

Dissertation Awards

2009

Three Essays on Labor and Credit Markets:
Dissertation Summary

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Three Essays on Labor and Credit Markets

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Changes in the credit market over the last 30 years have expanded access and transformed the way in which households apply for, use, and abuse credit opportunities. Yet the ramifications of this democratization of credit have been underexplored within the economics literature. This dissertation investigates three dimensions of the impact that the credit market has on the labor market, and vice versa. In doing so, this research develops improved frameworks for understanding the relationship between labor market choices made concurrently with borrowing decisions, as well as provides empirical evidence for these two markets' interdependence. The essays in this dissertation provide insight into the interaction between personal bankruptcy and the labor market, the incentive structure for the issuance of subprime mortgages, and the decision making behind borrowing interest-free student loans.

The Credit Market Consequences of Job Displacement

More than one million households file for bankruptcy each year. The system is designed to help households that are unable to repay their debts regain control of their finances. By limiting the risk associated with borrowing, however, bankruptcy laws create an incentive for individuals to increase their debt. This tension between the desire to give households a "fresh start" and the moral hazard therein has been a central point of conflict in the politics of bankruptcy reform and in the present academic research on bankruptcy. On the one hand, two-thirds of bankruptcy filers cite the loss of a job or other source of income as the main reasons for filing (Sullivan, Warren, and Westbrook 1999). These findings form the basis for the claim that unanticipated "trigger events" such as job loss, divorce, or health crises cause bankruptcy. On the other hand, some researchers counter that "strategic" behavior drives the decision to file for bankruptcy, as households continue to borrow and wait until the benefit from filing is at a maximum before discharging their debts. In their influential paper, Fay, Hurst, and White (2002) analyze filing patterns in the PSID and argue that "discharge of debt is the dominant consideration in households' decisions to file" (p. 716).

The first paper shows that these two perspectives, rather than being mutually exclusive, are both essential to understanding the personal bankruptcy decision. I develop a dynamic, forward-looking model of household behavior where the relationship between income shocks and the deci-

sion to file for bankruptcy is explicit. The model implies that strategic agents respond to adverse events optimally, both in their borrowing patterns and in the likelihood and timing of bankruptcy. Intuitively, the decision to file for bankruptcy is irreversible and costly, and as such, there is an option value to delaying (White 1998). Unanticipated shocks lead to asset positions where filing is financially beneficial, while expectations about future earnings play an important role in both the decision to file and the timing of when to file. The model provides two key predictions: 1) the bankruptcy decision crucially depends on both the magnitude and the expected persistence of the income shock, and 2) job separations and other income shocks can lead to lagged responses of bankruptcy filing.

I test these predictions using individual-level data from the National Longitudinal Survey of Youth (NLSY) and county aggregate data collected from the U.S. Courts. The effect of job loss on bankruptcy is estimated in the NLSY using an event-study framework that carefully controls for the timing of income shocks. Unlike previous research on bankruptcy, the event-study methodology explicitly addresses the source of exogenous variation and allows for estimation of preshock differences in bankruptcy likelihoods. Using this approach, I find that households are four times as likely to file for bankruptcy in the year immediately following a job displacement. Bankruptcy risk then declines in magnitude but persists for two to three years. The persistence of a higher bankruptcy risk after displacement is consistent with the model, which formalizes the option value to delaying filing.

To explore further the implications of the model and to test additional hypotheses raised by the "adverse events" empirical literature, I investigate the impact of divorce and health crises on the household bankruptcy decision. In contrast to previous research, I find that divorce is not a proximate cause of bankruptcy, as the likelihood of filing for bankruptcy rises prior to divorce. I also find that the timing of health shocks are highly related to the timing of bankruptcy. Overall, the evidence suggests that plausibly exogenous job displacement and negative health shocks can play a role in predicting future bankruptcies among those at-risk.

Although the NLSY is the best available panel data to study bankruptcy, its small sample size does not yield the statistical power necessary to distinguish the effects of job loss based on the severity of the displacement or the demographics of the displaced. To examine these issues, I use county-level data from the last three decades to estimate the aggregate relationship between bankruptcy and job loss. This independent analysis, using different data and a different empirical specification, yields similar results. I find that 1,000 additional job losses are associated with 8–11 bankruptcies, and that the effects of job loss persist for two to three years, consistent with the model and corroborating the individual-level results using the NLSY.

