The Credit Card Act and Consumer Debt Structure

Yiwei Dou
New York University

Julapa Jagtiani
Federal Reserve Bank of Philadelphia

Joshua Ronen
New York University

Raman Quinn Maingi
New York University

Consumer Finance Institute

The Credit Card Act and Consumer Debt Structure

Yiwei Dou
New York University

Julapa Jagtiani*
Federal Reserve Bank of Philadelphia

Joshua Ronen
New York University

Raman Quinn Maingi
New York University

August 2020

Abstract

We investigate whether the Credit Card Accountability, Responsibility, and Disclosure (CARD) Act of 2009 influenced the debt structure of consumers. By debt structure, we mean the proportion of total available credit from credit cards for each consumer. The act enhances disclosures of contractual and related information and restricts card issuers' ability to raise interest rates or charge late or over-limit fees, primarily affecting non-prime borrowers. Using the credit history via the Federal Reserve Bank of New York/Equifax Consumer Credit Panel during 2006–2016, we find that the average ratio of credit limit on cards to total consumer debt declined for non-prime borrowers in comparison to prime borrowers after the introduction of the CARD Act. The decline did not occur before the bill was first introduced in Congress; it took place afterward and continued through the end of our sample period. The results suggest that the CARD Act likely had an adverse effect on non-prime borrowers.

1. Introduction

A profound concern over decades about the credit card market has been weak consumer protection (Federal Reserve Board of Governors, 2010b; Levitin, 2011; Campbell et al., 2011). This concern, among others, led to a notable piece of legislation: The Credit Card Accountability, Responsibility, and Disclosure Act of 2009 (henceforth, the CARD Act)[1] with the objectives of protecting consumers and establishing fair and transparent practices in the credit card market. To this end, the CARD Act enhances disclosures to consumers of contractual and related information. It also restricts card issuers' ability to raise interest rates or charge late or over-limit fees.[2] Existing research evaluates whether the act effectively eliminates practices that are explicitly prohibited (Bar-Gill and Bubb, 2012; Agarwal et al., 2015). Relatively less attention has been devoted to the effects on the debt structure of consumers, particularly the ratio of total credit limits on consumer cards to total unsecured credit. In this paper, we seek to fill this gap in the literature.

It is a priori unclear whether the proportion of available credit line from consumer cards increases or decreases after the implementation of the act. On the one hand, research shows that restrictions on issuers' risk pricing reduce their willingness to lend (Han, Keys, and Li, 2018; Elliehausen and Hannon, 2018), which can translate into a lower proportion of available credit on consumer cards ("the supply effect"). On the other hand, the act induces better disclosure and consumer protection, which makes credit card products more appealing to consumers. As a result, they may increase the demand for credit through credit cards relative to other forms of borrowing. Consequently, consumers should borrow more through credit cards, relative to other financial products ("the demand effect"). Thus, the net effect of the act on the proportion of available credit from credit cards is ultimately an empirical question.

We use a novel data set that traces the quarterly credit history for nearly all the U.S. consumers via the Federal Reserve Bank of New York/Equifax Consumer Credit Panel (FRBNY Equifax CCP) during 2006–2016. Of the panel, we take a 5% random sample and require that each

---

[1] See Pub. L. No. 111-24, 123 Stat. 1734 (2009) (codified and scattered sections of the U.S.C.).

[2] The act requires monthly credit card statements to display prominently the interest savings from paying off balances in 36 months rather than making minimum payments. The act restricts interest rate increases on new transactions within the first year of opening the account and on existing balances except when the prior rate was an introductory rate or the minimum payment has not been received for 60 days. The act also prohibits a card issuer from imposing fees on consumers who make a transaction over an account's credit limit unless the cardholder explicitly opts in for the issuer to charge such a fee. Furthermore, an over-limit fee could be charged only once when the limit is exceeded, and over-limit fees are capped at the actual over-limit amount. A card issuer cannot impose a late fee of more than $25 unless one of the previous six payments was also late, and the late fee cannot be greater than the minimum payment.

consumer has a continuous history over the sample period, yielding over 3 million consumer-quarter observations. For each observation, we calculate our dependent variable (the proportion of available credit from consumer cards) as the total credit limits on all the consumer's outstanding cards divided by the sum of credit limits on all revolving accounts (e.g., credit cards and home equity lines of credit) and the highest unpaid balances over the history of the loan on installment accounts (e.g., student loans, auto loans, and mortgages). This ratio captures the fraction of consumer debt related to credit cards.

