Unsecured Credit Supply over the Credit Cycle: Evidence from Credit Card Mailings*

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JEL Classifications: D14, D82, G01, G21, K35 Key words: Credit supply, Credit Cycle, Personal bankruptcy, Credit card, Mail solicitation, Shrouding, CARD Act

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1 Introduction

Household debt of every type expanded substantially during the credit boom of the 2000s. This growth was driven in large part by expanded access to risky borrowers, including those previously excluded from the market. The "subprime" expansion in secured credit markets, such as auto loans and home loans, has been well documented (Adams, Einav and Levin (2009), Mian and Sufi (2009), and Keys, Mukherjee, Seru and Vig (2010), respectively). However, largely due to data limitations, there has been little analysis of the growth of unsecured consumer credit, which was as dramatic as the increase in secured consumer debt. In particular, credit card debt outstanding doubled between 1997 and 2008, a period when median household income was stagnant.¹ Taking a longer perspective, the growth of credit card debt has been even more spectacular: While secured consumer debt grew fivefold between 1980 and 2010, credit card debt grew seventeen-fold over this same period. Furthermore, much of the growth in credit card debt was along the extensive margin, as the share of households with a credit card account more than doubled over this period.²

The expansion of credit card debt is striking because unsecured creditors have the greatest exposure to borrowers' credit risk, as unsecured claims are generally wiped out in the event of consumer bankruptcy. Further, such bankruptcy risk has heightened substantially over the past three decades—personal bankruptcy filings increased fivefold, from fewer than 300,000 filings in 1980 to over 1.5 million filings in 2010.³ Recent research suggests that improvements in information technology and financial engineering have made it possible for lenders to target specific consumer groups, to narrowly tailor credit offers, and, in particular, to price-discriminate against default risk (Livshits, MacGee and Tertilt, 2007*b*; White, 2007; Dick and Lehnert, 2010). However, there is little empirical evidence on how the supply of unsecured consumer credit is related to default risk, especially among high-risk consumers.

¹Source: Federal Reserve: http://www.federalreserve.gov/releases/g19/Current/.

²In contrast, the homeownership rate increased less than one percentage point (64.4% to 65.1%) over the same 30 year span. See Federal Reserve Board (2006) and Bricker, Kennickell, Moore and Sabelhaus (2012).

³Source: The Administrative Office of the U.S. Courts. Personal bankruptcy filings peaked at roughly 2 million in 2005, the year of the most recent bankruptcy law reform.

In this paper, we attempt to fill this void by providing direct micro-level evidence on the supply of unsecured consumer credit over the boom and bust of the credit cycle. In particular, we focus on the dynamics of credit supply to individuals who previously filed for personal bankruptcy—a group of consumers exhibiting some of the clearest and most conspicuous default risk. Using a unique proprietary survey data set of credit card mail offers that is administratively linked to survey participants' credit records, we study how the likelihood of receiving a credit card offer varies with their credit scores and contrast this relationship estimated during the credit boom with the one estimated during the bust. Furthermore, we examine how likely consumers with a bankruptcy history are to receive such offers and characterize the terms therein, controlling for survey participants' credit scores as well as demographic and balance sheet characteristics. Throughout the paper, we refer to a consumer whose credit record has a bankruptcy flag as a "filer" and a consumer whose credit record does not have a bankruptcy flag as a "nonfiler." We analyze both the general terms of the offered credit card contracts, such as credit limits and regular interest rates, as well as often-neglected elements—terms that are referred to as "hidden" costs in the literature—such as fees and charges that are only disclosed in the fine print.

The central innovation of this paper is that we are able to observe directly a proxy for the supply of unsecured credit—credit card mail offers.⁴ This unique opportunity allows us to identify supply responses over the credit cycle without relying on variation in equilibrium quantities and prices to infer changes in supply and demand separately.⁵ In this regard, recent studies have examined post-bankruptcy use of credit using households surveys (Han and Li, 2011) or credit bureau data (Musto, 2004; Cohen-Cole, Duygan-Bump and Montoriol-Garriga, 2009). However, they have done so by examining the amount of debt borrowed (equilibrium quantity) and the interest rates at which loans were taken (equilibrium price). Consequently, these studies have not identified how credit supply *per se* is associated with

 $^{^4}$ We provide a detailed discussion of the accuracy of using mail offers as a measure of credit supply later in the paper.

⁵Gross and Souleles (2002a) analyze a panel of individual credit card accounts and are thus able to infer the intensive (but not extensive) margin of credit supply.

an impaired credit history and heightened credit risk.

In addition, studying credit supply to consumers with a personal bankruptcy history sheds essential light on consumers' bankruptcy decisions. In theory, the welfare of a rational debtor depends critically on his post-bankruptcy access to credit markets, a prospect which the debtor should take into account when deciding whether to file for personal bankruptcy. Conceivably, a bankruptcy record that permanently traps filers in financial autarky would inflict much greater economic costs than if lenders are immediately forgiving or if filing is anonymous. A growing literature examines households' bankruptcy decisions.⁶ However, to the best of our knowledge, little has been done to empirically characterize the supply of unsecured credit to bankruptcy filers. Moreover, our analysis complements a rapidly growing literature that uses dynamic equilibrium models to study unsecured credit markets, particularly by providing a set of statistics against which these models should be calibrated and stylized facts that should be matched (see, for example, Li and Sarte (2006), Chatterjee, Corbae, Nakajima and Rios-Rull (2007), and Livshits, MacGee and Tertilt (2007a)).

Our data cover three distinct time periods of the latest credit cycle: First, the boom period of 2007, when lenders mailed roughly 600 million credit card offers per month; second, the bust of 2009-2010, prior to the implementation of the Credit Card Accountability, Responsibility, and Disclosure Act of 2009 (henceforth the CARD Act), when aggregate offers plummeted to a low of 100 million offers per month; and third, the recovery of 2010-2011, after the CARD Act was in effect, when aggregate credit supply began to rebound. The solid line in Figure 1 shows the time-series of total credit card offers in the U.S. from 2001 through 2011.⁷ As of late 2011, lenders were mailing over 300 million offers per month, a substantial recovery but at levels considerably below that of the 2007 peak. Exploring credit card offers and terms over these distinct periods provides some of the first detailed evidence of fundamental changes in credit supply over the credit cycle and the effects of the CARD

⁶See, e.g., Fay, Hurst and White (2002), Gross and Souleles (2002b), Keys (2010), Dick and Lehnert (2010).

⁷Information on aggregate trends of mail volume is provided by the vendor from 2001-2011, but our offer level data linked to credit records are available for only the periods we described above.

Act on the supply of unsecured consumer credit.

Our main results from this analysis are summarized as follows: First, during the credit boom, consumers with mediocre credit scores were *more* likely to receive an offer than superprime consumers. The composition of credit supply has shifted dramatically in the wake of the bust, with the most creditworthy consumers now much more likely to receive an offer. In addition, we present suggestive evidence that the subsequent implementation of the CARD Act has further limited the supply of unsecured credit to riskier households.

Second, consumers are not excluded outright from the unsecured credit market after filing for bankruptcy, even in the aftermath of the most severe financial crisis in recent history. On average, nearly 40 percent of consumers with a history of personal bankruptcy receive at least one credit card offer in a given month. Indeed, we find both anecdotal and statistical evidence that offers to consumers with a bankruptcy history are not the result of a nondiscriminatory "blanket campaign." Rather, some lenders design their offers specifically to such consumers.⁸ The likelihood of a filer receiving an offer is only moderately lower than a nonfiler with comparable observable characteristics, including credit scores. Further, those who filed fewer than two years earlier are about as likely to receive an offer as comparable nonfilers. By contrast, those who filed for bankruptcy more than five years earlier receive significantly fewer offers, suggesting that lenders are wary of re-filing risk and accordingly extend less credit to such filers.

Third, we find that, despite relatively small differences in the probability of receiving a credit card offer, offers to filers are more restrictive, more expensive, and provide fewer takeup incentives than offers to their nonfiler counterparts. Furthermore, filers benefit far less from improving their credit scores than nonfilers. For instance, while the offered credit limit triples for nonfilers who improve their credit scores from the lowest quartile to the maximum of the filers' score range, filers' credit limits do not improve whatsoever over the same range of credit scores. This pattern further supports the hypothesis that lenders narrowly tailor

⁸For example, the header of one mail offer from a top credit card lender states "You deserve some credit for getting through bankruptcy."

offers to subgroups of consumers.

Fourth, we present (to the best of our knowledge) the first set of evidence on potential "shrouding" in credit card offers. In particular, we examine the effect of bankruptcy status on a set of contract terms that often appear only in the fine print, such as fees related to less frequently used transactions (for example, transactions involving foreign exchange). We find that credit card offers received by filers tend to contain higher "hidden" costs than offers to comparable nonfilers. These results are consistent with the predictions of Gabaix and Laibson (2006), in that even in a fairly competitive market, lenders may choose to shroud terms in credit offers to consumers who may be either myopic or imperfectly informed (see, for example, Angeletos, Laibson, Repetto, Tobacman and Weinberg (2001) and Agarwal, Driscoll, Gabaix and Laibson (2011)).

Finally, exploring the geographic heterogeneity of unsecured credit supply, we find that consumers are more likely to receive credit card offers in areas with stronger local macroeconomic indicators. In particular, consumers in states with greater house price appreciation, who likely received increased access to secured credit in the form of home equity loans during the boom, were also more likely to receive credit card offers. Thus, our analysis suggests that the leverage cycle was geographically correlated across secured and unsecured credit markets. Disproportionate house price appreciation in subprime areas, as documented in Mian and Sufi (2011), thus can help to explain why subprime consumers received more unsecured offers than any other population during the boom period.

The rest of the paper is organized as follows. Section 2 reviews the relevant legal and theoretical background; Section 3 describes the data and provides an overview of the changes of unsecured credit supply over the recent credit cycle; Sections 4 and 5 present descriptive statistics and regression results, respectively, contrasting the likelihood of receiving an offer and credit card contract terms by bankruptcy filing status and how these differences evolved over the credit cycle; and Section 6 concludes.

