



# Household Borrowing after Personal Bankruptcy

## Abstract

A large literature has examined factors leading to filing for personal bankruptcy, but little is known about household borrowing after bankruptcy. Using data from the Survey of Consumer Finances, we find that relative to households that have never filed for bankruptcy but have comparable demographics, earning power, risk aversion and attitudes toward borrowing, filers generally have a more limited access to unsecured credit but borrow more secured debt after bankruptcy. Filers also pay higher interest rates on all types of debt. In addition, we find that credit access and borrowing costs improve as more time passed since filing. However, filers are more prone to experience renewed debt payment difficulties, to accumulate less wealth, and to use expensive credit sources like payday loans than comparable nonfilers, even many years after filing. These findings suggest that for many bankrupt households, debt discharges alone had not provided an effective fresh start as intended by the law. Our estimate also provides moment conditions against which the equilibrium models of household credit can be calibrated.

JEL Classifications: J22, K35

Key words: Personal bankruptcy, credit constraints, household finance

# 1 Introduction

A cornerstone of the U.S. credit markets is the personal bankruptcy law. Amid the fast growth of household credit in the past two decades, the number of consumers that have sought for bankruptcy protection has also increased dramatically in the United States, with the annual rate of personal bankruptcy filings rising from 3.6 filings per thousand households in 1980 to nearly 14 in 2004. Such a rapid rise has motivated an extensive literature searching for the causes of personal bankruptcy. However, most of this literature focuses squarely on household financial conditions prior to their bankruptcy filings and pays little attention to household borrowing following their bankruptcy (or “post-bankruptcy borrowing”). This is somewhat surprising because what households expect with respect to post-bankruptcy borrowing should influence the filing decision in the first place. Meanwhile, studying post-bankruptcy financial well-being is critical to evaluating the effectiveness of the bankruptcy law regarding one of its most important intentions—to provide debtors a “fresh start.” Furthermore, documenting post-bankruptcy borrowing provides useful moment conditions against which the dynamic equilibrium models of household credit with bankruptcy features can be calibrated.

In this paper, we seek to provide a comprehensive analysis on household borrowing after personal bankruptcy filings. Using data from the Survey of Consumer Finances, we examine the differences in the use of credit between those households who have ever filed for bankruptcy and those who have never filed, hereafter “filers” and “nonfilers”, respectively. In addition, we study how the effects of bankruptcy filings vary with time passed since the last filing, hereafter “time since filing.” Specifically, for each of the three major household debt categories—credit card debt, first-lien home mortgages, and vehicle loans—we try to answer the following questions: Are filers less likely than comparable nonfilers to acquire new debt? Conditional on having certain types of debt, do filers borrow less or pay higher interest rates? Are filers more likely to experience renewed debt payment difficulties? Do filers’ net worth positions improve over time after filings? How do these effects change with

the staleness and the removal of bankruptcy flags from filers' credit reports?

We find that without controlling for time since filing, filers generally have less usage of credit card debt after bankruptcy than comparable nonfilers but borrow more on mortgages and vehicle loans, perhaps because mortgages and vehicle loans are collateralized and therefore are more secure from lenders' perspective. Specifically, relative to nonfilers with comparable demographics, earning power, risk aversion and attitudes toward borrowing, filers are about 50 percent less likely to have a credit card. Conditional on having a card, lines of credit extended to filers are almost \$12,000 lower. In contrast, filers have a similar likelihood of having a mortgage, and their mortgages have slightly higher loan-to-value ratios at the origination. Filers are also 28 percent more likely to have a vehicle loan. The sizes of filers' vehicle loans, relative to their income, are similar to those of nonfilers. Finally, filers generally pay significantly higher interest rates on all three types of loans than comparable nonfilers.

The effects of bankruptcy filing on household borrowing also depend on whether the bankruptcy filing flag appears on credit reports. The Fair Credit Reporting Act requires that credit bureaus remove a bankruptcy flag from credit reports ten years after a filing. We find that, for households who filed for bankruptcy fewer than nine years earlier—those whose filing flags might remain on their credit reports—the effects of filings on credit card debt and vehicle loans are similar to the general findings stated above, but the effects on first-lien mortgages vary considerably with time since filing. In contrast, relative to comparable nonfilers, households who filed more than nine years earlier—those whose filing flags no longer appear on their credit reports—have similar or higher likelihood of having each of the three types of debt; conditional on having the debt, these filers leverage more and carry higher balances, but do not necessarily pay higher interest rates.

In spite of the reduced-form nature of the empirical strategy employed in this paper, our analysis enables us to infer, to some extent, whether it is through the channel of credit demand or credit supply that bankruptcy filings affect post-bankruptcy borrowing. We make

such inference based on the predictions of standard microeconomic theory on equilibrium debt quantity and interest rate. Our inference leads to the following claims: First, households who filed for bankruptcy fewer than nine years earlier face a lower supply of unsecured credit than comparable nonfilers, but they have higher demand for vehicle loans. Second, relative to comparable nonfilers, households who filed more than nine years earlier have higher demand for all three types of credit. This higher demand is possibly due to the fact that filers may have deliberately deferred their loan requests until the tenth anniversary of filing, after which their credit scores will have improved with the removal of the bankruptcy flag.

Our analysis also reveals that filers continued to experience debt payment difficulties and accumulate less wealth after filing for bankruptcy. Relative to comparable nonfilers, filers are about 30 percent more likely to have fallen behind on their debt payment schedules, and they have substantially lower net worth, even many years after their last filings. We also find that filers are more likely to resort to very expensive credit sources, such as payday loans, presumably because they do not have access to alternative cheaper credit. The persistent financial distress and low wealth accumulation among filers suggest that, for many bankrupt households, debt discharge alone is not sufficient to provide an effective fresh start as intended by the personal bankruptcy law.

This paper contributes to three strands of literature. First, our analysis extends significantly the limited studies on household borrowing and financial well-being after bankruptcy. To the best of our knowledge, this study provides the first set of comprehensive evidence on both the quantity and prices of post-bankruptcy borrowing of major categories of household debt. Second, in recent years, a rapidly increasing volume of literature has used dynamic equilibrium models to study various positive and normative aspects credit markets that allow for personal bankruptcy. These models tend to impose various assumptions about post-bankruptcy credit access, instead of calibrating the models using the observed credit usage and terms. Our findings bridge this gap by providing a set of moment conditions against which such models can be calibrated. Third, our paper contributes to a growing literature on

the effects of filing for personal bankruptcy on consumer behavior. Existing empirical studies have looked into the effects of filings on homeownership, consumption smoothing, and labor supply. This paper complements these studies by providing further evidence about the costs of bankruptcy filing.

The rest of the paper is organized as follows. Section 2 reviews the relevant legislation, theory, and literature; Section 3 describes our data and discusses methodological issues; Sections 4 and 5 present, respectively, descriptive and regression results on post-bankruptcy borrowing; Section 6 examines debt delinquency and wealth accumulation after bankruptcy filings; and Section 7 concludes and discusses directions for future research.

## 2 Background: Legislation, Theory, and Literature

### 2.1 Relevant Legislation

Post-bankruptcy borrowing is affected by two areas of legislation: the Bankruptcy Code that governs the personal bankruptcy filings (Title 11 of the United States Code), and the Fair Credit Reporting Act (FCRA, codified at 15 U.S.C. 1681 et seq.) that regulates how a filing is reported by credit bureaus.

The key component of the Bankruptcy Code is the provision of debt discharge. A debtor can file under Chapter 7 of the Code to obtain a discharge of unsecured debts (with some debts, such as student loans and unpaid tax liabilities, not dischargeable). Alternatively, the debtor can file under Chapter 13 of the Code, where he obtains a debt discharge after paying off a portion of his debt through a three-to-five-year debt repayment plan. In particular, in such a plan, the debtor need not pay unsecured claims in full as long as unsecured creditors receive at least as much under the plan as they would receive if the debtor's assets were liquidated under Chapter 7 (11 U.S.C. 1325).<sup>1</sup>

One data limitation we encounter is that we do not observe under which chapter of the

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<sup>1</sup>See *Bankruptcy Basics* available at <http://www.uscourts.gov/bankruptcycourts/bankruptcybasics.html>.

Code a bankruptcy was filed for. We will discuss in more details later in the paper the potential bias that can arise. However, because historically Chapter 7 filings accounted for about two-thirds of total initial filings, and many of the Chapter 13 filings were converted to Chapter 7 within a couple of years after the initial filing, we argue that our findings here should be very close to the effects of Chapter 7 filings.