To examine the model's prediction that more permanent income shocks are more likely to lead to bankruptcy, I separate the county-level job losses into manufacturing and nonmanufacturing jobs. Manufacturing jobs are generally associated with longer tenure relationships and greater firm-specific human capital (Anderson and Meyer 1994; Topel 1990). Furthermore, losing a manufacturing job often leads to deeper and more persistent earnings shortfalls (Carrington 1993). Consistent with the model's predictions, I find that the loss of a manufacturing job is three times more likely to lead to bankruptcy than the loss of a nonmanufacturing job. This is the first empirical evidence that the structural shift away from the manufacturing sector has contributed to increases in bankruptcy, and confirms that the micro foundations of the dynamic model are supported by the macro patterns in the data.

Separating the effects by county demographics and macroeconomic conditions provides greater insight into the consequences of job loss. I find that job losses are more likely to lead to bankruptcies in counties that are more educated, wealthier, and have a larger fraction of working-age individuals. These results suggest that job loss may be more painful in these types of counties, with losses anticipated to be more permanent, or representing greater destruction of tenure and firm-specific human capital. Similarly, during high-unemployment periods when unemployment durations are expected to be significantly longer, the loss of 1,000 job leads to 40 more bankruptcies, while during low-unemployment periods the relationship is small and statistically insignificant. These results provide robustness to the main findings and offer an explanation for the cyclical patterns of bankruptcy observed in the aggregate data.

These two complementary empirical analyses at the micro and aggregate levels contribute to the literature on job loss by providing strong evidence that the consequences of displacement extend into the credit market. In a similar context, Sullivan (2008) finds that households increase their unsecured borrowing via credit cards in response to a short-term earnings shock. Though unemployment spells are usually brief, these short-term shocks can have larger long-term consequences on a worker's well-being. Recent research has documented decreased long-term earnings and consumption, greater marital discord, and even heightened mortality resulting from job losses (Browning and Crossley 2008; Charles and Stephens 2004; Jacobson, LaLonde, and Sullivan 1993; Stephens 2001; Sullivan and von Wachter 2007).

The costs of bankruptcy are steep for the bankruptcy courts, which review more than one million cases per year, for all borrowers, who pay higher interest rates to compensate for the cost of discharged debts, and for the households in jeopardy of default. Timely intervention on the part of policymakers or the private sector potentially could reduce the costs of bankruptcy. In 2005, a new provision to personal bankruptcy law was enacted that requires all debtors

to undergo credit counseling prior to filing for a discharge of their debts. However, this feature of the new bankruptcy code has not been successful in deterring filings, as clients receive counseling only after contacting a bankruptcy lawyer. A recent GAO report (GAO-07-203), appropriately titled "Value of Credit Counseling Requirement Is Not Clear," supports the view that counseling would be more effective if individuals with severe credit risks were identified at an earlier date: "Anecdotal evidence suggests that by the time most consumers receive the pre-filing counseling, their financial situations are dire, leaving them with no viable alternative to bankruptcy." Because the likelihood of filing for bankruptcy is heightened in the years following a layoff, providing credit counseling at the time of job displacement, or when an individual exhausts Unemployment Insurance benefits, might help some households avoid bankruptcy. It is not clear what form a successful intervention would take, whether it would require targeted extensions of credit, greater repayment flexibility, or forcing households to declare bankruptcy sooner and thus avoid accumulating additional unsecured debt. Designing feasible policy initiatives based on these results is an important direction for future research.

Does Securitization Lead to Lax Screening?

Securitization, converting illiquid assets into liquid securities, has grown tremendously in recent years, with the securitized universe of mortgage loans reaching \$3.6 trillion in 2006. The option to sell loans to investors has transformed the traditional role of financial intermediaries in the mortgage market from buying and holding to buying and selling. The perceived benefits of this financial innovation, such as improving risk sharing and reducing banks' cost of capital, are widely cited (see, for example, Pennacchi [1988]). However, delinquencies in the heavily securitized subprime housing market increased by 50 percent from 2005 to 2007, forcing many mortgage lenders out of business and setting off a wave of financial crises that spread worldwide. In light of the central role of the subprime mortgage market in the current crisis, critiques of the securitization process have gained increased prominence.