2 Legal Background and Conceptual Framework

2.1 Legal Background

One of the most important features of bankruptcy law is the provision of debt discharge. A debtor can file under Chapter 7 of the U.S. bankruptcy code to obtain a discharge of unsecured debts.⁹ Alternatively, the debtor can file under Chapter 13 of the code, whereby he or she obtains a debt discharge after paying off a portion of the debt through a three-tofive-year debt repayment plan.

The bankruptcy code also affects the post-bankruptcy supply of credit through its restriction on repeated discharges. Since the Bankruptcy Abuse Prevention and Consumer Protection Act became effective in 2005, the law now prohibits a debtor from obtaining another bankruptcy discharge (Chapter 7) until eight years after a previous debt discharge.¹⁰ The implications of such re-filing restrictions on credit supply are discussed in detail later in the paper.

In addition, credit supply to bankruptcy filers is affected by the Fair Credit Reporting Act (FCRA). The FCRA regulates how a bankruptcy filing is reported by the credit bureaus. In particular, the FCRA permits a bankruptcy record to stay on credit reports furnished by the credit bureaus for up to 10 years after the date of relief or the date of adjudication (FCRA 605 (a)(1)). In addition, all other nonbankruptcy defaults can stay on a credit report for up to seven years (FCRA 605 (a)(5)). Because we use credit bureau data to identify filers, we can only identify those consumers who filed fewer than ten years earlier. Likewise, if credit bureau data are lenders' only source for bankruptcy information, then lenders cannot distinguish the consumers who filed more than ten years before from those who never filed for bankruptcy. Indeed, Musto (2004) finds that filers' credit scores increase appreciably after their bankruptcy flags are removed, inducing greater access to and subsequent use of

⁹Some debts, such as student loans and unpaid tax liabilities, are deemed not dischargeable. See, for example, Administrative Office of the United States Courts (2006).

¹⁰The restriction on repeated Chapter 7 filing was six years prior to the 2005 reform.

credit.

The CARD Act was enacted in May 2009 and took effect in February 2010. The legislation strengthens consumer protection for credit card contracts and imposes various new restrictions on credit card lending. For example, the CARD Act limits the fees that can be charged on some cards, most notably types of over-limit fees and "subprime" fees. In particular, the Act limits non-penalty fees to 25 percent of the total amount of the card's credit line. In addition, the law bans most rate increases on existing balances (such as in the event of a late payment) and requires introductory or promotional interest rates to last at least six months, thereby largely limiting lenders' ability to quickly re-price contracts based on risk. On balance, the CARD Act makes credit card lending to risky consumers more restrictive, which in turn may lead lenders to reduce the supply of unsecured credit to such consumers.

2.2 Conceptual Framework

The market for unsecured credit is a classic setting with information asymmetries. As Stiglitz and Weiss (1981) show, the contract terms posted by lenders will directly affect the riskiness of borrowers who take up loans, leading to a credit rationing (pooled) equilibrium. Even when provided with information about the income and credit histories of consumers, some lenders nonetheless have difficulty in identifying "bad" versus "good" borrowers *ex ante* (adverse selection). Further exemplifying the information asymmetry, borrowers who accept contracts with higher interest rates may subsequently undertake riskier financial behavior that heighten their *ex post* credit risk (moral hazard). In this environment, the bankruptcy flag contains a number of different and possibly competing signals about a consumer's credit risk. As a conceptual framework guiding our empirical analysis, we use a stylized setup introduced by Einav, Jenkins and Levin (2012) to illustrate how bankruptcy filing status may affect various aspects of lenders' credit card offering decisions.

2.2.1 Setup

Consider a two-period model. At t = 0, the borrower earns y_0 and, conditional on having received a credit card offer, decides whether or not to respond and apply for the card. For simplicity, assume that all applications responding to outstanding credit card offers will be approved. The borrower then carries a debt of level L on the card to the next period. At t = 1, the borrower realizes his income y_1 and then, if he has a loan, he decides whether to pay it off or default. We assume that y_1 is sufficiently larger than y_0 so that the borrower has no incentive to save in t = 0. The borrower is characterized by his previous bankruptcy filing status b—with b = 1 for filers and 0 otherwise—and a vector of other financial and nonfinancial characteristics $[x, \theta]$, drawn from a joint distribution of $[B, X, Y_1, \Theta]$. The lender observes b and x but not θ , though she knows the conditional distributions of Θ and Y_1 given X = x and B = b. Thus, the lender faces two underlying sources of default risk: income risk—the uncertain borrower income y_1 , and information risk—the unobservable borrower type θ .

The x variables include credit score and other observable financial information—such as household liabilities and delinquency status—that the lender may legally use in the underwriting process. Though correlated with x, the bankruptcy status indicator b may contain additional information beyond x because the joint distribution of (Y_1, Θ) conditional on x depends on b. To the extent that we control for consumers' credit scores and a rich set of liability variables, the effects that we will identify in the empirical analysis are those of bankruptcy filing on credit supply above and beyond its direct impact on credit scores and other x variables.

One important characteristic of credit card contracts is that they are notoriously complex (Agarwal et al., 2011; Agarwal, Chomsisengphet, Liu and Souleles, 2006). Offers specify not only quantity and price, but also many other features, which a lender can tailor to influence potential borrowers' take-up and credit usage decisions. We focus on the following most frequently used terms in typical offers— $\phi = [f, L^u, R, w]$, where f, L^u, R , and w denote annual fees, credit limits, interest rate, and rate of rewards, respectively.¹¹ The borrower's take-up decision can be solved backward as follows. At t = 1, with the realization of y_1 and credit card debt L, the borrower decides to default if

$$u(y_1 - L(1 + R - w)) \le v(y_1, b), \tag{1}$$

where $u(\cdot)$ is the borrower's utility function over disposable income net of loan repayment. The utility derived if choosing to default, v, depends on the borrower's bankruptcy status. As described earlier, the law prevents filers from repeatedly filing within a certain period. Therefore, while nonfilers (b=0) have the option of filing for bankruptcy should they choose to default, filers can only enter a scenario known as "informal bankruptcy" should they choose to default. In such a scenario, creditors can pursue repayment aggressively through various debt collection methods, such as wage garnishment (Ausubel and Dawsey, 2004). Thus, other factors held constant, filers have a lower v (or higher default penalty) than their nonfiler counterparts and, as a result, are less likely to default.

Given the above debt payment rule and the offer vector ϕ , a borrower with (b, x, θ) chooses his optimal debt L^* according to:

$$W(L^*;\phi,b,x,\theta) = \max_{0 < L \le L^u} [u(y_0 + L - f) + \beta \mathbf{E}_{y_1} \max(u(y_1 - L(1 + R - w)), v(y_1, b))], \quad (2)$$

where $W(\cdot)$ is the value function, and \mathbf{E}_{y_1} denotes that the expectation is taken with respect to stochastic y_1 . If a borrower decides not to respond to the credit card offer $(L^* = 0)$, the value function of the financial autarky state can be written as $\overline{W} = u(y_0) + \beta \mathbf{E}_{y_1} u(y_1)$.¹² A borrower applies for the card if $W(L^*; \phi, b, x, \theta) \geq \overline{W}$.

Because the lender does not observe θ , a credit card offer depends on only (b, x) and the distribution of θ conditional on observed bankruptcy status b. Given (b, x), the set of

¹¹For notational simplicity, we assume the fee, f, occurs only in t = 0.

¹²Recall that we assume y_1 is sufficiently larger than y_0 .

borrowers who take up the offer ϕ thus can be represented as :

$$\widehat{\Theta} = \{\theta : W(L^*; \phi, b, x, \theta) \ge \overline{W}\}.$$
(3)

In this context, adverse selection occurs if changes in ϕ , such as an increase in interest rates, lead to the departure of less risky borrowers and thus a gradually riskier pool of applicants.

Following Einav et al. (2012), we assume that the lender acts monopolistically: given (b, x), she chooses ϕ to maximize her expected profits, Λ , by taking into account the effect of ϕ on the applicant pool $\hat{\Theta}$ and loan demand function L^* :

$$\Lambda(b,x) = \max_{\phi} P(\phi,b,x) \cdot \mathbf{E}_{\theta}(\pi(L^*,\phi,b,x,\theta) | W(L^*;\phi,x,\theta) \ge \overline{W}) - C, \tag{4}$$

where $P(\phi, b, x)$ is the probability of borrowers with (b, x) taking up the credit offer ϕ , C is the unit cost of producing and mailing the offers, and $\pi(L^*, \phi, b, x, \theta)$ is the lender's realized profit from the loan to a borrower with (b, x, θ) . Specifically,

$$\pi(L^*, \phi, b, x, \theta) = f + ML^*,\tag{5}$$

with M being the net rate of return on the loan excluding the fee revenue f. That is,

$$M = (1 - \mathbb{I}^D)(1 + R - w) + \mathbb{I}^D(1 - c) - (1 + r),$$
(6)

where $\mathbb{I}^{D}(L, R, w, v)$ is an indicator for whether or not the borrower defaults ($\mathbb{I}^{D} = 1$ if default occurs and 0 otherwise), c the charge-off rate on a defaulted account, and r the rate of funding costs. The lender mails an offer if $\Lambda(b, x) \geq 0$.

The first order condition (FOC) for the lender's profit maximization problem, in compact

notation, is:

$$0 = \frac{\partial P(\phi, b, x)}{\partial \phi} \cdot \mathbf{E}_{[\Theta, Y_1]|b, x}(\pi(L^*, \phi, b, x, \theta) | W(L^*; \phi, b, x, \theta) = \overline{W}) + P(\phi, b, x) \cdot \mathbf{E}_{[\Theta, Y_1]|b, x}\left(\frac{\partial \pi(L^*, \phi, b, x, \theta)}{\partial \phi} | W(L^*; \phi, b, x, \theta) \ge \overline{W}\right).$$

$$(7)$$

The FOC above has two key components that address the extensive and intensive profit margins, respectively. The first term of the FOC deals with the adverse selection issue by designing offers to maintain an optimal extensive margin on the pool of borrowers who will take up the offer, $P(\phi, b, x)$. The classic result from Stiglitz and Weiss demonstrates that raising the interest rate may attract a pool of borrowers of even higher default probability.¹³ Such a result also applies to other elements of ϕ , such as credit limits, rewards, and fees. Note that P is a function of bankruptcy filing status, b, and that the expectation is taken over the distribution of θ conditional on the observed b. A monopolistic lender will tailor different contracts catering to filers and nonfilers to optimize their participation, respectively.