Following the literature (Han et al., 2018; Elliehausen and Hannon, 2018), we use a difference-in-differences research design that compares changes in the proportion of available credit from consumer cards over time for non-prime borrowers, who were primarily affected by the CARD Act, to changes in the proportion of available credit from consumer cards for prime borrowers, who were little affected. As the bill was implemented in three stages, a recent study by Agarwal et al. (2015) examines the consequences in three periods relative to their pre-period (March 2008–April 2009): the passage of the bill and Phase 1 (May 2009–February 2010), Phase 2 (March 2010–August 2010), and Phase 3 (September 2010–December 2011). This approach, however, is criticized on the ground that it did not capture the anticipation effect when the bill was first introduced in Congress in February 2008[3] and when a similar credit card regulation was proposed in May 2008 and adopted in December 2008 by the Federal Reserve Board (Jambulapati and Stanvis, 2014; Zywicki, 2016). Since our sample covers a longer window, we address these concerns by examining five subperiods: the pre-period (2006Q1–2007Q4), the anticipation period (2008Q1–2009Q1), Phase 1 (2009Q2–2009Q4), Phase 2 (2010Q1–2010Q2), Phase 3 (2010Q3–2011Q4), and the post-Phase 3 period (2012Q1–2016Q4), which is after the end of Agarwal et al.'s (2015) sample period.

In regression analysis, we control for an array of variables that could potentially influence available credit from credit cards. They include the card utilization ratio, the number of credit inquiries, the presence of a card with more than 60 days past due, the presence of a non-credit card loan with more than 60 days past due, and the state of the local economy as measured by the state-level initial unemployment insurance claims. We also include consumer, year-quarter, and state-fixed effects in the regressions, and two-way cluster the standard errors at the consumer and subperiod levels.

Our baseline analysis suggests that the proportion of available credit from credit cards started to decline in the anticipation period for non-prime borrowers relative to prime borrowers.

---

[3] See H.R. 5244 — Credit Cardholders' Bill of Rights Act of 2008.

The decline persisted through all of the three phases and the post-Phase 3 period. The reduction is economically meaningful and ranges from 4% to 11% of the mean level of total credit limits on consumer cards divided by total available credit. The results suggest that the supply effect outweighs the demand effect, yielding a net reduction in the proportion of available credit from credit cards. We consider two potential alternative explanations. First, the freezing of securitization markets in the financial crisis may reduce the issuance of credit cards because it is more difficult to securitize them. However, according to the Securities Industry and Financial Markets Association (SIFMA), credit card receivables did not suffer more than other types of loans (i.e., mortgages, student loans, and auto loans) as liquidity dried up during the crisis. Second, Tian and Zhang (2018) find that the adoption of two new accounting standards for securitizations (SFAS 166/167) in 2010 primarily led to the consolidation of credit card securitization entities and reduced the total managed credit card receivables. However, the effect we document took place as early as 2008Q1 when the implications of the new standards on securitizations of credit card receivables were entirely unclear (Dou, Ryan, and Xie, 2018). In addition, since we implement a difference-in-differences design, it is unclear how these two events influence prime and non-prime borrowers differently. As such, they are unlikely to be responsible for our findings.

We then extend our analysis in a number of directions. First, a key assumption underlying our identification strategy is that non-prime and prime borrowers would have exhibited parallel trends in the proportion of available credit from credit cards in the absence of the CARD Act. We assess the validity of this parallel-trends assumption by examining six quarters preceding the anticipation period. We find no decline in those quarters. Second, to rule out the possibility that changes in secured borrowings drive our results, we exclude secured debt (i.e., mortgages, home equity lines of credit, and auto loans) from the denominator. Our results are robust to using this alternative dependent variable (total credit limits on consumer cards to total available unsecured credit). Third, we replace the non-prime indicator with Equifax Risk Score ranks based on six groups and continue to find robust results. Fourth, our results are robust to dropping the transition quarter of each subperiod. Fifth, we add state–year–quarter fixed effects to account for state-level legislative and economic changes (e.g., changes in real estate prices across states). These fixed effects permit a comparison of consumers within the same state–year–quarter. Our inferences are unaltered. Finally, in the baseline analysis, we use credit scores at the beginning of our sample period to identify non-prime consumers. Our results are resilient to using updated credit scores as of each quarter-end.