Another provision of the Bankruptcy Code that can affect post-bankruptcy borrowing is that it restricts repeated discharges. Specifically, before the bankruptcy reform in 2005, the law prohibited a debtor from obtaining a bankruptcy discharge until six years after being discharged from a previous bankruptcy filing. This limit has been extended to eight years in the Bankruptcy Abuse Prevention and Consumer Protection Act in 2005. As argued below, this temporary removal of the option of obtaining bankruptcy discharges may affect both the decision to file in the first place as well as the demand for and supply of credit after bankruptcy.

The FCRA is also critical to studying post-bankruptcy borrowing because it regulates how a filing is reported by credit bureaus. The most important rule is the time limit on reporting a filing and the associated defaults leading to the filing. Specifically, the FCRA requires that a bankruptcy filing can only stay on credit reports furnished by the credit bureaus for at most 10 years from the date of relief or the date of adjudication.<sup>2</sup> In addition, all other non-bankruptcy defaults can stay on a credit report for only seven years (FCRA §605 (a)(5)).<sup>3</sup>

The next subsection discusses the possible channels through which a bankruptcy filing can affect post-bankruptcy borrowing within the above regulatory framework. We note,

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<sup>2</sup>The date of adjudication is the date when the court decrees that the filer is bankrupt (FCRA §605 (a)(1)).

<sup>3</sup>The FCRA states: “§605 (a) Information excluded from consumer reports. (1) Cases under title 11 [United States Code] or under the Bankruptcy Act that, from the date of entry of the order for relief or the date of adjudication, as the case may be, antedate the report by more than 10 years”; and “(5) Any other adverse item of information, other than records of convictions of crimes which antedates the report by more than seven years.” The FCRA has no rule on the minimum period of time that credit bureaus have to report a bankruptcy filing. Indeed, it is common that credit bureaus remove a Chapter 13 bankruptcy record from a credit report after only seven years. Also, the Act has no time restrictions on using the bankruptcy record that is maintained in the creditor’s proprietary database.

however, that our goal is not to separately identify the effects of each channel. Rather, our discussions serve the purposes of illustrating the complexity regarding how bankruptcy may affect household borrowing and guiding the specifications and interpretations of our empirical analysis. The empirical results we present in the paper can be interpreted as the net effects of all such channels.

## 2.2 Channels through Which Bankruptcy Affects Borrowing

In theory, a bankruptcy filing may affect both the demand for and the supply of post-bankruptcy credit through various channels. First, a bankruptcy filing alters the household balance sheet, which in turn may affect future borrowing. With the existing unsecured debts discharged, the household balance sheet becomes less leveraged. All else equal, a stronger balance sheet may boost both the demand for and the supply of credit.

Second, a bankruptcy filing may result in changes in household preferences and financial sophistication. A debtor may learn how surprisingly easy or difficult it is to go through the legal process of bankruptcy filings. The realized extent of social stigma attached to bankruptcy can also be unexpectedly high or low, which may result in changes in the household's attitudes toward the use of credit. Also, the bankruptcy process may educate households about managing their personal finances.<sup>4</sup> In addition, compared with nonfilers, a recent filer may have a stronger need to re-establish a good credit history. Thus, all else equal, filers might have stronger demand for access to credit, but do not necessarily want to have a larger loan. Overall, given the heterogeneity of the bankruptcy process, it is extremely challenging to predict how in general household preferences and financial sophistication, and in turn overall demand for credit, change after filing for bankruptcy.

Third, from creditors' perspective, the bankruptcy filing can be taken as an important

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<sup>4</sup>Indeed, such educational effect is arguably one of the primary goals of the U.S. bankruptcy law. Congress (1973) suggests that the bankruptcy process should serve as consumer financial education to achieve the ultimate goal of a fresh start. Howard (1987) identifies three different ways that the bankruptcy system could provide a fresh start to consumer debtors: (1) consumer financial education of the debtor, (2) emotional and psychological relief from financial failure, and (3) renewed debtor participation in the open credit economy. See, e.g., Jackson (1998) for a comprehensive discussion.

signal revealing adverse information about a borrower that was previously unobservable. As a result, all else equal, creditors may reduce the supply of credit to filers and charge lofty interest rates to compensate for greater credit risk.

In addition, time since filing can affect both demand for and supply of post-bankruptcy credit. As mentioned earlier, after the tenth anniversary of a bankruptcy, credit bureaus have to remove the filing flag from credit reports. In addition, all derogatory information on credit events leading to the filing disappears by seven years after the bankruptcy. The removal of these flags boosts credit scores, resulting in increases in the supply of credit right after the tenth anniversary or perhaps even earlier (Musto, 2004). Demand for credit may also increase if debtors defer loan requests strategically until the bankruptcy or default flags are removed.

Restrictions on repeated discharges may also influence the demand for and the supply of credit. Such restrictions disappeared six (eight since 2005) years after bankruptcy. A forward-looking debtor would weigh the option value and benefits of an immediate debt discharge as he decides whether to file for bankruptcy. Conditional on having filed, the debtor may want to delay his use of credit until approaching the end of the delay period. Conversely, during the delay period, impaired creditors may be able to garnish debtor's wages and seize assets. This lower collection cost and expected higher recovery can boost the debtor's creditworthiness. Thus, as the refiling restriction is closer to being lifted, one might expect to see increasing demand for and decreasing supply of credit.

Finally, bankruptcy records aside, household financial situations may change after bankruptcy as the adverse conditions that led to the filing, such as job loss, divorce, medical problems, may have improved with time. As a result, the demand for credit could vary depending on the nature of the shocks.

The primary goal of our study is to estimate the *net* impact of bankruptcy on household borrowing. But we also go one step further to infer how the demand for and the supply of credit have changed, on net, using an approach similar to Gropp, Scholz and White (1997).

Specifically, we contrast the estimated effects of bankruptcy filings on interest rate ( $R$ ) and debt quantity ( $Q$ , measured by the likelihood of having a loan and the size of the loan conditional on having one) with predictions of the standard supply-demand model.

To illustrate this, consider a scenario in which we find that filers borrow larger quantities at higher interest rates than comparable nonfilers, denoted by  $(R \uparrow, Q \uparrow)$ . Then we can infer that filers must have a higher demand for credit than comparable nonfilers. Suppose otherwise, that filers have a weaker demand. Then by the standard supply-demand model, filers should borrow less if supply shifts down ( $Q \downarrow$ ) or pay lower interest rate ( $R \downarrow$ ) if supply shifts up. Each of these two outcomes would contradict with the observed changes in quantity of debt and interest rate. Similarly, the combinations of  $(R \uparrow, Q \downarrow)$ ,  $(R \downarrow, Q \uparrow)$ , and  $(R \downarrow, Q \downarrow)$  should indicate that, respectively, the post-bankruptcy supply have shifted down, the supply have shifted up, and the demand have shifted down.

## 2.3 Related Literature

There is a small literature on post-bankruptcy borrowing. Using data from a credit bureau, Musto (2004) finds that the removal of the bankruptcy flag at the tenth anniversary of filing leads to significant increases in the borrower's credit scores as well as in the number and credit limit of bank cards in the short run, but the removal of the filing record leads to lower credit scores and more delinquencies in the ensuing years. However, the lack of information in the credit bureau data on household income, assets, and demographic characteristics limits the scope of this analysis. Also using credit bureau data, Cohen-Cole, Duygan-Bump and Montoriol-Garriga (2009) document that access to credit is limited after bankruptcy, but for only a short period of time and mostly for people with relatively high credit scores. Keys (2008), using the 2004 wave of the National Longitudinal Survey of Youth (NLSY), find that filers are more likely to be declined credit or discouraged to apply for credit. The limitation of the NLSY data is that it samples only a cohort of consumers recently in their 40s.

A few studies look into post-bankruptcy borrowing using data obtained from either

post-bankruptcy surveys or court dockets. In general, these studies find widespread post-bankruptcy use of credit, but that many filers continued to experience financial difficulties after their debt discharges (Stanley and Girth, 1971; Staten, 1993; Braucher, 1993; Warren and Tyagi, 2003; Porter and Thorne, 2006; Porter, 2008). Based on these results, some question the effectiveness of personal bankruptcy in providing fresh start to struggling debtors. (Porter and Thorne, 2006; Zagorsky and Lupica, 2008). However, these studies are mostly descriptive and typically do not have a nonfiler control group.