The second term of the FOC specifies the optimal intensive margin on profitability for a given set of consumers who take up the offers. Specifically, by the definition of the profit function, eq. (4), we have

$$\frac{\partial \pi(L^*, \phi, b, x, \theta)}{\partial \phi} = \frac{\partial f}{\partial \phi} + M \frac{\partial L^*}{\partial \phi} + \frac{\partial M}{\partial \phi} L^*.$$
(8)

In addition to the dollar-for-dollar term $\frac{\partial f}{\partial \phi}$, the contract terms offered affect profitability through two channels, both of which vary with bankruptcy filing status, b. First, the optimal debt level L^* depends on ϕ , and, as discussed above, other factors (including θ) held constant, bankruptcy filers borrow less than nonfilers. Second, the net rate of return, M, depends on ϕ and its sensitivity is different between filers and nonfilers because they have different default probabilities and charge-off rates, c. Thus, the solution to the lender's optimization problem requires trading off the extensive adverse selection with the intensive per-contract

¹³For empirical evidence in the credit card market, see Agarwal, Chomsisengphet and Liu (2010).

profitability.

2.2.2 Extensions and Implications

A bankruptcy history can affect credit supply in a number of ways that are not modeled explicitly in the setup introduced earlier. For example, like other consumers, bankruptcy filers need credit for smoothing consumption and facilitating transactions. But, because essentially all of their existing lines of unsecured credit become void after bankruptcy, filers could have a more inelastic demand for credit.¹⁴ Moreover, filers need to obtain and use fresh credit to rebuild their credit history, which is substantially damaged by their bankruptcy filing. Both considerations would make filers more willing to apply for a new credit card account, to which lenders may react by reducing the attractiveness of the offers extended.¹⁵

In addition, the credit supply effect of a bankruptcy history may also depend on the time elapsed since the last filing because more recent filers have to wait longer until the restriction on repeated filing expires. Thus, other factors held constant, more recent filers may pose a lower default risk and a potentially higher recovery rate, which may in turn attract more generous offers from lenders.

To summarize, our stylized model illustrates that a bankruptcy history could affect lenders' offering decisions in two opposite directions. On the one hand, the distributions of y_1 and θ conditional on b = 1 imply greater credit risk than those conditional on b = 0, inducing lenders to extend less favorable offers, if at all. Specifically, we expect the offers extended to filers to have lower credit limits and charge higher interest rates and annual fees. Moreover, such offers are less likely to have take-up incentives such as promotional interest rates or rewards programs. On the other hand, restrictions on repeated filing make filers, and in particular recent filers, relatively "safer" risks from the lender's perspective. The net credit supply effect of a bankruptcy history is ambiguous, and therefore an open empirical

¹⁴In certain scenarios, such as some Chapter 13 filings, consumers may retain their existing credit card accounts conditional on agreeing to repay all or some of the existing debt on these accounts.

¹⁵In the context of the model, these factors reduce filers' value function in autarky, \overline{W} .

question.

It is important to note that this study focuses on how credit supply varies with bankruptcy filing status and other borrower characteristics during various stages of the credit cycle. We are, however, agnostic about the determinants of the credit cycle itself, which may include changes in capital constraints, the strength of lenders' balance sheets, access to the securitization market, and changes in technology, regulation, or competition. In the context of our simple model above, we treat the cost of funds r as exogenous and assume that loanable funds are perfectly elastic (see also Stiglitz and Weiss (1981) for a similar consideration).

3 Data and Summary Statistics

3.1 Data Description

Our main data source is Mintel Comperemedia's (henceforth "Mintel") proprietary surveys on credit offers to U.S. consumers.¹⁶ Each month, Mintel invites about 8,000 consumers to participate in the surveys by forwarding all incoming mail containing credit solicitations, such as offers of credit cards and home equity loans. Mintel requests that participating consumers forward solicitations sent to any members of the household and, in addition, that they complete an extensive demographic questionnaire.

The sample is stratified to represent the U.S. population in terms of household size and composition, age and education of the household head, geographic region, market size, and total household income. On average, about 3,000 consumers choose to participate in the survey each month. To keep the sample nationally representative, Mintel subsequently assigns a weight to each respondent to account for differential propensities of participation across demographic groups. After processing the forwarded mail offers, Mintel sends the database to TransUnion, one of the three major credit reporting agencies, where participating

¹⁶Mintel is a consumer and marketing research company headquartered in the U.K. The data we use are compiled by the company's American subsidiary, Comperemedia.

consumers' credit history information is merged in before the final data set is delivered to data subscribers.

Our focus in this paper is credit card offers, which represent the majority of all credit offers received by consumers.¹⁷ Mintel records essentially all information on the forwarded mail offers, allowing us to study not only whether a consumer receives any credit card offers in a given month, but also the full set of terms of the contracts offered. For interest rates, we focus on the so-called "go-to" rate—the regular non-promotional interest rate for purchases.¹⁸ For credit limits, the data reveal a recent change in industry practice. Historically, credit card offers have usually specified a *maximum* credit limit. However, since 2006, an increasing share of credit card offers have specified a *minimum* credit limit, and by early 2009, the vast majority of credit card offers only specified a minimum credit limit. Our analysis will thus focus on the minimum credit limit. Upon examining offers sent in 2007 that specified both the minimum and maximum credit limits, we find the two limits are strongly positively correlated.

In addition to interest rates and credit limits, the Mintel data contain information on whether the card charges an annual fee, whether the offer provides a promotional interest rate, and whether the offer includes enrollment in a reward program. Furthermore, the dataset includes other contract terms that are usually disclosed in the fine print. This additional information helps us better characterize subprime credit offers along a broader set of contract attributes.

3.2 Mail Offers as a Proxy for Credit Supply

To be clear, credit card offers are not equivalent to credit supply in various aspects. Lenders have the option of not approving an application responding to an outstanding offer, even

¹⁷Credit cards are by far the credit product that relies most heavily on direct mailing. Mortgage and credit card balance transfers are the second and the third most common types of solicitation, respectively.

¹⁸Mintel also records other interest rates specified in the offers such as the interest rates on balance transfers and cash advances. Broadly speaking, these offered interest rates exhibit similar contrasts between filers and nonfilers and dynamics over the credit cycle. For more on interest rate pricing, see Ausubel (1991), Stango (2000), and Knittel and Stango (2003).

if these are so-called "pre-approved" offers. Even for an approved offer, the credit limit ultimately extended is not necessarily identical to the amount specified in the offer. In addition, discussions with various major credit card lenders suggest that the volume of mail offers is frequently affected by lenders' marketing budget limitations, which may not always reflect changes in willingness-to-lend. That said, instead of merely serving as an advertisement or a marketing tool, we argue that data from credit card mail offers contain valuable information that speak to credit supply for the following reasons.

First, because sending an offer is costly for lenders, lenders will not send out offers if they do not have a legitimate intention to approve a large share of all responding applications. Second, selecting offer recipients typically involves a complicated, multi-stage screening process that is similar to the underwriting process. Third, we find that, despite the low response rate, total credit card mail volume is highly correlated with the aggregate number of credit card accounts opened (estimated using data from the Equifax consumer credit panel). As shown in Figure 1, the two time series track each other very closely over the last ten years with a correlation coefficient of 0.9, suggesting that the aggregate volume of credit card mail offers provides a close proxy for the supply of unsecured consumer credit.

3.3 Sample Construction and Demographics

Our sample consists of monthly Mintel surveys from three distinct time periods: the credit boom (from January 2007 to December 2007); the bust period prior to the CARD Act (from August 2009 to February 2010); and the bust-and-recovery period after the CARD Act was in effect (from March 2010 through December 2011). Each observation in our data represents a credit card offer, with detailed information about the offer and its recipient. Demographic and credit history information is also provided for those consumers who did not receive any offers in the participating month.

For our analysis, we apply the following sample selection rules. First, we keep only offers sent to participants and their spouses, as we do not have credit history information for other family members residing in the same location. Second, we keep only those consumers with valid credit histories and credit scores. This restriction may bias our sample towards homeowners who have a stable address, because the likelihood of successfully merging between Mintel and TransUnion databases is greater for these consumers.¹⁹ Third, because the credit history data reveal the number of months since the last derogatory public record, with bankruptcy being one possible type of derogatory public record, we keep only those filers whose number of bankruptcy filings is equal to the number of derogatory public records in order to precisely identify the time since filing for bankruptcy. After applying these filters, our final sample contains more than 153,000 consumers (about 6% of whom are filers) who received 197,903 credit card offers.²⁰

For our sample, we have essentially the same credit history information that a lender would have if the lender had no pre-existing lending relationship with a potential customer. One piece of information that lenders may have (but our merged data do not) is the chapter of the Bankruptcy Code, Chapter 7 or 13, under which a bankruptcy is filed. This limitation may hinder the identification of some consequences of bankruptcy filing, but we believe that the effect on our conclusions may be quantitatively small. According to the Administrative Office of U.S. Courts, in 2009, Chapter 13 filings accounted for about 30 percent of total initial personal bankruptcy filings. Furthermore, historically, many Chapter 13 filings are converted to Chapter 7 when borrowers fail to complete their repayment plans.

Table 1 presents descriptive statistics on key demographic and socioeconomic characteristics of our sample by bankruptcy filing status and the time elapsed since filing. All statistics, except the number of consumers in each column, are computed using the weights provided by Mintel. For comparison, we also include corresponding statistics on filers based on the

¹⁹TransUnion merges credit history data using the names and addresses of participants. As a result, the fraction of consumers who are homeowners in our final Mintel sample is higher than in the Survey of Consumer Finances.

²⁰It is worth noting that, because the Mintel data are cross-sectional, our identification of how bankruptcy affects the supply of credit comes from comparing consumers with and without a bankruptcy record. The implicit assumption is that unobservable consumer characteristics do not influence credit supply in a way that is systematically different between filers and nonfilers. Although we view this assumption as rather innocuous, better identification would be possible should longitudinal data become available.