This study adds to the debate on the costs and benefits of the CARD Act (Bar-Gill and Bubb, 2012; Jambulapati and Stavins, 2014; Agarwal et al., 2015; Debbaut, Ghent, and Kudlyak, 2016; Pinheiro and Ronen, 2016; Han et al., 2018; Elliehausen and Hannon, 2018; Dou, Li, and Ronen, 2019; Nelson, 2020). Bar-Gill and Bubb (2012) and Agarwal et al. (2015) find that the act effectively reduced late and over-limit fees. Agarwal et al. (2015) find no changes to account-level credit limits or interest rates around the act. In contrast, Han et al. (2018) find a reduction in issuers' credit supply, as proxied by mail solicitations and offered interest rates and other contractual terms. While the null result in Agarwal et al. (2015) suggests that the increased demand because of better consumer protection offsets the reduced supply of credit, it is also consistent with the interpretation that the credit card limits already declined in their pre-period (our anticipation period). Our sample spans a longer window and allows us to obtain a relatively clean pre-period to mitigate this concern.

Elliehausen and Hannon (2018) find a decrease in the number of bank credit card accounts held by non-prime borrowers relative to prime borrowers. The implications of their findings to consumer debt structure, however, are unclear for two reasons. First, the number of accounts cannot fully capture the dollar amount of available credit via credit cards. Second, consumers may also experience a contraction in total available credit (the denominator of our debt structure variable) so that the debt structure remains unchanged. Our results of a reduction in the proportion of available credit from credit cards complement their finding and enhance our understanding of how the CARD Act influenced the debt structure of households.

Santucci (2015) conducts a univariate comparison between two vintages of credit card accounts, those opened in 2005 and 2011. He finds that the latter exhibit lower credit limits than the former. His comparison, however, does not trace the evolution of the CARD Act, examines only new accounts, and does not account for the contraction in the total available credit or other secular trends. As such, he acknowledges that he cannot separate the effects of the CARD Act from those of many omitted events. In contrast, our tight research design allows us to better attribute our findings to the CARD Act.

The rest of the paper proceeds as follows. In Section 2, we discuss the CARD Act. We describe data and sample construction and lay out our methodology in Sections 3 and 4, respectively. Empirical results and a number of robustness tests are reported in Section 5. We conclude in Section 6.

2. The CARD Act of 2008

The CARD Act primarily amends the Truth in Lending Act and imposes several new substantive and disclosure requirements to establish fair and transparent practices pertaining to consumer credit cards. We discuss related events leading up to the passage of the act and the provisions that follow.

(1) **Anticipation**: The predecessor of the CARD Act, the Credit Cardholders' Bill of Rights Act, was introduced in the 110th Congress by Representative Carolyn Maloney as H.R. 5244 on February 7, 2008. The bill included many of the same provisions as the CARD Act and passed by a vote of 312 to 112 in the House on September 23, 2008. The Federal Reserve proposed rules to limit credit card practices on May 2, 2008, and approved several rules similar to provisions in the Credit Cardholders' Bill of Rights Act on December 18, 2008 (Jambulapati and Stanvis, 2014; Zywicki, 2016).[4] Maloney introduced the CARD Act in the 111th House as H.R. 627 on January 22, 2009.

(2) **Law Passage and Phase 1**: The CARD Act passed in the House with a vote of 357 to 70 on April 30, 2009, and in the Senate with a vote of 90 to 5 on May 19, 2009, and was signed into law by President Barack Obama on May 22, 2009. The provisions of the CARD Act were scheduled to take effect in three phases. Effective on August 20, 2009, the first phase required banks to provide various disclosures to consumers. In essence, the disclosures include 45-day advance notice of significant changes to terms (e.g., rate increases) and consumers' right to cancel the card account before the change goes into effect, and periodic credit card statements at least 21 days before the due date of payment.