The rationale for concern over the originate-to-distribute model during the crisis derives from theories of financial intermediation. Delegating monitoring to a single lender avoids the problems of duplication, coordination failure, and free-rider problems associated with multiple lenders (Diamond 1984). However, in order for a lender to screen and monitor, it must be given appropriate incentives (Holmstrom and Tirole 1997), and this is provided by the illiquid loans on their balance sheet (Diamond and Rajan 2003). By creating distance between a loan's originator and the bearer of the loan's default risk, securitization may have potentially reduced lenders' incentives to carefully screen and monitor borrowers (Petersen and Rajan 2002). On the other hand,

proponents of securitization argue reputation concerns, regulatory oversight, or sufficient balance sheet risk may have prevented moral hazard on the part of lenders. What were the effects of existing securitization practices on screening? This remains an empirical question.

The second paper, co-authored with Tanmoy Mukherjee, Amit Seru, and Vikrant Vig, investigates the relationship between securitization and screening standards in the context of subprime mortgage loans. The challenge in making a causal claim is the difficulty in isolating differences in loan outcomes independent of contract and borrower characteristics. First, in any cross-section of loans, those that are securitized may differ on observable and unobservable risk characteristics from loans kept on the balance sheet (not securitized). Second, in a time-series framework, simply documenting a correlation between securitization rates and defaults may be insufficient. This inference relies on establishing the optimal level of defaults at any given point in time. Moreover, this approach ignores macroeconomic factors and policy initiatives that may be independent of lax screening and yet may induce compositional differences in mortgage borrowers over time. For instance, house price appreciation and the changing role of government-sponsored enterprises (GSEs) in the subprime market may also have accelerated the trend toward originating mortgages to riskier borrowers in exchange for higher payments.

We overcome these challenges by exploiting a specific rule of thumb in the lending market, which induces exogenous variation in the ease of securitization of a loan compared to a loan with similar characteristics. This rule of thumb is based on the summary measure of borrower credit quality known as the Fair Isaac Company (FICO) score. Since the mid-1990s, the FICO score has become the credit indicator most widely used by lenders, rating agencies, and investors. Underwriting guidelines established by the GSEs, Fannie Mae, and Freddie Mac, standardized purchases of lenders' mortgage loans. These guidelines cautioned against lending to risky borrowers, the most prominent rule of thumb being not lending to borrowers with FICO scores below 620 (Avery et al. 1996;). While the GSEs actively securitized loans when the nascent subprime market was relatively small, since 2000 this role has shifted entirely to investment banks and hedge funds (the nonagency sector). We argue that persistent adherence to this ad-hoc cutoff by investors who purchase securitized pools from nonagencies generates a differential increase in the ease of securitization for loans. That is, loans made to borrowers that fall just above the 620 credit cutoff have a higher unconditional likelihood of being securitized and are therefore more liquid relative to loans below this cutoff.

To evaluate the effect of securitization on screening decisions, we examine the performance of loans originated by lenders around this threshold. As an example of our design, consider two borrowers—one with a FICO score of 621

(620⁺), the other with a score of 619 (620⁻)—who approach the lender for a loan. In order to evaluate the quality of the loan applicant, screening involves collecting both hard information, such as the credit score, and soft information, such as a measure of future income stability of the borrower. Hard information, by definition, is something that is easy to contract upon (and transmit), while the lender has to exert an unobservable effort to collect soft information (Stein 2002). We argue that the lender has a weaker incentive to base origination decisions on both hard and soft information at 620⁺ where there is a higher likelihood that this loan will be eventually securitized. In other words, because investors purchase securitized loans based on hard information, the cost of collecting soft information is internalized by lenders to a lesser extent when screening borrowers at 620⁺ than at 620⁻. Therefore, by comparing the portfolio of loans on either side of the credit score threshold, we can assess whether differential access to securitization led to changes in the behavior of lenders who offered these loans to consumers with nearly identical risk profiles.