2007 Survey of Consumer Finances (SCF). More than five percent of the consumers in the sample have at least one bankruptcy record on their credit history in the Mintel data. This fraction is only half of what is observed in the SCF. As discussed earlier, this discrepancy is due in part to the mandatory removal of the bankruptcy record from credit reports at the tenth anniversary of the last discharge of debt.²¹

The last two columns of Table 1 compare the Mintel sample with the SCF. The demographic attributes of the two samples are remarkably similar apart from racial and homeownership compositions. In general, filers are younger, less educated, less likely to be married, and less likely to be homeowners. The Mintel sample has fewer black consumers but more homeowners than the SCF. As noted above, this discrepancy likely reflects both the bias in the stratification of the Mintel sample and our sample selection restriction of requiring a valid matched credit history.

3.4 Credit History Data and the VantageScore

The credit history information allows us not only to identify bankruptcy filing and its timing but also to observe past and current credit activities, such as the number of new accounts opened, delinquency status, the number of credit history inquiries, and the amount of various types of household debt.

Additionally, the credit history data contain a credit score measure, the VantageScore. Over the last 30 years, credit scores have become the single most important factor in consumer lending (see, for example, Federal Reserve Board (2007)). The VantageScore is a product developed by the three major consumer credit reporting agencies and ranges from 500 to 990. As shown in Figure 2, the distribution of VantageScores differs significantly by bankruptcy status. First, the distribution of filers' VantageScores overlaps with scores of nonfilers, but the filers' distribution is substantially lower than the nonfilers'. The median of the filers' distribution is about 675, compared with 850 for the nonfilers' distribution.

 $^{^{21}}$ Consistent with this reasoning, in the 2007 SCF, about 40 percent of filers reported that they filed for bankruptcy more than nine years earlier.

Second, the range of filers' VantageScores overlaps with only the lower end of the nonfilers' VantageScore distribution. Specifically, the entire distribution of bankruptcy filers' VantageScores falls below 800, covering only a segment of the left tail of nonfilers' distribution.

VantageScores appear to improve only slowly and moderately after filing for bankruptcy. As shown in Figure 3, the average VantageScore is just above 620 for the most recent filers, increases to about 660 for filers whose last filing was two years earlier, and then slowly rises to an average near 700 for those who filed 8-10 years earlier. Should the cross-sectional relationship between VantageScores and the number of years since filing be consistent with the time series relationship for individual consumers, which we do not observe in the Mintel data, the persistently low VantageScores observed among filers suggest that either bankruptcy depresses the VantageScore as long as the flag stays on the credit history or that some risk characteristics or shocks that led the debtors to bankruptcy are persistent.

3.5 Liabilities

Table 2 presents summary statistics of liabilities by bankruptcy status and the time since last filing. Broadly speaking, the statistics on liabilities and delinquencies in the Mintel data are consistent with the results documented by Han and Li (2011) using the (consumer-reported) SCF data. These patterns suggest that filers may have gained access to various types of credit, including revolving credit, shortly after filing for bankruptcy, and that filers use these credit sources rather intensively, which may eventually lead to renewed debt payment difficulties. The results are also consistent with the findings of Musto (2004), who shows that bankruptcy filers' number of accounts and total credit limits rise with the time since filing.

One concern about interpreting the significant levels of debt borrowed by bankruptcy filers is that such debt may reflect undischarged liabilities from Chapter 13 filings. Because we do not have information on the chapter under which a consumer filed for bankruptcy, we cannot identify directly how much debt was accumulated after filing. To address this concern, we examine the number of new accounts opened by filers and nonfilers. As shown in Table 3, similar fractions of filers and nonfilers have recently opened new accounts and, conditional on having opened at least one account, the number of accounts opened are also comparable. From a lender's perspective, all else being equal, Chapter 13 filers are riskier than Chapter 7 filers because of the former's undischarged debt and greater risk of repeated filing. Therefore, the credit supplied to filers observed in our data likely represents a lower bound of the credit granted to Chapter 7 filers.

Finally, in the lower part of Table 3 we present statistics on credit inquiries by bankruptcy status. Credit inquiries serve as a proxy for demand for credit, as lenders evaluate a potential borrower's credit quality by performing a "credit inquiry" when a loan application is submitted. We find that filers' credit reports are more likely to have had a recent credit inquiry and, conditional on having at least one inquiry, the number of inquiries is also slightly higher for filers, suggesting that filers are more actively seeking credit than nonfilers.

4 Unsecured Credit Supply to Risky Borrowers over the Cycle

4.1 An Overview of the Unsecured Credit Cycle

We now explore changes in the supply of unsecured credit over the boom and bust of the credit cycle. Access to new unsecured credit fluctuated dramatically over our study period. Figure 4 provides a succinct summary of the trends in credit card offers across the Van-tageScore distribution. The figure shows that the VantageScore gradient in the likelihood of receiving an offer in the boom period of 2007 was surprisingly flat (the solid blue line). Forty percent of consumers with the worst credit scores (VantageScore below 550) received a credit offer in a given month, compared to sixty percent of consumers with the best credit scores (VantageScore above 950). If anything, consumers in the "subprime" range of the

VantageScore distribution, between 600 and 750, were *more* likely to receive an offer than any other part of the credit distribution. This pattern highlights the dramatic expansion of unsecured credit to less creditworthy consumers during the credit boom.

In the wake of the crisis, access to unsecured credit dropped precipitously, as lenders cut existing lines and significantly curtailed the practice of credit card mailings. The overall likelihood of a consumer receiving an offer in a given month fell from 60 percent to 35 percent, but this decrease was not felt evenly over the credit score distribution. As the dashed red line (August 2009–February 2010) in Figure 4 shows, the VantageScore gradient steepened sharply during this time period, with consumers at the top of the VantageScore distribution becoming about five times more likely to receive an offer as those at the bottom.

The volume of credit card mail offers has steadily recovered since early 2010. However, as indicated by the dotted green line (March 2010–December 2011), following the implementation of the CARD Act, although the likelihood of receiving an offer is uniformly higher across the credit score spectrum, the improvement is much more subdued for consumers with the lowest credit scores. For the range of VantageScores below 800, the green line represents a steeper credit score gradient than the red line, implying an even wider gap in the likelihood of receiving an offer between the most and the least creditworthy consumers. The trends shown in this figure are central to understanding the heterogeneous patterns of access to new unsecured credit during the boom and bust. The next section explores access to credit over time among the riskiest of consumers—those with a bankruptcy history—as well as the features of the contracts offered to those consumers.

4.2 Characteristics of Offers to Bankruptcy Filers

Table 4 presents the summary statistics of credit card offers by bankruptcy filing status for the full sample. Relative to nonfilers, filers as a whole are less likely to receive credit card offers—39 percent of filers received at least one credit card offer, significantly fewer than nonfilers, 51 percent. Even so, these statistics suggest that filers continue to enjoy a significant likelihood of receiving a credit card offer in a given month and do not face outright exclusion from the unsecured credit market.²² Conditional on having an offer, offers to filers have significantly lower minimum credit limits and higher interest rates. Moreover, offers to filers are more likely to charge an annual fee but are less likely to have either a reward program or a promotional interest rate.

Among offers to filers, contract terms also vary relative to the time elapsed since filing. Consumers who filed more than six years earlier appear less likely to receive an offer than those who filed more recently, especially compared to those who filed within the last 24 months. Thirty-six percent of filers who filed six to ten years earlier received at least one offer, relative to 43 percent for those who filed fewer than two years earlier. However, conditional on having an offer, terms offered generally improve with the time since filing.²³

Note that charging an annual fee and offering rewards programs can be correlated. The credit card industry sometimes refers to cards that do not charge a fee and do not offer rewards programs as "plain vanilla" cards. Cards charging a fee but not offering rewards programs are referred to as "credit building" cards, cards not charging a fee but offering rewards programs as "general market" cards, and cards charging a fee and offering rewards programs as "premium rewards" cards. As shown in the bottom rows of Table 4, we find that filers are overwhelmingly more likely to receive "credit building" cards, much less likely to receive "general market" cards, and essentially receive no "premium rewards" cards.²⁴

4.3 Bankruptcy Filers' Credit Access over the Boom and Bust

As shown in Figure 2, bankruptcy filers, on average, have much lower VantageScores than nonfilers. If consumers with lower credit scores generally tend to receive fewer and less

 $^{^{22}}$ Putting the monthly likelihood in perspective, if the probability of receiving an offer was independent across months, more than 99 percent of filers would receive at least one offer in a given year.

 $^{^{23}}$ The only exception is that the offers sent to the most seasoned filers have a lower likelihood of having promotional interest rates (52 percent) than more recent filers (57 percent).

²⁴Bankruptcy filers, and, for that matter, other high risk consumers, are reportedly more likely to receive offers of secured cards—cards for which the consumer is required to put down some amount of security deposit. However, we find only a very small number of secured card offers in our sample.

attractive credit card offers, the differences shown in Table 4 may not speak to the effects of a bankruptcy history per se on credit supply. Furthermore, if a bankruptcy history has an additional effect, we are interested in how such an effect evolved over the credit cycle. Figures 5 and 6 address these questions. Each panel of the two figures plots how an outcome variable (likelihood of receiving an offer, minimum credit limit, and interest rate spread on Figure 5; having annual fees, having an introductory interest rate, and having rewards on Figure 6) varies with a consumer's VantageScore and contrasts this relationship by bankruptcy status. Panels in the left column present results of the pre-crisis period (January 2007–December 2007), the middle column the post-crisis pre-CARD-Act period (August 2009-February 2010), and the right column the post-CARD-Act period (March 2010–December 2011).

Overall, the results suggest that a bankruptcy history has a substantial additional effect on the supply of unsecured credit across the relevant portion of the VantageScore distribution, and that such an effect changed appreciably over the credit cycle. To begin with, panels in the top row of Figure 5 indicate that bankruptcy filers (the dashed red line) have a lower likelihood of receiving an offer over most of the portion of the VantageScore distribution where filers and nonfilers overlap. The filer-nonfiler difference in the propensity of receiving an offer is narrowest in the pre-financial-crisis period. However, the gap became much more pronounced in the post-CARD-Act period, with filers with the highest VantageScores only half as likely as nonfilers with similar VantageScores to receive an offer.