(3) **Phase 2**: On February 22, 2010, a major portion of the CARD Act became effective. It restricts interest rate increases within the first year of a new account and limits rate increases for existing balances, except if the prior rate was temporary and lasted at least six months (e.g., a teaser rate) or the borrower has not paid the minimum payment for 60 days. It also regulates how payment is structured and applied to a consumer's account.[5] The act prohibits a card issuer from imposing fees on consumers that make a transaction over an account's credit limit unless the cardholder explicitly opts in for the

---

[4] See the proposed rules (Federal Reserve Board of Governors, 2008) and the final rules (Federal Reserve Board of Governors, 2010a).

[5] Card issuers cannot set payment deadlines arbitrarily, must accept payments received before 5:00 p.m. on the due date, and cannot treat a payment on the next business day as late if the payment is due on a Sunday or holiday. If a card account has multiple interest rates (e.g., a new purchase rate in addition to the regular rate), issuers are required to apply payments to the highest-rate balance first.

issuer to charge such a fee. Furthermore, an over-limit fee could be charged only once when the limit is exceeded. The act also regulates the issuance of credit cards to borrowers under 21 years of age. Finally, the CARD Act requires repayment disclosures in monthly credit card statements that detail the total cost to consumers if they make only the minimum monthly payment versus the monthly payment that would eliminate the current outstanding balance (without further advances) in 36 months.

(4) **Phase 3**: On August 22, 2010, the third phase of the CARD Act came into effect. The provisions in this phase require issuers to reevaluate any new increases in interest rate every six months. It caps over-limit fees at the actual over-limit amount. A card issuer cannot impose a late fee of more than $25 unless one of the previous six payments was also late (a $35 late fee may be charged in this case), and the late fee cannot be greater than the minimum payment. Issuers are prevented from charging more than one fee per violation in a single billing cycle and from charging fees for not using the card for some time.

3. Data and Sample Construction

Our primary source of data is the Federal Reserve Bank of New York/Equifax Consumer Credit Panel (hereafter, FRBNY Equifax CCP). The panel uses a unique sample design to pull out information from consumer credit reports to track individuals' access to and use of credit (e.g., balances and credit limits on all accounts) and their geographic location at a quarterly frequency. In particular, the FRBNY Equifax CCP contains a 5% random sample of individuals in the United States who have a Social Security number and a credit history. The panel starts from the first quarter of 1999 to the present. Researchers can use it to compute nationally representative estimates of the levels and changes in various aspects of individual liabilities. Lee and van der Klaauw (2010) provide a detailed description of the database. We use these data to construct dependent and explanatory variables at the consumer-quarter level in our regression analyses, as discussed in the next section.

One issue with the FRBNY Equifax CCP is that the data allow for entry and exit in every quarter. Consumers may enter, for example, because they have turned 18 or if they are opening their first credit account. Consumers may exit, for instance, upon their death. Consequently, the data constitute an unbalanced panel. To ensure that any observed short-term and long-term effects are not related to the changing composition of the panel over time, we artificially balance the FRBNY Equifax CCP as follows. We select a 0.5 percent random sample of consumers in the panel.

This procedure leaves us with 118,000 of the roughly 23.7 million distinct primary consumers in the FRBNY Equifax CCP. We then restrict the sample to consumers who have a record in every quarter of the panel from 2006Q1 to 2016Q4. This procedure leaves us with 98,000 consumers. We then require that consumers have an Equifax Risk Score in every quarter of the panel, resulting in 78,899 consumers.[6] The Equifax Risk Score is a credit score based on an enhanced risk model designed to predict the likelihood of a consumer becoming 90+ days delinquent within 24 months. The score uses a numerical range of 280 to 850, where higher scores indicate lower credit risk. Finally, we drop 699 consumers who consistently reside in a U.S. territory outside of the 50 states and Washington, D.C. This leaves us with a final sample of 78,200 consumers for 44 quarters, which gives us a total of 3.4 million consumer-quarter observations in our sample.[7]

4. The Methodology

Prior research documents that the CARD Act primarily affects non-prime borrowers; they are unsophisticated and tend to be exploited by financial institutions (Han et al., 2018; Elliehausen and Hannon, 2018). In contrast, prime borrowers are less subject to the practices prohibited by the CARD Act. Following the methodology of Han et al. (2018) and Elliehausen and Hannon (2018), we employ a difference-in-differences research design that compares changes in outcomes over time for non-prime borrowers to changes in outcomes for prime borrowers. The identifying assumption for this strategy is that, in the absence of the CARD Act, outcomes would have been parallel between these two groups of consumers. We validate the parallel trends assumption in the later section.