Our analysis is also related to a much larger literature on what are the factors that induce a personal bankruptcy filing. The general findings are that immediate financial benefits from debt discharge, adverse events (such as job loss, medical expenses, and divorce), and falling social stigma are all positively associated with the likelihood of filing for bankruptcy (Domowitz and Sartain, 1999; Lin and White, 2001; Fay, Hurst and White, 2002; Gross and Souleles, 2002; Warren and Tyagi, 2003; Athreya, 2004).<sup>5</sup> However, these conventional factors appear to be able to explain only a fraction of the enormous increase in personal bankruptcy filing rates in the United States since 1980s (White, 1998; Sullivan, Warren and Westbrook, 2000; Fay et al., 2002).<sup>6</sup> Recent studies suggest that, among other factors, the ease of access to credit, both before and after filing for bankruptcy, may have played a more important role (Livshits, MacGee and Tertilt, 2007*a*; White, 2007). Innovations in consumer credit markets may have led to easier access to credit, especially unsecured credit, which may, in turn, have led to an unsustainable degree of leverage for some households, increasing the immediate financial benefits from bankruptcy discharge. In addition, rapid technological progress in the financial industry made it less costly to screen and manage distressed debtors, resulting in an increased supply of credit to segments of the markets that used to be out of reach for conventional lenders (Dick and Lehnert, 2007; White, 2007). The greater availability of credit to those who filed for bankruptcy may have also reduced the

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<sup>5</sup>Other factors may also play a role in the bankruptcy filing decision, such as behavior bias (Laibson, Repetto and Tobacman, 2003) and availability of other public insurance (Athreya and Simpson, 2006).

<sup>6</sup>See, e.g., Athreya (2005) for a survey of this literature.

detering effects of having a bankruptcy flag on credit reports.

Our study also complements the rapidly growing literature that uses equilibrium models to study issues related to personal bankruptcy, such as the factors driving the sharp rise in the bankruptcy filing rates and the welfare implications of bankruptcy law reforms (Livshits, MacGee and Tertilt, 2007*b*; Chatterjee, Corbae, Nakajima and Rios-Rull, 2007; Li and Sarte, 2006). These theoretical models differ from each other in their assumptions on post-bankruptcy credit access, with default punishment ranging from no penalty to complete financial autarky. Our estimates provide an empirical basis for calibrating such models in future research.

Finally, this paper is related to a growing literature on the effect of bankruptcy filings on consumer and creditor behaviors. Existing empirical studies have looked into the effects of bankruptcy on consumption smoothing (Filer and Fisher, 2005; Filer and Fisher, 2007), labor supply (Han and Li, 2007), wealth accumulation (Repetto, 1998), and homeownership (Li and Carroll, 2008; Eraslan, Li and Sarte, 2007; White and Zhu, 2008), as well as the effects of the personal bankruptcy law on the demand for and the supply of credit (Lin and White, 2001; Fan and White, 2003; Gropp et al., 1997). Our study augments this literature with a comprehensive analysis on the credit consequences of bankruptcy filings.

## 3 Data and Methodologies

### 3.1 Data and Sampling

Our main data source is the Survey of Consumer Finances (SCF), which is widely believed to be the best source of information about household finances in the United States. Sponsored by the Federal Reserve Board, this triennial survey collects detailed information on household balance sheet, income, and demographic characteristics of U.S. households.<sup>7</sup>

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<sup>7</sup>The survey oversamples the high end of the wealth distribution in order to obtain more precise estimates of national household wealth, once weighted appropriately. For a more detailed description of the SCF, see the survey's website at <http://www.federalreserve.gov/PUBS/oss/oss2/scfindex.html>.

Starting from the 1998 wave, the SCF asks respondents, “have you (or your spouse/partner) ever filed for bankruptcy?” If the answer is “Yes”, the survey will continue to ask, “when was the most recent time?” As noted earlier, the SCF lacks information on the chapter choice in a bankruptcy filing.

Our empirical analysis focuses on three major types of household debt: credit card debt, first-lien home mortgages, and vehicle loans. These three types of debt account for over 80 percent of total household debt.<sup>8</sup> Because credit card debt is unsecured and mortgages and vehicle loans are secured by collateral, focusing on these debt categories also help contrast the potentially different effects of bankruptcy filing on secured and unsecured loans.

Our study uses the data from the 1998, 2001, 2004, and 2007 waves of the SCF. We restrict our sample to the households whose heads have not reached typical retirement age. Specifically, we include, for credit card debt, only those between 25 and 65 years old in the survey year and, for vehicle loans and mortgages, those between 25 and 65 years old at the time when the loans were originated. We also restrict our sample to those with a normal household income greater than \$3,000 in 2004 dollars (removing households near the lowest percentile of the income distribution).

Finally, we take the following measures to address the situation of multiple accounts within each type of debt. For credit card debt, credit limits and card balances are the totals on all cards, but the interest rate used in our analysis is the rate on the card with the highest balance;<sup>9</sup> for first-lien mortgages, we restrict our analysis to the mortgage on the primary residence; and for vehicle loans, we restrict our analysis to the loan on the first vehicle purchased after bankruptcy filing.

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<sup>8</sup>The SCF also contains information on various other types of debt, such as home equity loans and home equity lines of credit. We do not present our results on them mainly because only a handful number of bankrupt households have acquired them post bankruptcy.

<sup>9</sup>This restriction is due to the data availability because the SCF collects credit card interest rate information for only the card with the highest balance.

## 3.2 Empirical Models

We use various regression techniques to analyze the effects of bankruptcy filing and the time since filing on post-bankruptcy credit access, debt amount, and borrowing costs. Specifically, for credit card debt, access is measured by the likelihood of having a credit card and the ratio of credit limit to income, and debt amount by the ratio of card balance to household income; for first-lien mortgages, access is measured by the likelihood of having a mortgage, and debt amount by loan-to-value ratio (LTV) at origination; for car loans, access is measured by the likelihood of having a vehicle loan, and debt amount by loan-to-income ratio (LTI) at origination. Finally, to take into account the variations in market interest rate levels in different origination years, we measure borrowing costs using the spreads of the interest rate on each type of debt over yields on comparable maturity Treasury securities in that year.

In a generic regression, we use the following model specification:

$$y_{it} = \beta B_{it} + \alpha Z_{it} + \epsilon_{it}. \quad (1)$$

The variable  $B_{it}$  is a vector of dummy variables indicating, for household  $i$  at time  $t$ , how many years have elapsed after the most recent bankruptcy filing, and  $Z_{it}$  is a vector of control variables including proxies for household preferences, and demographic and income characteristics. Specifically,  $Z_{it}$  includes household head age, race, educational attainment, family size, marital status, tenure of current job, normal income quartiles, risk aversion, and attitudes toward borrowing.<sup>10</sup> In all regressions, we also include year dummies to control for variations in economy-wide conditions.

For binary choice dependent variables, such as whether a household had a certain type of loan or not,  $y_{it}$  is a latent variable. Define an indicator variable  $L_{it}$  that equals to 1 if the

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<sup>10</sup>A few important risk variables that the SCF data do not have include household's credit score and geographic characteristics (not available in the public version of the data). There may also be other unobservable household heterogeneity that affects both bankruptcy filing decisions and post-bankruptcy borrowing. To the extent that these variables may be correlated with household demographics, earning power, and preferences, the impact of such data limitation is mitigated by controlling for as many as possible observable variables.

household has such debt and 0 otherwise. We assume that

$$L_{it} = 1, \text{ if } y_{it} \geq 0; L_{it} = 0, \text{ if otherwise.}$$

We then use Logit regressions to estimate these models with binary dependent variables.

For continuous dependent variables where  $y_{it}$  is fully observable, we use ordinary least squares (OLS) regressions to estimate equation (1). These continuous dependent variables include the ratio of credit card limit to income, mortgage LTV, vehicle loan LTI, and interest rate spreads. For continuous dependent variables where  $y_{it}$  is censored, including credit card balance to income and to credit limit ratios, we use Tobit regressions to estimate equation (1).

### 3.3 Measurement Issues

We now discuss two main measurement issues related to special features of the SCF data. The first one is that in the public release of the SCF data, the exact timing of the last filing is masked: the reported number of years since the last filing is rounded up to the nearest odd number. To address this issue, we create alternative sets of dummy variables to indicate the range intervals of time since filing. Using such dummy variables, instead of a continuous variable, has two advantages. First, it allows us to address the possible nonlinear effect of time since filing. Second, it allows us to use cut-off points that take into account the time restrictions in both the Bankruptcy Code and the FCRA. As noted in Section 2, a filer cannot refile for bankruptcy until after the sixth anniversary of the last bankruptcy, and the bankruptcy flag is removed from credit reports after the tenth anniversary of filing. Our discussions there suggest that both the demand for and the supply of credit may change at these critical points in time.