The lower panels of Figure 5 compare the lines of credit extended and spreads of interest rates offered to bankruptcy filers and nonfilers across VantageScore distributions.²⁵ We find that credit card offers to filers tend to carry a lower minimum credit limit and a higher interest rate spread. Similar to the probabilities of receiving an offer, these filer-nonfiler differences also varied noticeably over the credit cycle. Before the financial crisis, the offers to filers are more comparable with those to nonfilers; but, in the post-CARD-Act period, on balance,

 $^{^{25} \}rm We$ use interest spreads rather than the level of interest rates to control for the time variation in lenders' funding costs.

filers tend to receive much less favorable offers. In particular, unlike the minimum credit limits offered to nonfilers, which increased noticeably with their VantageScores, those offered to filers are not only much lower but also not increasing with filers' credit scores. Moreover, spreads over two-year Treasury yields of interest rates offered to filers were essentially the same as those for nonfilers in the pre-crisis period but widened sharply in the post-CARD-Act period.

Consistent with the summary statistics presented in Table 4, offers to filers are also more likely to charge annual fees but less likely to include incentives such as introductory (teaser) interest rates. This disparity deepened in the post-crisis era and, in particular, after the CARD Act was implemented. For example, as shown in the upper row of Figure 6, in the pre-crisis period offers to filers were only slightly more likely to charge an annual fee. The gap became larger in the post-crisis pre-CARD-Act period, and even more pronounced in the post-CARD-Act period. Similarly, the difference in the share of offers carrying rewards between filers and nonfilers became greater during the post-CARD-Act period. Thus, although filers continue to receive credit card offers, lenders who extend credit to them apparently engage in a different business strategy—keeping credit limits low to mitigate default risk and levying fees to boost profit from such borrowers.

On balance, comparing the pre-CARD-Act period with the post-CARD-Act period, we see an appreciable decline of credit supply to filers relative to nonfilers, potentially speaking to the effects of the CARD Act on credit supply to consumers with the most severe credit risk. Indeed, the Act directly limited lenders' risk-pricing ability and could consequently have made lenders more wary of extending credit to these consumers. In a similar vein, we note that during the post-CARD-Act period, offered interest rate spreads for both filers and nonfilers were wider than those even in the immediate aftermath of the financial crisis.

5 Econometric Analysis

5.1 Model Specifications

In this section, we further isolate the effects of bankruptcy history on the supply of unsecured credit from observable balance-sheet and demographic characteristics. Motivated by the nonlinear relationship between credit supply and VantageScores shown in Figures 4 to 6, we control for credit scores in a flexible semi-parametric way by including a set of dummy variables for VantageScore bins. Each bin has a width of 50 VantageScore points (the 500-550 bin is the excluded group). To further control for credit risks, we include indicator variables for whether a consumer currently has any 90-day-delinquent mortgage accounts, whether a consumer has ever had any 30-day delinquent accounts, and whether a consumer had any 90-day-delinquent accounts over the past 24 months. Because lenders frequently use the socalled "back-end" ratio—the ratio between total debt payments and disposable income—in loan underwriting (Johnson and Li, 2010), we control for household liabilities by including the ratio of total debt outstanding to household income and a dummy variable indicating whether a consumer has any existing unsecured revolving lines of credit. We also include the logarithm of household income as an additional control variable. For demographic characteristics, we control for a quadratic polynomial of consumer age, marital status, household size, race, and educational attainment. Finally, we control for seasonal, geographical and macroeconomic variation by including monthly fixed effects and state fixed effects.²⁶

Our dependent variables of interest are the same as those examined in Figures 5 and 6. We estimate probit and OLS models for discrete and continuous dependent variables, respectively.²⁷ Motivated by the patterns shown in Figures 5 and 6, we estimate the model for each of the three periods over the credit cycle separately, and the results are presented in Tables 5, 6, and 7. The reported values for all OLS regressions are estimated coefficients,

 $^{^{26}{\}rm The}$ post-CARD-Act sample covers more than twelve months. Accordingly, we also include a yearly dummy.

²⁷For the minimum credit limit, which is censored at 0, we also estimated tobit models with the same control variables. The results (not shown) are essentially unchanged.

while those for probit regressions are estimated marginal effects, evaluated by changing the values of the dummy independent variables from 0 to 1.

5.2 Filers vs. Nonfilers

We first analyze how the supply of unsecured credit differs between filers and nonfilers, without distinguishing filers by time elapsed since filing. To indicate bankruptcy status, we include in our regressions a dummy variable equal to 1 for filers and 0 for others. To the extent that the observed VantageScores already reflect the impact of bankruptcy filing on credit scores, our regression analysis identifies the effect of the bankruptcy flag on lenders' credit offer decisions beyond its influence on credit scores. One immediate observation from the table is that, for all three periods over the credit cycle, almost all of the estimated coefficients and marginal effects of the bankruptcy filer dummy are highly statistically significant. As Figures 5 and 6 demonstrate, these estimates consistently suggest that filers encounter a more limited supply of unsecured credit—they receive fewer and less-attractive offers—confirming that the bankruptcy flag influences credit underwriting decisions above and beyond any direct effect it may have on credit scores.

Specifically, with all observable characteristics including credit scores held constant, filers are less likely to receive a credit card offer in a given month (column 1). The margin was narrowest before the financial crisis (2.8 percentage points) and widened subsequently to 4.0 percentage points after the crisis and further to 13.0 percentage points after the CARD Act became effective. Even when filers do receive an offer, their offers tend to have a lower credit limit than nonfilers', with the difference being most substantial after the financial crisis (column 2). Controlling for other factors, before the financial crisis, offers to filers on average have a minimum credit limit nearly \$100 lower than the offers to nonfilers. The gap widened to about \$400 after the crisis.

The results also reveal that offers to filers tend to be more expensive, making those offers even less favorable. Filers are offered contracts with higher interest rates (column 3) and more often charged annual fees (column 4). Such disparities appear to have worsened during the post-CARD-Act period. Notably, prior to the financial crisis, interest rate spreads were similar for filers and nonfilers, whereas in the post-CARD-Act period, filers' spreads are more than 175 basis points wider than nonfilers'. Finally, our estimates confirm that even controlling for observable characteristics, offers to filers are less likely to have introductory interest rates (column 5) or rewards (column 6), though these terms do not appear to have worsened further following the implementation of the CARD Act.²⁸

In addition to bankruptcy status, we find that both household liability and current payment status affect credit card offers, and that these effects vary notably over the credit cycle. Before the financial crisis, a higher total-debt-to-income ratio was associated with a strikingly *greater* likelihood of receiving an offer. Perhaps even more puzzlingly, having a delinquent account was also associated with a larger likelihood of receiving an offer. Although the cross-sectional nature of our analysis makes it hard to establish a strong causal relationship between indebtedness and receiving offers, the observation that lenders did not appear to aggressively screen out consumers with higher levels of debt and delinquent accounts speaks to the degree to which credit was available to the subprime segment of the population during the pre-crisis period. However, the landscape changed abruptly following the financial crisis, as higher debt ratios and delinquency records become associated, as expected, with generally a lower likelihood of receiving offers and higher spreads.²⁹

²⁸If anything, comparing with the post-crisis pre-CARD-Act period, filer-nonfiler differences on introductory rates and rewards narrowed somewhat in the post-CARD-Act period.

²⁹We also find that even after controlling for credit scores and other liability characteristics, the likelihood of receiving a credit card offer remains about three percentage points higher for white consumers relative to comparable consumers of other races (not shown in the table). The offers to white consumers were also more favorable than those to nonwhite consumers. However, caution should be taken in interpreting this estimated racial disparity, as it may arise due to various reasons (including discrimination against consumers of certain backgrounds) with potentially different policy implications. Here we remain agnostic as to the source of the estimated racial disparity in credit card mailings and leave it as a topic for future research.

5.3 The Effect of Time Elapsed since Filing

We now examine the extent to which the time elapsed since filing may affect the likelihood of receiving credit card offers and the terms offered. To do so, we replace the bankruptcy filing dummy variable in the earlier regressions with three dummy variables indicating whether the last filing occurred within the last two years ("recent" filers), three to five years earlier ("seasoned"), or six to ten years earlier ("remote"). The results are presented in the bottom rows of Tables 5, 6, and 7.

We find that a previous bankruptcy filing negatively affects the probability of receiving unsecured credit offers to the greatest extent for consumers who filed for bankruptcy more than six years earlier—those who are closest to being eligible to file for bankruptcy again. Offers to these consumers tend to have the lowest credit limits. The tight control on the quantity of credit supplied to remote bankruptcy filers likely reflects lenders' concerns about renewed default risk associated with re-filing for bankruptcy. Thus, even though seasoned and remote filers have more accounts open (as shown in Table 2 and in Musto (2004)), they appear to have acquired these accounts based on fewer credit offers than more recent filers. That said, other credit card terms tend to improve for the most seasoned filers, with the exception of the likelihood of a promotional interest rate. Holding other factors constant, offers to remote filers are more likely to have the narrowest interest rate spreads, are least likely to have an annual fee, and are most likely to include a rewards program.

Relative to nonfilers, credit supply to filers across time since filing also varied substantially over the credit cycle. The changes are particularly appreciable for the likelihood of receiving an offer. In both the pre-crisis and post-crisis pre-CARD-Act periods, only the remote filers had a significantly lower likelihood of receiving an offer. The accommodative credit supply to the most recent filers over this period is consistent with our hypothesis that some lenders may target such consumers because they have discharged most of their previous unsecured debt through bankruptcy and are not able to file again for a number of years. Indeed, during the pre-crisis period, recent filers even enjoyed a seven percentage points *greater* likelihood of receiving an offer, further exemplifying the subprime expansion of unsecured consumer credit. However, in the post-CARD-Act period, all filers have had a reduced likelihood of receiving a credit offer, regardless of time elapsed since filing.

5.4 Geographic Variation in Credit Card Offers

The next table, Table 8, investigates macroeconomic and legal explanations for variation in unsecured credit offers. We replace state fixed effects with explicit measures of local economic conditions—the state-level unemployment rate and annual house price changes in the previously estimated regressions.³⁰ We also include characteristics of the state's legal environment, namely measures of required judicial vs. non-judicial foreclosure proceedings, and the levels of both property and homestead exemptions applied in personal bankruptcy filings.