We estimate the following regression specification:

$$\textit{Credit Card/Total Debt}_{it} = \alpha + \beta_1 \textit{Non-prime}_i \times \textit{Anticipation}_t + \beta_2 \textit{Non-prime}_i \times \textit{Phase 1}_t$$
$$+ \beta_3 \textit{Non-prime}_i \times \textit{Phase 2}_t + \beta_4 \textit{Non-prime}_i \times \textit{Phase 3}_t$$
$$+ \beta_5 \textit{Non-prime}_i \times \textit{Post-Phase 3}_t + \beta_6 \textit{Utilization Ratio}_{it-1}$$
$$+ \beta_7 \textit{Utilization Ratio>1}_{it-1} + \beta_8 \textit{Credit Inquiries}_{it-1}$$
$$+ \beta_9 \textit{Missing Inquiries}_{it-1} + \beta_{10} \textit{Card 60 Day Past Due}_{it-1}$$
$$+ \beta_{11} \textit{Non-card 60 Day Past Due}_{it-1} + \beta_{12} \textit{Unemployment Claims}_{it-1}$$
$$+ d_i + e_t + f_s + v_{it}, \qquad (1)$$

---

[6] It is important to note that essentially every consumer with a credit card will have an Equifax Risk Score. Thus, while the population of adults without a score is important in some studies, it is less relevant here.

[7] A small number of consumers (154) live in a U.S. territory for at least one quarter during our sample period. Because of insufficient data, we remove these consumers from our sample while they live in a territory; our results are robust to complete exclusion of these consumers as well.

where *i* indexes the consumer, *t* indexes the year-quarter, and *s* indexes the state (for the state fixed effects). The dependent variable, *Credit Card/Total Debt*, is the ratio of total credit limits on consumer cards to total available credit to the borrower . The numerator is the sum of credit limits on credit card accounts of the consumer. The denominator is the sum of credit limits on revolving accounts (e.g., credit cards and home equity lines of credit) and the highest unpaid balances over the history of the loan on installment accounts (e.g., student loans and mortgages). Both the numerator and the denominator of this ratio are equilibrium outcomes; this ratio captures the fraction of available credit to consumer that come from credit cards. It is important to note that the denominator helps remove effects of concurrent events (e.g., the financial crisis) on consumers' overall borrowing capaicity.

Our test variables consist of the interaction between *Non-prime* and each of five subperiod indicators. Following the literature, we set *Non-prime* to 1 for borrowers with Equifax Risk Score less than 660 as of 2006Q1, and zero otherwise (Mian and Sufi, 2009; Han et al., 2018; Elliehausen and Hannon, 2018). This variable does not change over time to facilitate the interpretation of the results. Nevertheless, using a dynamic Equifax Risk Score as of each quarter-end does not affect our inferences, as discussed in Section 5.

Using a sample of card accounts from March 2008 to December 2011, Agarwal et al. (2015) examine the consequences of the CARD Act in three periods relative to their pre-period (March 2008–April 2009): the passage of the bill and Phase 1 (May 2009–February 2010), Phase 2 (March 2010–August 2010), and Phase 3 (September 2010–December 2011). To make our research design comparable with theirs, we define three subperiod indicators as follows.

We set *Phase 1* to 1 for 2009Q2–2009Q4, and zero otherwise. It reflects the effect of the passage and first phase implementation of the CARD Act. *Phase 2* is set to 1 for 2010Q1–2010Q2, and zero otherwise. It captures the effect of the second phase implementation of the CARD Act. *Phase 3* is set to 1 for 2010Q3–2011Q4, and zero otherwise. As our sample period ends at 2016Q4, we create an additional indicator, *Post-Phase 3*, set to 1 for 2012Q1–2016Q4, and zero otherwise. It allows us to assess the long-run effect of the CARD Act after the end of Agarwal et al.'s (2015) sample period. Another difference between our design and Agarwal et al.'s (2015) is that we include an indicator, *Anticipation*, set to 1 for 2008Q1–2009Q1, and zero otherwise. The anticipation period corresponds to Agarwal et al.'s (2015) pre-period (March 2008–April 2009). It allows us to capture the anticipation effects because a series of events leading up to the passage of the CARD Act, as discussed in Section 2.