In our baseline specifications, we first consider a coarse partition of the sample that has only one dummy variable indicating whether the household has ever filed for bankruptcy

(equal to 1 if filed, 0 otherwise). We then conduct a finer partition that contains a set of dummy variables indicating that the bankruptcy was filed one year earlier, two-five years earlier, six-nine years earlier, and more than nine years earlier. We also consider other partitions between the coarsest and the finest, with dummy variables indicating that the bankruptcy was filed between one to five years earlier or more than five years earlier, and with dummy variables indicating that the bankruptcy was filed between one to nine years earlier or more than nine years earlier. The key results with these alternatives, not shown, are consistent with those reported here.<sup>11</sup>

The second measurement issue is a timing mismatch between when each wave of the SCF was conducted and when loans recorded in the survey were originated. To estimate equation (1) and the related OLS and Tobit regressions, the variables on both sides of the equations ought to be valued at the same time. Also, we need to identify those loans acquired after bankruptcy for filers. Because the SCF is cross-sectional, household characteristics and financial conditions at the time of the loan application are not directly observable (except for the small number of loans originated shortly before the surveys). To maximize our use of the data, we take the following measures to address this timing mismatch issue.

First, we know that all credit cards possessed by filers at the time of the survey were obtained after bankruptcy because all credit cards possessed before bankruptcy became void upon the filing.<sup>12</sup> However, the SCF has no information on when exactly a card was issued. Therefore, for relevant regressions involving credit card debt, we use the values at the time of survey for all dependent and independent variables. In particular, to make it comparable across different survey years, we measure borrowing costs with the spreads between credit card interest rates and the yields of two-year Treasury securities in the survey year.

Second, for mortgages and vehicle loans, the SCF asks the respondents “when the loan was taken?” Combining this information and the time since filing, we can identify the

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<sup>11</sup>Estimations with dummy variables for each point of reported time, ranging from 1 to over 11, have lower precisions as the numbers of observations for some year-groups are too small.

<sup>12</sup>However, not all credit card debt are discharged in Chapter 13 filings.

loans originated after the last bankruptcy filing for filers and infer the time since filing as of the origination of these loans. In measuring debt quantity and borrowing costs, we treat mortgages and vehicle loans differently. For mortgages, the SCF asks about both the amount of mortgage acquired and the house price at the origination. Thus, we can calculate the LTV at the origination. We measure borrowing costs with the spreads of mortgage interest rates over the yields of ten-year Treasury securities in the year of the origination. We keep only mortgages that were used for new purchases (as opposed to refinancing). Also, we restrict the mortgages to those originated within five years prior to the survey to make the control variables collected in the survey year sufficiently close to their values as of the time of origination.

For vehicle loans, the SCF asks for the original amount of the loan but not the original vehicle price. Because the SCF does not ask for income information retrospectively, we use “normal income” reported in the survey year to estimate LTI at the origination. Again, we mitigate the approximation error by restricting the analysis to the loans taken within five years prior to the survey.<sup>13</sup> We measure borrowing costs with the spreads of vehicle loan interest rates over the yields of five-year Treasury securities in the year of vehicle purchase.

## 4 Descriptive Statistics

In this section, we present descriptive statistics on bankruptcy filing status, household credit access, debt amount, borrowing costs, overall borrowing, and financial health after bankruptcy filings. Note that all summary statistics except the number of observations are computed using the sampling weights provided with the SCF.

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<sup>13</sup>“Normal income” does not include the transitory income fluctuations in the survey year and is supposedly more stable than current income. See the Appendix for details on the SCF questions on normal income.

## 4.1 Bankruptcy Filing Status

Table 1 summarizes bankruptcy filing status reported in the SCF. Overall, the occurrence of bankruptcy filings in the SCF is similar to the national bankruptcy statistics. First, about 1.3 percent of households filed for bankruptcy in the year just prior to being surveyed for all four waves of surveys together. This is consistent with the annual rate of personal bankruptcy filing based on the national statistics over the same period. Second, the fraction of households who have *ever* filed for bankruptcy rose from 8.5 percent in 1998 to 12 percent in 2007, also consistent with the figures computed from various credit bureau data.<sup>14</sup>

## 4.2 Demographics, Income, and Preferences

Table 2 contrasts household characteristics, including demographics, income, risk aversion and attitudes toward borrowing, between filers and nonfilers. The summary statistics suggest that, on average, filers have lower earning power but are generally more willing to borrow than nonfilers. Specifically, filers have lower normal income and are less likely to have college degrees, less likely to be married or self-employed, more likely to be nonwhite, more likely to have overspent in the survey year, and in general are more willing to borrow. Perhaps paradoxically, filers are also more likely to have higher risk aversion (see Appendix for the definitions of “overspending”, “credit attitude”, and “risk aversion”).<sup>15</sup> However, the two groups are similar in average household head age and family size.

## 4.3 Credit Card Debt, Mortgages, and Vehicle Loans

Statistics on credit card debt are shown in panel A of Table 3. On average, filers have fewer credit cards than nonfilers. About 61 percent of filers have credit cards, compared with 75

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<sup>14</sup>There were a large number of households filed for bankruptcy before the 2005 reform. However, because the 2007 SCF was in the field nearly two years after the filing peak and the number of years after filing was rounded to the next odd number, we cannot see an appreciable mass of filing prior to the reform in the public release of the SCF data.

<sup>15</sup>See the appendix for more information about the SCF questions regarding overspending, risk aversion and attitude toward borrowing.

percent of nonfilers. Conditional on having a credit card, filers also have significantly lower credit limits, by \$12,000. However, filers borrow more conditional on having a card. They are more likely to have an unpaid balance; conditional on having unpaid balances, filers' balances are in turn moderately higher in dollar amount and significantly higher as a ratio to normal income or to credit limit. Moreover, filers pay average interest rate spreads of 11.3 percent on their balances, about 1.6 percentage points higher than those paid by nonfilers.

As shown in panel B, filers have a slightly lower likelihood of having acquired mortgages; but conditional on having a mortgage, filers have a LTV that is almost 9-percentage-point higher and pay mortgage rate spreads that are half a percentage point higher. As shown in panel C, 48 percent of filers have acquired a vehicle loan after filing for bankruptcy, a fraction significantly higher than that of nonfilers, 38 percent. Conditional on having a vehicle loan, filers borrow similar amount relative to their income. However, filers pay an average rate spread of 6.5 percent on their vehicle loans, which is notably higher than the average spread paid by nonfilers, 4.3 percent.

#### **4.4 Overall Borrowing and Financial Health**

In panel D of Table 3, we present summary statistics on overall household borrowing and financial health. Overall, filers appear to be more credit constrained than nonfilers. Close to 50 percent of filers, more than double that of nonfilers, report that they have been either rejected on at least one loan application or have been discouraged from applying for a loan.

Despite their higher likelihood of being credit constrained, filers are more likely to have some debt and have a much more leveraged balance sheet, as indicated by the higher debt-to-asset ratio, than nonfilers.<sup>16</sup> In addition, filers are far more likely to be or have been behind in their debt payments during the five years prior to the survey, and have a lower net worth, relative to normal income, than nonfilers.

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<sup>16</sup>There is no strong evidence that filers are more persistent in pursuing credit. Among those declined borrowers, about two-thirds apply again regardless whether they ever filed for personal bankruptcy.

## 5 Regression Results on Post-bankruptcy Borrowing

Filers differ from nonfilers not just in their bankruptcy histories but also in many other dimensions, including their preferences, demographic, and financial conditions. To isolate the effects of bankruptcy filing on household borrowing, we use a regression approach to control for the observable differences in these factors. This section reports these regression results. Note that our discussions here focus on the coefficients on bankruptcy filing status. To save space, estimated coefficients on other control variables—those discussed in Section 3—are reported in a separate appendix that is available upon request. Also, the reported standard errors are adjusted using the procedure provided by the SCF to correct the multiple imputations bias, they are also adjusted for clustering when applicable.<sup>17</sup>

### 5.1 Credit Card Debt

Table 4 shows regression results for credit card debt. Columns (1) and (2) are based on Logit regressions of whether or not households have a credit card. Conditional on having a credit card, Columns (3)-(4) are based on OLS regressions of credit limit to income ratio, Columns (5)-(8) are based on Tobit regressions of card balance to income and to credit limit ratios, censored at zero balance, and Columns (9)-(10) are based on OLS regressions of rate spreads conditional on having a positive balance. Several points are worth noting. First, bankruptcy filing has a negative effect on the probability of having unsecured credit; however, the negative effects decrease with time since filing and essentially disappear for those who filed more than nine years earlier. Specifically, as shown in Column (1), the odds ratio estimates suggest that the likelihood of a filer obtaining a new credit card, unconditional on time since filing, is slightly over half of that of a nonfiler with comparable characteristics. (The unconditional likelihood of having a credit card is 75 percent for nonfilers. See Table 3.) In addition, as shown in Column (2), the likelihood of a household who filed a year earlier

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<sup>17</sup>For a detailed description of this procedure, see the SCF data dictionary at <http://www.federalreserve.gov/pubs/oss/oss2/2004/scf2004home.html>.

having a new credit card is only about 16 percent of the likelihood of a comparable nonfiler. The odds ratio increases to 53 percent for those who filed two to five years earlier, 74 percent for those who filed six to nine years earlier, and 77 percent for those who filed over nine years earlier.