We find that the local economic environment is an important factor influencing unsecured credit supply. For example, a one-percentage point increase in a state's unemployment rate reduces the likelihood of receiving a credit card offer by nearly one percentage point. A onestandard-deviation increase in house price growth is associated with a pronounced increase of 13.2 percentage points in the likelihood of receiving an offer, all else being equal, suggesting that the increase in house prices was correlated with increases in unsecured credit access for consumers living in the same area. Understanding the drivers of credit expansion during the house price bubble is an important goal for subsequent research. Our results are broadly consistent with the view that lenders took local house price appreciation into consideration when extending unsecured credit.

Larger bankruptcy exemptions allow borrowers to better protect their assets in the bankruptcy process, and thus, conditional on a given amount of debt, they make bankruptcy less costly. We find that, all else being equal, residents of states with larger exemptions are less likely to receive unsecured credit offers, though the magnitude of these effects is small.

 $^{^{30}}$ In the regressions, we include the house price change with a lag of one quarter because these data are available to the public with a lag.

Similarly, consumers residing in states with stronger pro-lender foreclosure laws are on average one percentage point more likely to receive credit offers.

The results of Table 8 extend previous work on the variation in credit access across states, suggesting that state laws impact residents' access to credit.³¹ Our results also highlight that unsecured credit expansion was larger in places with greater house price appreciation and secured credit growth. Thus, increases in secured and unsecured forms of leverage were geographically correlated as credit supply surged, contributing to the severity of the "balance-sheet recession" in the areas hardest hit by house price declines (see, for example, Mian and Sufi (2011)).

5.5 Robustness Analysis with Restricted Samples and Matching

In our baseline results, we compared bankruptcy filers with all other consumers to focus on an explicitly "subprime" population. However, Figure 2 shows that bankruptcy filers' VantageScores are all below 800. To the extent that we have controlled for the credit score's effects on credit supply in a flexible semi-parametric way by including a vector of VantageScore bins, nonlinearity in the relationship between credit scores and credit supply will not bias our results. However, if other control variables are correlated with credit scores and potentially have nonlinear effects on credit supply, then using the entire nonfiler sample as the control group may bias our estimates.

As a robustness check, we exclude those nonfilers with VantageScores over 800 and reestimate the models in Tables 5, 6, and 7. Imposing this additional sample restriction excludes roughly two-thirds of the nonfiler observations. The results are available from the authors upon request. Our main findings on bankruptcy status and time since filing are qualitatively unchanged and the differences in point estimates are small.³²

To further improve the identification of a relevant comparison group for bankrupt con-

 $^{^{31}}$ For example, Gropp, Scholz and White (1997) used the 1983 SCF data to analyze the relationship between bankruptcy exemptions and credit availability.

 $^{^{32}}$ A further robustness check using only prime-age respondents aged 25 to 65 yielded results that were qualitatively equivalent to our reported estimates.

sumers, we implement a propensity score matching procedure, using a range of balance sheet variables, including VantageScore, to identify nonfilers whose credit records appear most similar to those of filers. As shown in Table 9, the results estimated using propensity score matching method are very similar to our baseline results. Thus, our findings consistently indicate the differential treatment of individuals with a bankruptcy flag on their credit record.

5.6 Less Conspicuous Contract Terms and Hidden Costs

We now examine offer terms that are generally disclosed only in the fine print. Credit card contracts are notoriously complicated. It is likely that most consumers, even the most sophisticated ones, do not take the time to read the entirety of the credit card offers they accept (Agarwal et al., 2006; Agarwal et al., 2011). Theories show that in a competitive market with some consumers unaware of add-on prices (or, alternatively, holding myopic preferences), firms will intentionally "shroud" cost information from consumers in equilibrium (Gabaix and Laibson, 2006; DellaVigna and Malmendier, 2004). Here, we show that the credit card market is an ideal place to look for hidden add-on costs because of its complex contract structures. We further examine whether credit card offers to riskier consumers have more hidden costs or complex terms.

A typical credit card contract contains numerous terms, many of which are buried in the fine print, in addition to the relatively standard terms of credit.³³ The Mintel database collects information on more than 90 potential attributes of any offered contract. This detailed information allows us to investigate a rich set of contract features that may not be immediately obvious to most borrowers.

As shown in Table 10, bankruptcy filers are significantly less likely to be offered a waiver of annual fees than comparable nonfilers (column 1).³⁴ Filers also face higher costs in other

³³For example, a typical credit card contract can have four prevailing interest rates: the rate charged on revolving purchases, on revolving balance transfers, on cash advances, and the "trigger" rate imposed when the borrower is delinquent.

³⁴Because of the nonstandard nature of these terms, they are specified in only a small number of offers.

aspects of their contracts. For example, when finance charges are applied to the balances carried over from one period to the next, filers pay higher minimum finance charges than comparable nonfilers (column 2) before the CARD Act became effective. Finally, the fees attached to credit card offers can be more complex than a simple annual fee. Fees classified as "other" are also significantly more prevalent among filers' offers, and the difference remains statistically significant after controlling for other consumer characteristics (shown in column 3).³⁵ These fees could include inactivity fees, paper statement fees, or other assorted fees. Mintel does not separately identify the components of this residual category, and some types of fees, such as explicit inactivity fees, have been outlawed by the CARD Act. Nonetheless, although the difference in these other fees has declined after the implementation of the CARD Act, the difference remains large and statistically significant.

6 Conclusion

A hallmark feature of the last credit cycle was a profound increase in various types of credit extended to subprime borrowers. While a large and growing body of literature has examined the expansion in mortgage and auto loans, little is known regarding how the supply of unsecured credit to such borrowers evolved over the credit cycle. Furthermore, it is extremely difficult to disentangle supply and demand changes from observed variations in the quantity and price of credit. This paper thus contributes to the literature on two fronts. First, we take advantage of an unprecedented data set of credit card mail solicitations to directly measure the supply of unsecured consumer credit as the volume of credit card offers and the terms offered therein. Second, because the mail offer data are administratively linked to offer recipients' credit history, we are able to examine the supply of credit to consumers with various levels of creditworthiness over the cycle. In particular, we are able to focus on offers to personal bankruptcy filers, which generally involves high-risk lending to subprime

Consequently, we do not have enough observations for the post-crisis and pre-CARD-Act periods (marked as N.A. in the table).

 $^{^{35}}$ Mintel did not record this data for the pre-crisis period (marked as N.A. in the table).

consumers.

Studying the dynamics of credit offers over the credit boom and bust, we find that subprime offers were prevalent during the peak years of credit expansion, but that this segment of the market contracted most sharply during the downturn. Indeed, unsecured credit supply to subprime consumers has remained very tight in recent years despite the broad recovery of credit supply to other consumers, likely reflecting, in part, the effects of the CARD Act. Thus the balance-sheet recession and need for deleveraging has not been felt evenly across the credit score distribution. Our results also suggest that those households who have been hit hardest by the collapse of the housing bubble also likely face significant challenges in obtaining unsecured credit, even years after the financial crisis.

Furthermore, our findings shed light on the more empirically plausible calibrations of dynamic equilibrium models of consumer credit and default behavior. Research using such models has grown rapidly in the past decade (for example, Chatterjee et al. 2007, Chatterjee et al. 2011, Livshits, MacGee, and Tertilt 2007, Athreya et al. 2009). Our results suggest that, in contrast to the stylized assumption typically made in such models that filers can reenter credit markets with a constant likelihood in each period, bankruptcy filers receive credit offers soon after filing for bankruptcy, but the credit they receive is limited and costly, and, if anything, diminishes over time. These findings reveal the crucial complexity of postbankruptcy access to credit, thereby providing useful empirical guidance for enriching and calibrating such models.

Quantifying the broader welfare implications of changes in credit access for bankruptcy filers represents a potential strand of future research. On balance, filers may continue to find it difficult to smooth consumption over time or to insure against idiosyncratic income risk using their credit cards because of their low credit limits and expensive interest rates. Finally, we note that this study focuses solely on how unsecured credit supply varied with borrower characteristics over the last credit cycle. We remain agnostic about the determinants of the cycle itself: Many factors, such as capital regulations, willingness of lenders to increase leverage, and access to securitization markets affected the supply of unsecured credit to risky borrowers. Understanding the impact of these drivers of cyclical dynamics is also a promising area of future research.

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Figure 1: Credit Card Offer Mail Volume and Number of New Accounts Opened This figure shows the time series of total credit card mail solicitation volumes in the U.S. from 2001 through 2011 and the number of new credit card accounts opened estimated using the Equifax consumer credit panel. Note that the household-level data used in the microeconometric analysis are available for the periods January 2007 to December 2007 and August 2009 to December 2011. Source: Authors' calculations using Mintel/Comperemedia and Equifax data.



Figure 2: Vantage Score Distribution by Filing Status

This figure shows the frequency distributions of Vantage Scores by bankruptcy filing status. Note that the entire distribution of the filers' Vantage Scores, blue plot, falls below 800, while the nonfiler distribution covers the whole range up to 1000. The median Vantage Scores for the filers' and nonfilers' distributions are 675 and 850, respectively.



Figure 3: Average Vantage Scores by Year since Filing

This figure shows how Vantage Scores vary with the number of years since last bankruptcy filing in the cross section. This cross-sectional relationship would be consistent with an individual's time-series relationship between Vantage Scores and the time since filing if the heterogeneity among individual filers is constant over time.



Figure 4: Likelihood of Receiving A Credit Card Offer by Vantage Scores over the Credit Cycle

This figure plots how the likelihood of receiving a credit card offer changes with Vantage Scores at the different stages of the recent credit cycle: the pre-crisis period (represented by the year of 2007, the solid blue line), the post-crisis and pre-CARD Act period (from August 2009 to February 2010, the dashed red line), and the post-CARD Act period (from March 2010 to December 2011, the dotted green line). The figure shows that non-prime consumers with scores between 600 and 700 were actually more likely to receive credit card offers than those consumers with near-perfect credit (900-999) prior to the crisis. However, after the crisis, the relationship between Vantage Score and the likelihood of receiving an offer dramatically steepened, with low-creditworthy households' access to unsecured credit offers falling sharply.



