student loan dollars. While these borrowers historically have had stronger labor market outcomes and avoid default, they represent a significant share of dollars in default and avoid repaying their loans. Worryingly, non-repayment rates have increased in the past decade. The increase in non-repayment is largely explained by changes in student demographics, the type of institutions in which they enroll, changes in default rates, and most importantly the increased participation of alternative repayment options such as IBR and forbearance. These changes mean more borrowers will struggle with their loans and that the impact on government finances from non-payment will rise. Three trends are of special concern. First, an increasing share of large-balance borrowers enroll in for-profit institutions, which tend to have worse loan and labor market outcomes than other types of institutions. Second, repayment rates are decreasing. Third, new programs such as Public Service Loan Forgiveness and IBR forgive balances after set time periods. All of these factors could have important fiscal and welfare consequences in the future.

The credit supplement to the Federal Budget reports that graduate and parent loans are not subsidized (at least, according to federal scoring rules for federal loans) and that recoveries on defaulted loans are high, giving the impression that defaulted loans do not impose costs on taxpayers. However, these estimates fail to account for the costs of recovery and, if these projections prove incorrect then the fiscal costs could be much larger. At a time when the pool of borrowers is changing, loan amounts exceed historical experience, and recent repayment plans offer substantial opportunities for debt forgiveness, historical experience may not be a good indicator of future experience.

The welfare implications of the distribution of loan balances and repayment are less clear. Student loans exist to alleviate credit constraints, but does lifting these constraints for large-balance borrowers enhance their welfare? Screening for large-balance borrowers who are likely to avoid repayment could have substantial welfare impacts (Cox 2016; Lochner and Monge-Naranjo 2011; Sun and Yannelis 2016; Looney and Yannelis 2018). Examining the risk characteristics of by large-balance borrowers or the programs they attend could have direct fiscal implications, benefits to taxpayers, and improvements in borrower outcomes.

The evidence in this paper is intended to be helpful to policymakers attempting to understand the consequences of the expansion in credit and borrowing and in designing policies to reduce risks to students and taxpayers and to promote better educational outcomes. The finding suggest that the selective reduction in credit could reduce or reverse unintended consequences or costs of lending programs. For instance, reducing loan limits, eliminating certain types of high-cost loans, strengthening institutional accountability systems, and applying accountability rules to graduate and parent loans could reduce adverse outcomes, reduce risks on taxpayers, and improve economic outcomes.

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