Second, even for filers that managed to get a card, bankruptcy still has a negative effect on the credit limit extended, and the effect is largely constant over time except when time since filing is over nine years. As shown in Column (3), unconditional on time since filing, the credit limit to income ratio of a filer is 14 percentage points lower than that of a comparable nonfiler. Noticeably, while the credit limit-to-income ratio of those who filed fewer than nine years earlier is all around 22 to 24 percentage points lower than that of a comparable nonfiler, the ratio of those who filed more than nine years earlier is not statistically different from that of a comparable nonfiler (Column 4).

Third, conditional on having a card, filers have moderately higher debt balance relative to their normal income, though the differences are not statistically significant for all filer groups by time since filing. Moreover, filers have higher utilization rates than their comparable nonfilers. We also find that conditional on having a credit card, the likelihood of carrying credit card debt (not shown) among filers is strikingly higher than nonfilers. On average, filers are almost three times more likely to carry credit card debt than comparable nonfilers, and the margin is the highest for those who filed most recently. This result should be interpreted with a grain of salt because the higher likelihood of carrying credit card balances might merely reflect the debt not discharge in a Chapter 13 filing, which is exactly one of the most important factors leading to the filing in the first place. As shown in Column (5), unconditional on time since filing, the point estimate suggests the credit card balance to income ratio of filers as a whole is about 2.8 percentage points higher than that of comparable nonfilers. Controlling for time since filing, we find that those who filed more than nine years earlier have a significantly higher balance-to-income ratio than comparable nonfilers (Column 6). Furthermore, as shown in Column (7), the utilization rate among

filers, unconditional on time since filing, is 22 percentage points higher than that of comparable nonfilers. The coefficients in Column (8) are all statistically significant and positive, suggesting that regardless of time since filing, filers tend to use credit limits available to them more intensively.

Fourth, filers, except those who filed fewer than nine years earlier, pay notably higher rates on their credit card debt than comparable nonfilers. As shown in Column (9), unconditional on time since filing, the rate spreads that filers pay on their credit card debt balance are 1.2 percentage points, or about 12 percent, higher than those paid by comparable nonfilers. (The average rate spread for nonfiler is about 9.9 percent. See Table 3.) Such heavy premium is only applied to those filers whose bankruptcy flags remain on their credit reports. As shown in Column (10), while those who filed fewer than nine years earlier pay 1.6 to 2 percentage points higher than comparable nonfilers, those who filed over nine years earlier pay a rate that is only higher than that paid by comparable nonfilers by less than 0.5 percentage point.

To summarize, households who filed for bankruptcy fewer than nine years earlier appear to have a significantly lower likelihood of having a new credit card and lower credit limit relative to their normal income, but they tend to use their credit more intensively and pay significantly higher spreads. However, these statistics of those who filed more than nine years earlier are not as dramatically different from those of comparable nonfilers, except that filers tend to carry higher balance relative to both normal income and credit limit.<sup>18</sup>

## 5.2 First-Lien Mortgages

Table 5 shows regression results for first-lien mortgages. Columns (1) and (2) are based on Logit regressions of whether households obtained a first-lien mortgage in a given year after filing for bankruptcy, Columns (3)-(4) are based on OLS regressions of LTV and Columns

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<sup>18</sup>The results are consistent with Musto (2004): because bankruptcy filing flag was removed from credit report at the tenth anniversary, filers saw a boost in their credit scores and borrowed more than what they would have if the flag were not removed.

(5)-(6) are based on OLS regressions of rate spreads, conditional on having obtained a mortgage. Several points are worth noting. First, all else equal, the effect of bankruptcy history on the likelihood of obtaining a mortgages is negative for recent filers, insignificant for those who filed more than several years earlier, but turns positive for those who filed more than nine years earlier. As shown in Column (2), the coefficients on time since filing dummies change from negative and statistically significant for those filed one year earlier, to statistically insignificant for those filed between two to nine years earlier, and to positive and statistically significant for those filed more than nine years earlier. The odds ratio estimates suggest that those who filed one year earlier are 81 percent, or 43 percentage points, less likely to obtain a mortgage than comparable nonfilers, while those who filed more than nine years earlier are 38 percent, or 20 percentage points, more likely to obtain a mortgage than comparable nonfilers. Because of this nonlinear effect, an estimation without controlling for time since filing would yield no statistically significant effect of bankruptcy filing on obtaining a first-lien mortgage.

Second, conditional on having obtained a mortgage, filers, mostly those who filed six to nine years earlier, have higher LTVs on their mortgages. As shown in Column (3), unconditional on time since filing, filers have statistically significantly higher LTVs on their mortgages than comparable nonfilers do. But the margin is small in magnitude, at only 5 percentage points. (The average LTV for nonfilers is 79 percent. See Table 3.) As shown in Column (4), this effect owes mostly to the significantly higher LTV by those who filed six to nine years earlier.

Third, conditional on having obtained a mortgage, filers pay higher rate spreads on their mortgages. As shown in Column (5), unconditional on time since filing, filers have statistically significantly higher rate spreads on their mortgages than comparable nonfilers. And the margin is notable, about 33 basis points, or 25 percent of the average rate spreads for nonfilers. However, as shown in Column (6), this effect owes mostly to the significantly higher rate spreads paid by those who filed two to five years earlier, who paid about 54 basis

points, or 42 percent, higher than comparable nonfilers. Those who filed more than nine years earlier also paid 26 basis points more, which is also statistically significant.<sup>19</sup>

The above results suggest that the effects of bankruptcy filing on obtaining a first-lien mortgage depend on time since filing. It is very difficult for the most recent filers to obtain a mortgage. Those who filed between two and nine years earlier have a similar likelihood as comparable nonfilers of having a mortgage, but they tend to lever more and pay higher borrowing costs. Those who filed more than nine years earlier have a somewhat higher likelihood of having a mortgage but have similar leverage and costs as comparable nonfilers.

### 5.3 Vehicle Loans

Table 6 shows regression results for vehicle loans. Columns (1) and (2) are based on Logit regressions of whether households obtained a car loan after filing for bankruptcy, and conditional on having obtained a vehicle loan, we run OLS regressions for LTIs in Columns (3) and (4) and rate spreads in Columns (5) and (6). The most striking result is that filers are much more likely to have a new vehicle loan than comparable nonfilers. As shown in Columns (1) and (2), whether conditional on time since filing or not, the coefficients on bankruptcy filing status are all positive and almost all statistically significant. The odds ratio estimates suggest that, unconditional on time since filing, filers as a whole are 27 percent more likely to obtain a new vehicle loan than comparable nonfilers. The margin is 40 percent for those who filed a year or less earlier, falls notably to about 20 to 39 percent for those who filed more than two years earlier (statistically insignificant).

The strong tendency of having a vehicle loan after filing for bankruptcy may owe to the repossession of vehicles in the bankruptcy process. While vehicles are exempt assets in bankruptcy, filers still have to surrender those with an outstanding lien. Because most households find it hard to do without their vehicles, they would have to buy one if they lost it in bankruptcy. Moreover, the higher likelihood of having a car loan could also reflect that,

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<sup>19</sup>The effect is significant in that we reject a one-side test of the null hypothesis of negative effect at the 95 percent of confidence level.

unlike nonfilers, filers have little liquid asset that can be used to purchase a car without acquiring a loan. From the point of the view of creditors, vehicle loans are secured by the vehicle, and thus they are safer than unsecured credit card debt.