Figure 5: Credit Card Offers by Vantage Scores and Filing Status I

This figure shows how the likelihood of receiving an offer and, conditional on having an offer, the minimum credit limit and interest rate spread vary with a consumer's Vantage Score by the consumer's bankruptcy filing status. Bankruptcy filers are shown in dotted red lines, non-bankrupt consumers in solid blue lines. The panels in the left column present results of the pre-crisis period (January 2007 to December 2007), the middle column the post-crisis pre-CARD-Act period (August 2009 to February 2010), and the right column the post-CARD-Act period (March 2010 to December 2011). In the pre-crisis period, bankrupt consumers were equally likely to get an offer, conditional on credit score, and offers had similar interest rates but significantly lower credit limits. In the post-crisis, post-CARD Act period, bankrupt consumers receive fewer offers and their offers have both higher interest rates and lower credit limits.



Data source: Compiled by authors using Mintel data.

Figure 6: Credit Card Offers by Vantage Scores and Filing Status II

This figure shows how, conditional on having a credit card offer, the likelihood of having annual fees, having an introductory interest rate, and having rewards vary with a consumer's Vantage Score by the consumer's bankruptcy filing status. Bankruptcy filers are shown in dotted red lines, non-bankrupt consumers in solid blue lines. The panels in the left column present results of the pre-crisis period (January 2007 to December 2007), the middle column the post-crisis pre-CARD-Act period (August 2009 to February 2010), and the right column the post-CARD-Act period (March 2010 to December 2011). In the post-crisis, post-CARD Act period, offers to bankrupt consumers are much more likely to have an annual fee, but less likely to have either an introductory interest rate period or a rewards program.



Data source: Compiled by authors using Mintel data.

Table 1: Demographics by Bankruptcy Filing Status and Timing

This table presents descriptive statistics on key demographic and socioeconomic characteristics by bankruptcy filing status and the time elapsed since filing. For comparison, on the two far-right columns, we also include corresponding statistics on filers based on the 2007 SCF. All statistics, except the number of consumers in each column, are computed using the weights provided by Mintel and the SCF. Individuals in the Mintel sample are broadly similar to those in the SCF, but are somewhat more likely to be homeowners and less likely to be African-American.

	Mintel					SCH	،
	Number of years since last filing						
	Nonfilers	Filers	0-2 years	3-5 years	6-10 years	Nonfilers	Filers
Mean age	53.4	50.8	49.5	50.2	51.7	50.1	49.2
Mean household size	2.6	2.7	2.9	2.7	2.6	2.5	2.7
High School (%)	31.2	37.2	34.7	38.3	37.7	32.0	39.1
Some College $(\%)$	21.0	23.8	23.8	25.2	23.0	17.7	23.4
College $(\%)$	34.9	21.2	23.1	19.2	21.5	36.9	23.4
Homeowner $(\%)$	77.6	57.4	63.0	52.9	57.5	62.5	51.4
Black (%)	5.9	8.5	8.7	9.1	8.1	12.2	15.3
Married $(\%)$	58.3	50.3	56.9	48.8	48.2	59.5	54.1
Number of consumers	145,095	8,183	1,776	2,203	4,204	3,982	436

Source: Mintel/Comperemedia data and the Survey of Consumer Finances (SCF).

				Filed	
	Nonfilers	Filers	0-2 years	3-5 years	6-10 years
Total debt (\$)	82,035 [22,789]	45,417 $[9,868]$	37,328 $[3,352]$	33,290 [7,443]	55,416 [14,543]
Nonmortgage debt (\$)	20,361 [6,642]	13,530 [5,509]	9,592 [1,077]	11,744 $[4,462]$	16,154 [8,149]
Revolving debt (\$)	9,603 $[1,519]$	3,538 $[592]$	1,756 [0]	2,443 [483]	4,882 [1,794]
Revolving credit limit (\$)	41,211 [24,900]	8,217 [2,800]	5,597 $[500]$	5,867 [1,800]	10,596 $[5,500]$
Number of revolving accounts	6.2 [5]	3.9 [3]	2.6 [2]	3.8 $[3]$	4.5 [4]
Installment debt (\$)	10,265 $[0]$	9,858 $[0]$	7,765 $[0]$	9,237 [0]	11,074 [986]
Income (\$)	75,076 $[55,000]$	52,792 [42,500]	55,454 [47,500]	47,174 $[37,500]$	54,738 [42,500]
Number of del. accounts	$0.35 \\ [0]$	0.68 [0]	0.97 [0]	0.53 [0]	$\begin{array}{c} 0.64 \\ [0] \end{array}$

Table 2: Liabilities Statistics by Bankruptcy Filing Status

This table presents summary statistics of liabilities by bankruptcy status and the time elapsed since last filing. For each variable, we report mean values with median values shown in the brackets below. Number of delinquent account refers to the accounts that were 30 or more days past due during the last 12 months. All statistics are computed using the weights provided by Mintel.

Table 3: New Accounts Opened and Inquiries Made on Credit History

This table shows the number of new accounts opened by filers and nonfilers. Statistics referring to the previous M months do not include the consumers who filed for personal bankruptcy within this period. The average number of trades open is calculated conditional on having at least one such trade opened. All statistics are computed using the weights provided by Mintel.

		All trades		Bank c	ards
	Timing	Nonfilers	Filers	Nonfilers	Filers
Percent of consumers opened trades(%)	previous 3 months	18.2	19.3	7.3	8.8
Avg. num. of trades opened	previous 3 months	1.3	1.3	1.1	1.2
Percent of consumers opened $\mathrm{trades}(\%)$	previous 6 months	31.6	31.9	13.3	15.2
Avg. num. of trades opened	previous 6 months	1.5	1.6	1.2	1.3
Percent of consumers opened $trades(\%)$	previous 12 months	50.3	50.2	23.7	25.7
Avg. num. of trades opened	previous 12 months	1.9	2.1	1.4	1.5
Percent of consumers opened $trades(\%)$	previous 24 months	70.9	70.9	40.5	42.8
Avg. num. of trades opened	previous 24 months	2.9	3.2	1.7	1.9
		Nonfil	ers	File	rs
Percent of consumers with credit inquiry	previous 6 months	29.6		41.6	3
Avg. num. of credit inquiry	previous 6 months	1.9		2.3	

Table 4: Credit Card Offers by Bankruptcy Filing Status

This table presents the summary statistics of credit card offerings by bankruptcy filing status for the full sample. The average number of offers is calculated conditional on receiving at least one credit card offer. Mean values are reported, with median values shown in brackets below. All statistics are computed using the weights provided by Mintel. Plain vanilla, credit building, general market, and premium rewards are four types of credit card offers that, in this order, charge no annual fee and carry no rewards program, charge an annual fee and carry rewards programs, and charge an annual fee and carry rewards programs, respectively.

				Filed	
	Nonfilers	Filers	0-2 years	3-5 years	6-10 years
Received at least one offer $(\%)$	51.4	38.9	43.0	41.2	35.9
Avg. num. of offers received (monthly)	2.6	2.8	3.0	3.0	2.7
	[2]	[2]	[2]	[2]	[2]
Avg. min credit limit (\$)	1,368	407	381	417	415
	[500]	[300]	[300]	[300]	[300]
Avg. interest rate $(\%)$	13.7	15.6	17.1	15.5	14.9
	[13.0]	[14.9]	[16.9]	[15.0]	[14.0]
Have introductory rate $(\%)$	68.7	53.1	56.8	51.7	52.2
Have annual fee $(\%)$	19.1	44.7	57.6	47.9	35.2
Have rewards program $(\%)$	69.9	14.4	6.5	8.7	22.9
Plain vanilla (%)	22.5	42.5	36.6	44.5	44.4
Credit building (%)	7.6	43.2	56.9	46.8	32.7
General market (%)	58.5	12.8	5.8	7.6	20.4
Premium rewards $(\%)$	11.4	1.6	0.7	1.1	2.5

Table 5: Empirical Results Estimated Using the Pre-Financial-Crisis Sample (January 2007 – December 2007)

This table reports the estimated effects of bankruptcy filing status on the likelihood of receiving a credit card offer and, conditional on receipt, offer terms, for the pre-crisis period (January 2007–December 2007). State-cluster-corrected standard errors are reported in parentheses. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. "Recent," "Seasoned," and "Remote" filers refer to consumers who filed for bankruptcy 0-2 years, 3-5 years, and 6-10 years prior to the surveys, respectively.

	Have an offer	Min. credit limit	Spreads	Annual fee	Have intro rate	Rewards
	Probit	OLS	OLS	Probit	Probit	Probit
	(1)	(2)	(3)	(4)	(5)	(6)
Filer	-0.028^{***} (0.010)	-93.631^{***} (16.892)	-0.015 (0.120)	0.057^{***} (0.013)	-0.054^{***} (0.011)	-0.342^{***} (0.009)
Debt ratio	0.003^{***} (0.001)	-1.633 (3.127)	-0.023** (0.010)	-0.001 (0.001)	0.000 (0.001)	0.001 (0.001)
Have rev. credit	0.110^{***} (0.010)	67.269^{***} (19.444)	-0.651^{***} (0.107)	-0.099^{***} (0.020)	0.006 (0.015)	0.084^{***} (0.015)
Mort. curr. 90+ del.	0.253^{***} (0.055)	-136.200^{**} (65.138)	$0.343 \\ (0.676)$	-0.095^{*} (0.050)	0.327^{***} (0.065)	$0.130 \\ (0.103)$
90+ del. in pre. 24 mo.	0.001 (0.004)	-8.353^{**} (4.124)	0.094^{***} (0.029)	0.034^{***} (0.003)	-0.012^{***} (0.003)	-0.030^{***} (0.004)
30+ del. ever	0.018^{**} (0.007)	-193.123^{***} (20.787)	0.190^{***} (0.052)	0.029^{***} (0.007)	-0.010 (0.007)	-0.092^{***} (0.007)
Log(income)	0.037^{***} (0.004)	$123.947^{***} \\ (13.266)$	0.047 (0.029)	0.018^{***} (0.003)	-0.031^{***} (0.004)	0.051^{***} (0.004)
Controlling for						
Demographics?	Yes	Yes	Yes	Yes	Yes	Yes
VantageScore bin?	Yes	Yes	Yes	Yes	Yes	Yes
Monthly fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.036	0.141	0.100	0.156	0.022	0.199
Ν	40,241	44,718	68,889	68,894	68,894	68,894
Recent filer	0.071^{***} (0.027)	-29.020 (23.693)	0.233 (0.168)	0.090^{***} (0.022)	0.011 (0.024)	-0.366^{***} (0.020)
Seasoned filer	-0.024 (0.021)	-59.958^{**} (22.545)	0.290^{**} (0.124)	0.098^{***} (0.015)	-0.032 (0.021)	-0.376^{***} (0.011)
Remote filer	-0.062^{***} (0.016)	-151.499^{***} (19.170)	-0.387^{***} (0.133)	0.006 (0.015)	-0.103^{***} (0.011)	-0.304^{***} (0.013)