Using a sample of more than one million home purchase loans during the period 2001–2006, we empirically confirm that the number of loans securitized varies systematically around the 620 FICO cutoff. For loans with a potential for significant soft information—low documentation loans—we find that there are more than twice as many loans securitized above the credit threshold at 620⁺ vs. below the threshold at 620⁻. Since the FICO score distribution in the population is smooth (constructed from a logistic function), the underlying creditworthiness and demand for mortgage loans (at a given price) is the same for prospective buyers with a credit score of either 620⁻ or 620⁺. Therefore, these differences in the number of loans confirm that the unconditional probability of securitization is higher above the FICO threshold, i.e., it is easier to securitize 620⁺ loans.

Strikingly, we find that while 620⁺ loans should be of slightly better credit quality than those at 620⁻, low documentation loans that are originated above the credit threshold tend to default within two years of origination at a rate 10–25 percent higher than the mean default rate of 5 percent (which amounts to roughly a 0.5–1 percent increase in delinquencies). As this result is conditional on observable loan and borrower characteristics, the only remaining difference between the loans around the threshold is the increased ease of securitization. Therefore, the greater default probability of loans above the credit threshold must be due to a reduction in screening by lenders.

Since our results are conditional on securitization, we conduct additional analyses to address selection on the part of borrowers, lenders, or investors as explanations for the differences in the performance of loans around the credit threshold. First, we rule out borrower selection on observables, as the loan terms and borrower characteristics are smooth through the FICO score threshold. Next, selection

of loans by investors is mitigated because the decisions of investors (Special Purpose Vehicles, SPVs) are based on the same (smooth through the threshold) loan and borrower variables as in our data (Kornfeld 2007).

Finally, strategic adverse selection on the part of lenders may also be a concern. However, lenders offer the entire pool of loans to investors, and, conditional on observables, SPVs largely follow a randomized selection rule to create bundles of loans out of these pools, suggesting securitized loans would look similar to those that remain on the balance sheet (Gorton and Souleles 2005). Furthermore, if at all present, this selection will tend to be more severe below the threshold, thereby biasing the results against us finding any screening effect. We also constrain our analysis to a subset of lenders who are not susceptible to strategic securitization of loans. The results for these lenders are qualitatively similar to the findings using the full sample, highlighting that screening is the driving force behind our results.

Could the 620 threshold be set by lenders as an optimal cutoff for screening that is unrelated to differential securitization? We investigate further using a natural experiment in the passage and subsequent repeal of antipredatory laws in New Jersey (2002) and Georgia (2003) that varied the ease of securitization around the threshold. If lenders use 620 as an optimal cutoff for screening unrelated to securitization, we expect the passage of these laws to have no effect on the differential screening standards around the threshold. However, if these laws affected the differential ease of securitization around the threshold, our hypothesis would predict an impact on the screening standards. Our results confirm that the discontinuity in the number of loans around the threshold diminished during a period of strict enforcement of antipredatory lending laws. In addition, there was a rapid return of a discontinuity after the law was revoked. Importantly, our performance results follow the same pattern, i.e., screening differentials attenuated only during the period of enforcement. Taken together, this evidence suggests that our results are indeed related to differential securitization at the credit threshold and that lenders did not follow the rule of thumb in all instances. Importantly, the natural experiment also suggests that prime-influenced selection is not at play.

Once we have confirmed that lenders are screening more rigorously at 620⁻ than 620⁺, we assess whether borrowers were aware of the differential screening around the threshold. Although there is no difference in contract terms around the cutoff, borrowers may have an incentive to manipulate their credit scores in order to take advantage of differential screening around the threshold (consistent with our central claim). Aside from outright fraud, it is difficult to strategically manipulate one's FICO score in a targeted manner, and any actions to improve one's score take relatively long periods of time—about three to six months. Nonetheless, we investigate further using the same natural experiment evaluating the performance effects over a relatively short time horizon.

The results reveal a rapid return of a discontinuity in loan performance around the 620 threshold, which suggests that rather than manipulation, our results are largely driven by differential screening on the part of lenders.