Conditional on having obtained a new vehicle loan, the amount of loans that filers took out relative to their normal income is similar to that taken out by comparable nonfilers. As shown in Columns (3) and (4), in the regressions of the ratios of vehicle loan to normal income, all coefficients on bankruptcy filing status, whether conditional on time since filing or not, are statistically insignificant and small.<sup>20</sup>

However, filers, especially those who filed fewer than six years earlier, paid significantly higher rate spreads. As shown in Column (5), unconditional on time since filing, the rate spreads that filers paid on their vehicle loans are 1.7 percentage points, or 40 percent, higher than those paid by comparable nonfilers. (The average rate spread for nonfilers is 4.5 percent. See Table 3.) The effects of bankruptcy filing on vehicle loan rate spreads are nonlinear. As shown in Column (6), compared to nonfilers with similar characteristics, those who filed a year earlier, two and five years earlier, and six and nine years earlier paid, respectively, 2.7, 2.9, and 1.3 percentage points higher on their vehicle loan rates, and all these differentials are statistically significant. However, the differentials in rate spreads between those who filed nine years earlier and comparable nonfilers are not statistically different from zero and the point estimates are also much smaller.

## 5.4 Inferences on the Demand and Supply Effects

In Table 7, we summarize our regression results qualitatively and infer how bankruptcy filing status affects the demand for and the supply of post-bankruptcy credit. Our main inference results are characterized as the following: On the one hand, relative to comparable nonfilers, households who filed for bankruptcy fewer than nine years earlier—those whose filing flags

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<sup>20</sup>Because we cannot estimate the vehicle value at the time of purchase, we do not have a measure for leverage. We do find, not shown, that the ratios of vehicle loan to total household assets are significantly higher for filers. However, this may be because filers have unusually low assets after they surrender their non-exempted assets in the bankruptcy process.

remained on their credit reports—clearly faced a lower supply of unsecured debt, as they borrowed less at higher rate spreads; but they had stronger demand for vehicle loans, as they were more likely to have a vehicle loan at higher rate spreads. On the other hand, relative to comparable nonfilers, households who filed more than nine years earlier—those whose filing flags no longer appeared on their credit reports—had stronger demand for all three types of credit, as they had similar or higher likelihood of having these types of debt, carried larger balances or higher leverages, and often pay higher rate spreads.<sup>21</sup>

As shown in Line 1, without considering the possible nonlinear effects of time since filing, filers generally borrowed a smaller amount of credit card debt than comparable nonfilers, with both lower likelihood of obtaining a credit card and lower credit limit conditional on having a card. In contrast, filers borrowed more on mortgage and vehicle loans. In particular, relative to comparable nonfilers, filers have similar likelihood of obtaining a mortgage but with higher LTVs. Filers are also more likely to acquire a vehicle loan. Nonetheless, filers paid significantly higher rate spreads on all of the three types of loans than comparable nonfilers.

Based on the approach we lay out in Section 2.2, the combinations of the effects on debt quantity and interest rate suggest that filers faced lower supply of unsecured credit but had a higher demand for mortgage and vehicle loans than comparable nonfilers. The dichotomy between secured and unsecured credit may be due to their different lien status and treatments imposed during the bankruptcy process. As we argued earlier, bankruptcy filing causes lower supply of credit as creditors take it as a signal for unobservable factors associated with higher credit risk. This supply channel has a stronger effect on unsecured credit because of its unsecured nature. The securities in mortgages and vehicle loans mitigate this supply effect.

Changes in credit supply and demand also depend on time since filing. Specifically, for

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<sup>21</sup>Consistent with Musto (2004), the expiration of the bankruptcy refiling restrictions at the sixth year anniversary appears to have no discernible effect. Unfortunately, the SCF data do not allow us to look into further the possibilities that certain lenders are targeting filers within the restriction period.

credit card debt, households who filed less than nine years earlier borrowed less at higher rate spreads than comparable nonfilers, indicating lower supply of credit for these filers. However, households who filed more than nine years earlier carried higher balance relative to their normal income and pay higher rates than comparable nonfilers, suggesting they have stronger demand for credit. All else equal, creditors are generally unable to identify these filers from nonfilers once the bankruptcy flag is removed from their credit reports. Moreover, filers may have deliberately deferred their loan applications until the tenth anniversary of filing after which they should be able to get better deals with their credit scores improved by the removal of the bankruptcy flag.

For mortgage loans, our findings indicate unambiguously that households who filed more than nine years earlier had stronger demand for credit than comparable nonfilers, as they borrowed more at higher rate spreads. For those who filed fewer than nine years earlier, the effects of bankruptcy filing are ambiguous and vary with time since filing in some ambiguous ways.

For vehicle loans, we find that households who filed less than nine years earlier are more likely to borrow to purchase a vehicle at higher rate spreads than comparable nonfilers, indicating an unambiguously stronger demand for car loans. In contrast, households who filed more than nine years earlier were more likely to obtain a vehicle loan, though they did not necessarily pay higher rates than comparable nonfilers. The higher likelihood of obtaining a vehicle loan is bound to be due to stronger demand for credit instead of higher supply, because from the creditor's point of view, filers with their bankruptcy flags removed are observationally indistinguishable from nonfilers.

## **6 Post-bankruptcy Financial Health**

One of the primary goals of bankruptcy discharge is to “relieve the honest debtor from the weight of oppressive indebtedness and permit him to start afresh” (U.S. Supreme Court,

*Williams v. United States Fid. & Guar. Co.*, 236 U.S. 549 (1915)). Bankruptcy advocates argue that such a fresh start can promote wealth accumulation and more prudent debt management (Howard, 1987; Porter and Thorne, 2006). However, we find that filers tend to accumulate substantially less wealth after bankruptcy than comparable nonfilers, and that filers are more likely to experience renewed debt repayment difficulties.

Specifically, we conduct two types of analysis on post-bankruptcy financial health. First, we run Logit regressions of two indicators for financial stress on the same set of independent variables used in the above analysis. The first indicator, called “ever behind”, is equal to 1 if the household has made any loan payments later than scheduled or skipped any payments during the year prior to the survey, 0 otherwise; and the second indicator, “serious delinquency”, is equal to 1 if the household has been behind in any loan payments by two months or longer during the same period, 0 otherwise. For this regression, we remove households that filed for bankruptcy one year before the survey to focus on the late debt payments not related to the bankruptcy filings. Second, we run OLS regressions of the ratio of net worth, defined as total assets net of total debt, to normal income, on the same set of independent variables.

The results are shown in Table 8. As shown in Column (1), unconditional on time since filing, filers are about 42 percent more likely to have ever been behind their debt payments than comparable nonfilers. This margin is also statistically significant. As shown in Column (2), the similar margin is found for filers with all different time since filing, and are all statistically significant. As shown in Column (3), unconditional on time since filing, filers are about 40 percent more likely to be seriously delinquent than comparable nonfilers. However, Column (4) shows that this effect is due mostly to the significantly higher serious delinquency rates among those who filed between six and nine years earlier. As shown in Columns (5) and (6), relative to comparable nonfilers, the net worth of filers is substantially lower, by at least 80 percent of annual normal income. What is more striking is that the gap has not narrowed as more time elapsed since filing for bankruptcy. Even ten years after

filing, filers' net worth to income ratio remains lower than that of nonfilers by more than 90 percentage points.

The above results have two implications. First, the persistent financial stress and slow wealth accumulation suggest that for many filers, filing for bankruptcy (and the debt discharge) alone had not provided an effective fresh start despite having discharged unsecured debt. In addition, the clear evidence of higher demand for certain secured debt but worse financial health after bankruptcy raise the concerns of possible behavioral bias that have caused filers to have consistently borrow "too much" (Laibson et al., 2003). This is an important issue we will look into further in our future research. Second, the credit risk for those who filed more than nine years earlier may not be correctly priced, in part due to the removal of bankruptcy flag. While they appear to be similar to comparable nonfilers in the likelihood of obtaining credit and in the rate spreads paid, these filers are more likely to fall behind in debt payment schedules, which in part is due to their more leveraged balance sheets.<sup>22</sup> Thus, concurring Musto (2004), our findings suggests that the removal of bankruptcy information from credit reports may lead to inefficient pricing.

Household financial difficulties after bankruptcy may be in part owing to that filers use much more expensive sources to meet their needs for credit when their access to credit card debt is restricted. We find some evidence consistent with this hypothesis from the most recent SCF survey. The 2007 SCF collected data on whether the households borrowed any payday loans during the year prior to the survey. These loans are backed by the borrower's next pay check and typically carry very high interest rates. Though the small sample size does not allow us to do a regression analysis controlling for observable characteristics, sample (unconditional) statistics show that filers are indeed much more likely to use payday loans, and the usage declines with time since filing. As table 9 shows, nearly 15 percent of households that filed one year earlier had used payday loans, 7 percent among those filed

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<sup>22</sup>A caveat regarding to these statements is that our empirical results on financial stress and wealth accumulation may reflect other unobservable household characteristics that we have not controlled for in our analysis.

two to five years earlier, whereas there were only 2 percent of nonfilers had used such credit in the previous year. This is likely due to filers have more limited access to credit cards, as the data show that those who use payday loans are much less likely to have a credit card or have much lower credit limit if they do have a credit card (not shown).