Table 6: Empirical Results Estimated Using the Post-Crisis, Pre-CARD-Act Sample (August 2009–February 2010)

This table reports the estimated effects of bankruptcy filing status on the likelihood of receiving a credit card offer and, conditional on receipt, offer terms, for the post-crisis and pre-CARD-Act period (August 2009-February 2010). State-cluster-corrected standard errors are reported in parentheses. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. "Recent," "Seasoned," and "Remote" filers refer to consumers who filed for bankruptcy 0-2 years, 3-5 years, and 6-10 years prior to the surveys, respectively.

	Have an offer	Min. credit limit	Spreads	Annual fee	Have intro rate	Rewards
	Probit	OLS	OLS	Probit	Probit	Probit
	(1)	(2)	(3)	(4)	(5)	(6)
Filer	-0.040**	-444.497***	0.750**	0.047	-0.214***	-0.456***
	(0.018)	(54.928)	(0.284)	(0.034)	(0.034)	(0.048)
Debt ratio	-0.002**	-24.120***	-0.029***	-0.001	-0.003***	0.004*
	(0.001)	(7.960)	(0.009)	(0.003)	(0.001)	(0.002)
Have rev. credit	0.090***	-51.266	0.384	0.015	0.012	-0.003
	(0.014)	(98.831)	(0.343)	(0.035)	(0.038)	(0.020)
Mort. curr. 90+ del.	-0.087	1443.209*	-2.231**	-0.154	-0.038	0.125^{*}
	(0.070)	(846.335)	(0.884)	(0.124)	(0.183)	(0.069)
90+ del. in pre. 24 mo.	-0.005	-14.071	0.052	0.019***	-0.002	-0.028***
	(0.003)	(11.779)	(0.075)	(0.006)	(0.006)	(0.006)
30+ del. ever	-0.050***	-220.444***	0.218***	0.061***	0.010	-0.039***
	(0.007)	(43.152)	(0.070)	(0.018)	(0.018)	(0.010)
Log(income)	0.039***	-35.171	-0.101**	0.022***	-0.057***	0.036***
	(0.005)	(27.523)	(0.039)	(0.007)	(0.006)	(0.005)
Controlling for						
Demographics?	Yes	Yes	Yes	Yes	Yes	Yes
VantageScore bin?	Yes	Yes	Yes	Yes	Yes	Yes
Monthly fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.070	0.137	0.165	0.111	0.064	0.235
Ν	$25,\!272$	10,948	16,060	16,061	16,061	16,061
Recent filer	0.051	_347 938***	0.482	0.138*	-0 107	-0.561***
	(0.031)	(112.065)	(0.423)	(0.077)	(0.086)	(0.102)
Seasoned filer	-0.010	-412.403***	0.820*	0.160***	-0.235***	-0.668***
	(0.025)	(88.520)	(0.436)	(0.056)	(0.052)	(0.051)
Remote filer	-0.088***	-525.011***	0.843*	-0.075**	-0.256***	-0.324***
	(0.019)	(60.673)	(0.501)	(0.029)	(0.044)	(0.058)

Table 7: Empirical Results Estimated Using the Post-CARD-Act Sample (March 2010–December 2011)

This table reports the estimated effects of bankruptcy filing status on the likelihood of receiving a credit card offer and, conditional on receipt, offer terms, for the post-CARD-Act period (March 2010-December 2011). State-cluster-corrected standard errors are reported in parentheses. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. "Recent," "Seasoned," and "Remote" filers refer to consumers who filed for bankruptcy 0-2 years, 3-5 years, and 6-10 years prior to the surveys, respectively.

	Have an offer	Min. credit limit	Spreads	Annual fee	Have intro rate	Rewards
	Probit	OLS	OLS	Probit	Probit	Probit
	(1)	(2)	(3)	(4)	(5)	(6)
Filer	-0.130***	-365.824***	1.787***	0.267***	-0.076***	-0.333***
	(0.008)	(27.252)	(0.181)	(0.021)	(0.011)	(0.024)
Debt ratio	-0.000	-1.841	-0.006	0.001	-0.001	0.001
II	0.100***	(2.340) cf 27c**	0.000)	0.000	0.002**	0.002
have rev. credit	(0.009)	(31.834)	(0.113)	(0.008)	(0.023) (0.010)	(0.003)
Mort. curr. $90 + $ del.	-0.122	-124.830	0.401	-0.083***	0.099***	-0.010
	(0.084)	(108.888)	(1.034)	(0.023)	(0.034)	(0.078)
90+ del. in pre. 24 mo.	-0.006**	-35.498***	0.188***	0.020***	-0.010***	-0.028***
	(0.002)	(5.463)	(0.047)	(0.002)	(0.002)	(0.004)
30+ del. ever	-0.023***	-272.507***	0.611***	0.038***	-0.006	-0.074***
	(0.008)	(17.536)	(0.062)	(0.006)	(0.005)	(0.006)
Log(income)	0.036***	84.136***	-0.080***	0.033***	-0.041***	0.035***
	(0.003)	(20.876)	(0.018)	(0.003)	(0.003)	(0.004)
Controlling for						
Demographics?	Yes	Yes	Yes	Yes	Yes	Yes
VantageScore bin?	Yes	Yes	Yes	Yes	Yes	Yes
Yearly-monthly fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.053	0.084	0.219	0.117	0.040	0.112
Ν	81,396	65,291	102,629	102,688	102,688	102,688
Recent filer	-0.033	-321.416***	2.688***	0.297***	-0.055***	-0.519***
	(0.020)	(28.202)	(0.347)	(0.032)	(0.018)	(0.035)
Seasoned filer	-0.116***	-307.806***	2.056***	0.348***	-0.113***	-0.476***
	(0.018)	(57.342)	(0.237)	(0.034)	(0.024)	(0.037)
Remote filer	-0.181***	-431.099***	1.016***	0.211***	-0.074***	-0.195***
	(0.009)	(34.882)	(0.225)	(0.026)	(0.013)	(0.028)

Table 8: Marginal Effects of Macroeconomic and Legal Factors on the Likelihood of Receiving Credit Card Offers

This table reports the estimated effects of macroeconomic and legal factors (at the state level) on the likelihood of receiving a credit card offer using the whole sample (2007, August 2009-December 2011). The regression includes as additional controls the full set of variables, except the state fixed effects, shown in Table 7. State-cluster-corrected standard errors are reported in parentheses. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. Both macroeconomic factors such as unemployment and house price growth affect the likelihood of receiving an offer. State regulatory environments related to bankruptcy and foreclosure law are also important determinants of receiving an offer.

$\frac{\text{Property exempt}}{100,000}$	$\frac{\text{House exempt}}{100,000}$	Pro-lender foreclosure	Unemployment	Lagged Δ HPI
-0.026	-0.002*	0.012^{**}	-0.008***	0.132^{***}
(0.020)	(0.001)	(0.007)	(0.002)	(0.054)

Table 9: Bankruptcy Filing Effects on the Likelihood of Credit Card Offers Estimated Using a Propensity Score Matching Method

This table reports the bankruptcy filing effects on the the likelihood of credit card offers estimated using a propensity score matching method. Coefficients are average treatment effects on the treated, that is, for those who have filed for bankruptcy, the difference between their observed likelihood of credit offers and the would-be likelihood of credit offers if they had not filed. The control sample for all estimations consists of consumers who have never filed for bankruptcy. Standard errors estimated using a bootstrapping method with the state-level clustering are reported in parentheses. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. "Recent," "Seasoned," and "Remote" filers refer to consumers who filed for bankruptcy 0-2 years, 3-5 years, and 6-10 years prior to the surveys, respectively,

	All Filers	Recent	Seasoned	Remote
Pre-crisis				
	-0.027**	0.055^{*}	-0.030	-0.054***
	(0.01)	(0.03)	(0.02)	(0.02)
Post-crisis & pre-CARD				
	-0.039**	0.027	-0.018	-0.072***
	(0.02)	(0.04)	(0.03)	(0.02)
Post-CARD				
	-0.118^{***}	-0.036	-0.104***	-0.163***
	(0.01)	(0.02)	(0.02)	(0.01)

Table 10: Additional Costs and Hidden Fees

This table reports the estimated effects of bankruptcy filing status on additional costs and "hidden" fees. Pre-crisis refers to January 2007-December 2007; post-crisis, pre-CARD-Act refers to August 2009-February 2010; and post-CARD-Act refers to March 2010-December 2011. All regressions include the full set of controls shown in Table 7. State-cluster-corrected standard errors are reported in parentheses. Statistical significance at the 10, 5, and 1 percent levels is indicated by *, **, and ***, respectively. The cells labeled "N.A." have too few observations across groups to report meaningful results.

	Dependent variables:				
	Waived annual fee	Min. finance charges	Have other fees		
Sample Period	Probit	OLS	Probit		
	(1)	(2)	(3)		
Pre-Crisis	-0.048***	0.174^{***}	N.A.		
	(0.004)	(0.013)			
Post-Crisis, Pre-CARD-Act	N.A.	0.233***	0.230***		
		(0.045)	(0.081)		
Post-CARD-Act	-0.002	-0.028**	0.118***		
	(0.007)	(0.011)	(0.017)		