As a test of the role of soft information on screening incentives of lenders, we investigate the full documentation loan lending market. These loans have potentially significant hard information because complete background information about the borrower's ability to repay is provided. In this market, we identify another credit cutoff, a FICO score of 600, based on the advice of the three credit repositories. We find that twice as many full documentation loans are securitized above the credit threshold at 600⁺ vs. below the threshold at 600⁻. Interestingly, however, we find no significant difference in default rates of full documentation loans originated around this credit threshold. This result suggests that despite a difference in ease of securitization around the threshold, differences in the returns to screening are attenuated due to the presence of more hard information. Our findings for full documentation loans suggest that the role of soft information is crucial to understanding what worked and what did not in the existing securitized subprime loan market.

Can Self-Control Explain Turning Down Free Money?

The third paper, co-authored with Brian C. Cadena, uses insights from behavioral economics to explain a particularly bizarre borrowing phenomenon: About one in six undergraduate students who are offered interest-free loans turn them down. The students we observe making these choices are not atypical: Our sample consists of full-time students enrolled at public or private nonprofit four-year institutions. Upon filling out the application required for all forms of need-based aid, these students demonstrated sufficient financial need to qualify for interest-free loans sponsored by the federal government.

There are three principal reasons we should be surprised that one-sixth of eligible students turn down the subsidized loans that they are offered. First, these loans do not accrue interest until six months after students leave school. These interest payments represent a direct transfer to the student, and the amount is nontrivial. If a student eligible for the maximum in each year chose to accept the loan each year, with an interest rate of four percent, the government subsidy would be worth more than \$1,500. The "free money" aspect of below-market interest rates on student loans has long been a part of conventional economic wisdom. One classic undergraduate textbook explains the benefits of a \$1,000 interest-free loan as follows: "You could at least take the money and put it in a savings bank, where you will earn at least 4 percent per year. Each year you can draw out the \$40 interest and throw a big party. Finally . . . you can draw out the \$1,000, plus the last year's interest; repay the \$1,000; and

have \$40 for a last party” (Alchian and Allen 1964). We are unaware, however, of any work that has tried to systematically understand why students do not take advantage of this potential \$1,500 “gift” from the government.

Seeing students turn down interest-free loans is also surprising because government-sponsored loans help to make increasingly expensive educational costs more affordable. During a period when the return to higher education has dramatically increased, the rising costs of an undergraduate education have far outpaced the increase in the availability of grants and scholarships (Avery and Hoxby 2003; Dynarski 2002;). In the absence of these programs, students would find it costly to borrow against their future earnings due to informational asymmetries between students and private lenders. The federal government has recognized this potential market failure and offers students grants and loans through large-scale programs, which provided \$90 billion in total aid during the 2004–2005 school year. The Stafford Loan Program was originally legislated through the Higher Education Act of 1965 and has been awarded based on a straightforward needs test since 1987. By rejecting their government-sponsored loans, students who choose to borrow are effectively choosing to borrow at a significantly higher cost.

Finally, student aid offers are administered under the presumption that students will accept all of their need-based aid. Students must actively reduce or reject any amount they do not wish to borrow. In fact, if a student has borrowed before, she needs to do nothing at all to receive the full amount of any subsidized loan awarded by her financial aid office. As other researchers have shown, there is a significant mental barrier to making decisions which deviate from the default, known as “default bias” (see, for example, Choi et al. [2003]). In the absence of competing forces, therefore, students should rarely deviate from the default of accepting all of their need-based aid, including interest-free loans.

While the benefits of subsidized student loans are seemingly unambiguous, borrowing does increase a student’s short-term liquidity. As the quotation at the beginning of this section suggests, interest-free loans are a double-edged sword in the hands of an easily tempted consumer. Despite the fact that these loans make it possible to smooth consumption over time, having such a large amount of liquidity can lead to overspending, i.e., consuming more out of current income than an agent with perfect willpower would desire.