## 7 Conclusions

In this paper we study household borrowing and financial health after filing for personal bankruptcy. Using a large national-wide representative household survey, the SCF, we document that, in general, bankruptcy filers have more restricted access to unsecured credit, and that, conditional on having used credit, filers tend to borrow more on their credit cards and leverage more aggressively on collateralized loans. Filers also pay significantly higher borrowing costs across all major types of credit. Some of these adverse treatments abate as the bankruptcy flag is removed from credit reports ten years after the filing, with the use of credit generally increased and borrowing costs lowered.

We also find that in spite of the debt discharge at the filing, bankrupt households are more likely to experience renewed financial difficulties, to accumulate much less wealth, and to use expensive credit sources, such as payday loans. Moreover, financial hardship persists even more than ten years after the filings, suggesting that, for many bankrupt households, debt discharge may not have achieved its intended goal of providing a fresh start. In addition, our findings suggest that the credit risk for those who filed more than nine years earlier and thus have their bankruptcy flags removed from their credit reports may not be correctly priced. These results suggest that further studies are needed to assess the impact of regulating credit information disclosure on consumer credit market efficiency.

Our joint analysis of equilibrium credit quantity and interest rate allows us to make limited inference on how the demand for and the supply of credit respond to bankruptcy filings. Specifically, we find that filers whose bankruptcy flags remain on their credit reports

generally face lower supply of unsecured credit but have higher demand for secured loans. In contrast, relative to comparable nonfilers, filers whose bankruptcy flags were removed have higher demand for all types of credit. In our ongoing research, we are trying to use credit mail solicitations data to more precisely identify the supply effects. In addition, we seek to apply the estimates reported above to calibrating dynamic equilibrium models of household credit.

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# Appendix

## A Definitions of Selected Variables

Definitions on selected variables.

- “Normal income”: Starting from the 1995 wave, the SCF asks “Is this income unusually high or low compared to what you would expect in a ‘normal’ year, or is it normal?” If the households answer that the income they reported for the previous year was unusually high or low, the SCF then asks “About what would your income have been if it had been a normal year?” We use this normal income measure to approximate the income levels in the years prior to the survey.
- “Overspending”: The SCF asks “Including only monthly payments on your house or car and leaving aside any spending on investments, over the past year, would you say that your family’s spending exceeded your family’s income, that it was about the same as your income, or that you spent less than your income?” The households choose from (1) spending exceeded income; (2) spending equalled income; and (3) Spending was less than income. We define overspending as those who answered (1).
- “Attitudes toward borrowing”: The SCF asks the following question for a number of different types of loans: “People have many different reasons for borrowing money which they pay back over a period of time. For each of the reasons I read, please tell me whether you feel it is all right for someone like yourself to borrow money.”
- Risk aversion: The SCF asks about households’ attitude toward financial risks: “Which of the statements on this page comes closest to the amount of financial risk that you and your (spouse/partner) are willing to take when you save or make investments?” The households may choose from (1) take substantial financial risks expecting to earn substantial returns; (2) take above average financial risks expecting to earn above average returns; (3) take average financial risks expecting to earn average returns; and (4) not willing to take any financial risks. We define the choice (1) as high risk aversion and (4) as low risk aversion.

Table 1: Bankruptcy Filing Status in the Survey of Consumer Finance

This table shows the percent of households that reported having filed for bankruptcy in the Survey of Consumer Finances (SCF). The SCF asks how many years earlier a bankruptcy was filed, but, in the public data, all even numbers of years are rounded upward to the next odd number. We use the revised Kennickell-Woodburn weights provided by the SCF to compute the shares reported in the table. The number of observations refers to the number of households actually surveyed, not the number of imputates.

Filing status	Percent of households in survey year				
	1998	2001	2004	2007	All waves
Nonfilers	91.49	89.97	89.00	87.85	89.51
Filers	8.51	10.03	11.00	12.15	10.49
1 year earlier	1.76	1.18	1.20	0.93	1.25
2-5 years earlier	2.04	3.09	3.12	2.83	2.78
6-9 years earlier	1.57	2.24	2.79	2.62	2.33
> 9 years earlier	3.14	3.53	3.89	5.77	4.12
Number of observations	4,305	4,442	4,519	4,419	17,665

Table 2: Household Characteristics By Bankruptcy Filing Status

In this table we compare household characteristics, including the demographics, income, risk aversion and attitudes toward borrowing, for nonfilers and filers in the SCF 1998, 2002, 2004, and 2007. See the Appendix for definitions of “normal income,” “overspending,” “attitudes toward borrowing,” and “risk aversion.” For comparability across different survey waves, we express normal income in 2004 dollars.

Characteristics	Nonfilers	Filers
Age (mean)	43.7	45.5
Family size (mean)	2.8	2.8
Below high school (%)	11.2	12.6
High school (%)	29.5	39.4
Some college (%)	17.9	25.1
College (%)	41.4	22.9
Married (%)	64.6	57.1
Nonwhite (%)	28.0	30.1
Self-employed (%)	13.4	9.5
Normal income (mean, in 2004 \$)	81.7	52.8
Overspending (%)	14.4	20.5
Attitudes toward borrowing (%)		
Pro installment loans	30.8	30.7
Willing to borrow for vacation	15.5	16.7
Willing to borrow when inc is low	49.6	51.1
Willing to borrow for jewelry	6.5	5.6
Willing to borrow for automobile	83.1	87.2
Willing to borrow for education	85.7	85.6
Risk aversion (%)		
High risk aversion	33.2	45.7
Low risk aversion	4.7	4.2
Number of observations (un-weighted)	11,801	1,343

**Table 3: Statistics on Household Borrowing by Bankruptcy Filing Status**

All debt balance values are in 2004 dollars. Credit card, mortgage and car loans interest rate spreads are measured against yields on 2-, 10-, and 5-year Treasury securities. “Loan declined/discouraged” is defined as being actually declined when the household applied for loans in the past five years, or discouraged from borrowing when households did not apply because they expected that the application would be turned down should they have chosen to apply. The loan-to-value ratio (LTV) of home mortgages, car loan-to-income ratio, and mortgage and car loan interest rate spreads are valued at the year of the loan originations, but other statistics are valued at the SCF survey year.

Variables	Nonfilers	Filers
<b>Panel A. Credit card debt</b>		
Having credit card (%)	75.0	60.9
Credit card limit (\$)	25,315	13,491
Credit limit/income (%)	26.1	21.9
Having credit card debt (%)	62.9	82.3
Credit card debt amount (\$)	3,768	4,036
Card balance/income (%)	3.9	6.5
Card balance/limit (%)	14.9	30.0
Credit card spread (pp.)	9.70	11.28
<b>Panel B. First-lien mortgages</b>		
Having mortgage (%)	54.0	49.5
Mortgage balance owe now (\$)	171,300	97,554
LTV at origination (%)	78.8	87.6
Mortgage rate spreads (pp.)	1.30	1.80
<b>Panel C. Car loans</b>		
Having car loans (%)	38.4	48.3
Current balance (\$)	12,149	11,773
Loan-to-income (%)	18.4	21.7
Car loan spread (pp.)	4.33	6.51
<b>Panel D. Overall borrowing and household financial health</b>		
Loan declined/discouraged (%)	21.8	48.9
Having any debt (%)	84.4	89.9
Debt/asset (%)	16.8	35.7
Ever behind schedule (%)	20.7	36.3
60+ days delinquent (%)	7.2	15.6
Net worth/ normal income	5.53	2.42

Table 4: **Regression Results on the Effects of Bankruptcy Filing on Credit Card Debt**

This table shows regression results on the effects of bankruptcy filing on credit card debt. Columns (1) and (2) are based on Logit regressions of whether households have a credit card after filing for bankruptcy; Columns (3) and (4) are based on OLS regressions of credit limit and Columns (5)-(8) are based on tobit regressions of card balance censored at zero balance, conditional on having a credit card; and Columns (9) and (10) are based on OLS regressions of rate spreads conditional on having a positive balance. In all regressions, we include the following control variables besides bankruptcy filing status: household head age, educational attainment, race, family size, marital status, income quartiles, tenure at current job, risk aversion, attitudes toward borrowing, and year-wave dummy variables. Standard errors are reported in the parenthesis, and estimated odds ratios for Logit regressions are reported in the brackets. \*, \*\*, and \*\*\* indicate the estimated coefficient is statistically significant at the 90, 95, and 99 percent of confidence levels, respectively.

Filing status	Having card		Credit limit Income		Balance Income		Balance Limit		Rate spread	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Ever filed	-0.581*** (0.073) [0.560]		-0.135*** (0.021)		0.028*** (0.009)		0.220*** (0.018)		116.9*** (20.2)	
1 yr earlier		-1.820*** (0.193) [0.162]		-0.235*** (0.076)		0.045 (0.032)		0.202*** (0.068)		190.5** (76.9)
2-5 yrs earlier		-0.635*** (0.124) [0.530]		-0.238*** (0.039)		-0.003 (0.016)		0.235*** (0.035)		176.2*** (39.6)
6-9 yrs earlier		-0.299** (0.146) [0.742]		-0.217*** (0.040)		0.011 (0.016)		0.246*** (0.035)		164.3*** (39.2)
> 9 yrs earlier		-0.263** (0.117) [0.769]		-0.021 (0.030)		0.052*** (0.012)		0.200*** (0.027)		48.5* (28.8)
$R^2$	0.317	0.321	0.106	0.108	0.388	0.390	0.217	0.217	0.033	0.034
N. of obs	13,135	13,135	10,231	10,231	10,231	10,231	10,231	10,231	10,231	10,231

**Table 5: Regression Results on the Effects of Bankruptcy Filing Status on First Lien Mortgages**

This table shows regression results on the effects of bankruptcy filing on first lien mortgages. Columns (1) and (2) are based on Logit regressions of whether households obtained a first lien mortgage after filing for bankruptcy, and conditional on having obtained a mortgage, Columns (3) and (4) are based on OLS regressions of loan-to-value ratios and Columns (5) and (6) are based on OLS regressions of rate spreads. In all regressions, we include the following control variables: household head age, educational attainment, race, family size, marital status, income quartiles, tenure at current job, risk aversion, attitudes toward borrowing, and year-wave dummy variables. Standard errors are reported in the parenthesis, and estimated odd ratios for Logit regressions are reported in the brackets. \*, \*\*, and \*\*\* indicate the estimated coefficient is statistically significant at the 90, 95, and 99 percent of confidence levels, respectively.

Filing status	Having mortgage		mortgage debt house value		Rate spread	
	(1)	(2)	(3)	(4)	(5)	(6)
Ever filed	0.111 (0.080) [1.118]		0.049*** (0.015)		33.0*** (9.6)	
1 yr earlier		-1.560** (0.580) [0.210]		0.060 (0.125)		77.2 (63.9)
2-5 yrs earlier		0.004 (0.140) [1.004]		0.042 (0.026)		54.4*** (16.4)
6-9 yrs earlier		0.149 (0.144) [1.160]		0.089*** (0.027)		5.9 (16.8)
> 9 yrs earlier		0.363*** (0.121) [1.380]		0.020 (0.025)		27.1* (15.3)
$R^2$	0.045	0.046	0.165	0.165	0.179	0.180
N. of obs	14,254	14,254	3,230	3,230	2,961	2,961

**Table 6: Regression Results on the Effects of Bankruptcy Filing Status on Car Loans**

This table shows regression results on the effects of bankruptcy filing on car loans. Columns (1) and (2) are based on Logit regressions of whether households obtained a car loan after filing for bankruptcy, and conditional on having obtained a car loan, Columns (3) and (4) are based on OLS regressions of loan-to-normal income ratios and Columns (5) and (6) are based on OLS regressions of rate spread. In all regressions, we include the following control variables: household head age, educational attainment, race, family size, marital status, income quartiles, tenure at current job, risk aversion, attitudes toward borrowing, and year-wave dummy variables. Standard errors are reported in the parenthesis, and estimates odd ratios for Logit regressions are reported in the brackets. \*, \*\*, and \*\*\* indicate the estimated coefficient is statistically significant at the 90, 95, and 99 percent of confidence levels, respectively.

Filing status	Having loan		car loans normal income		Rate spread	
	(1)	(2)	(3)	(4)	(5)	(6)
Ever filed	0.235*** (0.047) [1.265]		0.002 (0.008)		173.9*** (27.6)	
1 yr earlier		0.343** (0.153) [1.409]		0.020 (0.025)		267.2** (116.6)
2-5 yrs earlier		0.187** (0.083) [1.206]		-0.003 (0.013)		290.1*** (49.4)
6-9 yrs earlier		0.226** (0.087) [1.254]		0.020 (0.017)		133.2** (60.3)
> 9 yrs earlier		0.257*** (0.076) [1.294]		-0.012 (0.014)		52.1 (46.2)
$R^2$	0.068	0.068	0.370	0.370	0.105	0.113
N. of obs	15,718	15,718	2,082	2,082	2,082	2,082

**Table 7: Summary and Inference on Supply and Demand Effects**

All demand and supply effects are relative to comparable nonfilers. Results are based on statistical significance at the 95 or higher percent of confidence level for one-side hypothesis tests. Notations: S=Supply, D=Demand, Q=quantity, measured as either the likelihood of obtaining a loan or the amount of loan conditional on having a loan, R=spreads of loan interest rate over yields of comparable maturity Treasury securities, ↓=higher, ↑=lower, ∼=ambiguous.

Filing status	Credit Card		Mortgage		Car Loan	
	Estimates	Inference	Estimates	Inference	Estimates	Inference
1. Ever filed	Q↓, R↑	S↓	Q↑, R↑	D↑	Q↑, R↑	D↑
<i>By time since filing:</i>						
2. 1 yr earlier	Q↓, R↑	S↓	Q↓, R∼	S↓ or D↓	Q↑, R↑	D↑
3. 2-5 yrs earlier	Q↓, R↑	S↓	Q∼, R↑	S↓ or D↑	Q↑, R↑	D↑
4. 6-9 yrs earlier	Q↓, R↑	S↓	Q↑, R∼	S↑ or D↑	Q↑, R↑	D↑
5. > 9 yrs earlier	Q↑, R↑	D↑	Q↑, R↑	D↑	Q↑, R∼	D↑

Table 8: Regression of the Impact of Filing Bankruptcy on Financial Stress and Wealth Accumulation

This table shows regression results on the effects of bankruptcy filing on financial stress and wealth accumulation. Columns (1) and (2) are based on Logit regressions of whether households have ever been behind a loan payment, Columns (3) and (4) are based on Logit regressions of whether households have been 60 or more days delinquent on any loan payments, and Columns (5) and (6) are based on OLS regressions of wealth accumulation (measured as the ratio of net worth—total assets minus total debt—to normal income). In all regressions, we include the following control variables: household head age, educational attainment, race, family size, marital status, income quartiles, tenure at current job, risk aversion, attitudes toward borrowing, and year-wave dummy variables. Standard errors are reported in the parenthesis, and odds ratio estimates, when applicable, are reported in the brackets. \*, \*\*, and \*\*\* indicate the estimated coefficient is statistically significant at 90, 95, and 99 percent level, respectively.

Filing status	Ever Behind		60+ Days Delinquent		Wealth Accumulation	
	(1)	(2)	(3)	(4)	(5)	(6)
Ever filed	0.353*** (0.098) [1.423]		0.329** (0.122) [1.391]		-0.896*** (0.074)	
1 Year Earlier						-1.093*** (0.182)
2-5 Years Earlier		0.466*** (0.130) [1.594]		0.219 (0.183) [1.245]		-0.838*** (0.127)
6-9 Years Earlier		0.310** (0.158) [1.365]		0.534** (0.218) [1.712]		-0.809*** (0.141)
> 9 Years Earlier		0.280** (0.126) [1.324]		0.273 (0.182) [1.314]		-0.931*** (0.119)
$R^2$	0.154	0.155	0.178	0.179	0.368	0.368
N. of obs	8,663	8,663	8,663	8,663	7,936	10,573

Table 9: Bankruptcy and the Use of Payday Loans

This table contrasts the use of payday loans by whether households had filed for bankruptcy and how many years had elapsed since last filing. The data were collected in the 2007 SCF. Because the payday loans questions were asked only in the 2007 and the overall number of households that used payday loans was small, we do not run regression analysis.

Filing status	Used pay-day loans (%)
1 Year Earlier (%)	14.9
2-5 Years Earlier (%)	6.9
6-9 Years Earlier (%)	5.4
> 9 Years Earlier (%)	2.8
Never filed (%)	2.0