We formalize this argument by modeling a college student choosing how much to borrow while in school. We show that a rational agent would not turn down interest-free student loans because doing so requires foregoing a significant government subsidy in addition to limiting future liquidity. We then discuss how rejecting the loan is consistent with models of self-control from the theoretical literature that allow rational consumers to prefer a subset of choices to the complete set. The debt-averse behavior we observe, therefore, may be the optimal choice a forward-thinking student can make

knowing that in the following period she will be tempted to overspend.

There are, however, alternative reasons why a potential borrower could make the “wrong” decision. Certainly some students will reject the loan because they do not understand how the subsidy works or do not analyze the decision closely enough. Students may also falsely believe that borrowing through student loan programs will hurt their credit score. In fact, each month while the student is in school the lender reports that the loan account is being paid as agreed, establishing a solid credit history. Apart from these information problems, some students may reject their loans because of the hassle that borrowing creates, such as having to keep track of the documents associated with a loan or being required to make a payment each month after graduation. Still others may reject the loans because they have acquired an antidebt ethic such that indebtedness carries a psychological cost. Because any of these factors can potentially explain the significant fraction of students who turn down their interest-free loans, we cannot simply interpret high rejection rates as evidence of a self-control motive.

To determine whether self-control plays an important role, the ideal quasi-experimental setting would fix the benefits of borrowing while varying students’ exposure to increased liquidity. A feature of financial aid disbursement does exactly this: Although the value of the subsidy is unchanged, needy on-campus students have their loans automatically applied to their educational expenses while similarly needy off-campus students receive a portion of their aid in cash. Comparing the take-up rates of these two groups provides us with a means to test whether self-control motives are responsible for some of the failure in take-up.

However, if students who reject their loans for other reasons tend to live in off-campus housing, this comparison may incorrectly attribute differences in take-up rates to differences in liquidity. To address these selection concerns, we form a difference-in-differences estimator, using students whose liquidity is unaffected by their housing location as a counterfactual. For these students, any loan funds will be applied directly to their tuition bill regardless of where they live. Importantly, each member of the counterfactual group is also eligible for the maximum subsidized loan. If students reject their loans to avoid excess liquidity, the difference between on- and off-campus rejection rates should be much larger for the group who potentially receive their loans in cash.

Our estimates from the 1999–2000 and 2003–2004 waves of the National Postsecondary Student Aid Study support a self-control explanation: Students who would have received cash from their loans turn down the subsidized loan seven percentage points more frequently than similarly needy students who live on-campus. Importantly, there is no significant difference in rejection rates across housing locations for students who would not receive cash regardless of where they live. These difference-in-differences results suggest that

the increased liquidity created by living off-campus leads students to reject their loans in higher numbers.

In further support of this hypothesis, we then isolate the variation in living off-campus resulting from supply constraints at the school level. Specifically, we estimate the effect of liquidity on take-up using the university's dormitory capacity (number of beds per student) as an instrument for the housing location decision. To maintain the advantages of the difference-in-differences framework, we also instrument for the interaction of location and loans in excess of tuition, which determines whether the loan is distributed in cash. This exactly identified IV specification (two endogenous regressors and two instruments) thus continues to compare the on/off-campus differences in take-up between students whose loans pay only tuition and students whose loans also pay room and board. In contrast to the OLS results that potentially suffer from endogenous selection into on- or off-campus housing, the IV results isolate the variation in housing location and exposure to liquidity that derives from differences in the supply of on-campus housing units. The IV results complement the earlier findings, again demonstrating a differential willingness to borrow across housing locations, even when controlling for differences in school quality that are correlated with housing capacity. These sets of results are difficult to explain without self-control concerns affecting students' decisions.

These findings provide evidence that consumers choose to limit their available choices in a natural setting, i.e., one not generated by the researcher. While several laboratory and simulation studies have presented evidence consistent with consumers exercising self-control (for example, Ariely and Wertenbroch 2002), studies using data and situations not generated by the researcher have tended to find evidence of consumers succumbing to the temptation of earlier consumption (DellaVigna and Malmendier 2006; Shapiro 2005,). In addition, while most field experiments are explicitly designed to hold constant any differences between two choices except for the level of commitment, our results reveal that some consumers are willing to pay a substantial amount of money in order to restrict their future decisions. These two features distinguish this study as particularly compelling evidence for the existence and importance of time-inconsistent preferences.

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