We are interested in coefficients on the five interaction terms (β_1-β_5). In our specification, the time period prior to the passage of the law (2006Q1–2007Q4) is the omitted group and the coefficients (β_1-β_5) should be interpreted relative to this period.

In the regression specification, we include the following control variables that are potentially related to the proportion of available credit from credit cards. *Utilization Ratio* is the ratio of total credit card unpaid balance to total credit card limits, capped at 1.[8] *Utilization Ratio>1* is an indicator set to 1 if the ratio of total credit card unpaid balance to total credit card limits is greater than 1, and zero otherwise. *Credit Inquiries* is the number of credit inquiries in the past 12 months and zero for missing numbers. *Missing Inquiries* is an indicator set to 1 for missing numbers of credit inquiries in the credit report, and zero otherwise. *Card Past Due 60+* is an indicator set to 1 for the presence of at least one credit card being 60 or more days past due, and zero otherwise. *Non-card Past Due 60+* is an indicator set to 1 for the presence of one non-credit card being 60 or more days past due, and zero otherwise. *Unemployment Claims* is the state-level total number of initial unemployment insurance claims divided by the entire workforce, multiplied by 100. All control variables are lagged by one quarter to ensure that the consumers' debt structure at the quarter-end does not affect the control variables.

We add three sets of fixed effects to the regression; d_i represents consumer fixed effects, which absorb all time-invariant heterogeneity across consumers (e.g., ethnicity, values, and inherent ability); e_t represents year-quarter fixed effects to capture time effects such as macroeconomic conditions and legal environments: and f_s stands for state-fixed effects, which strip out time-invariant differences among consumers' resident states such as consumer finance rate ceilings (Durkin, Elliehausen, and Hwang, 2016). Notably, d_i and e_t absorb the main effects of *Non-prime$_i$* and the five subperiod indicators (*Anticipation$_t$*, *Phase 1$_t$*, *Phase 2$_t$*, *Phase 3$_t$*, and *Post-Phase 3$_t$*), respectively. The presence of these fixed effects permits interpretation of the model as a generalized difference-in-differences specification with a pre-period and five post-periods (Angrist and Pischke, 2009). To correct for time-series (within a consumer) and cross-sectional (within a subperiod) dependence, we two-way cluster standard errors by consumer and subperiod (Gow, Ormazabal, and Taylor, 2010).

---

[8] Santucci (2016) find a reduction in revolving credit card balances from 2009 to 2013, and the reduction is concentrated among riskier borrowers. The *Utilization Ratio* helps account for this reduction.

5. The Empirical Results

We first report descriptive statistics for the variables used in our regression analyses in Section 5.1. The primary results are presented in Section 5.2. We validate the parallel trends assumption between non-prime and prime consumers in Section 5.3. We show the results using an alternative dependent variable and an alternative treatment variable in Sections 5.4 and 5.5, respectively. Finally, we conduct three additional analyses to assess the robustness of our results in Section 5.6.

5.1. Descriptive Statistics

Table 1 presents descriptive statistics for regression variables. In Panel A, we use the full sample of 78,200 consumers for 44 quarters, which represent 3,437,849 consumer-quarter observations. Total credit limits on consumer cards amounts to 29 percent of total available credit for an average consumer, an economically significant portion of consumer debt. About 33.2 percent of borrowers are non-prime. The average utilization ratio is 0.269, and 4.8 percent of consumers have a utilization ratio greater than 1. An average consumer authorizes 1.422 credit inquiries in the past 12 months, which suggests that she is active in borrowing. There are missing credit inquiries for 29.8% of consumers.[9] About 7.3 percent (11.2 percent) of consumers have a credit card (non-credit card) account that is more than 60 days past due. On average, 3.529 percent of the workforce file initial unemployment claims in a state.

Panel B presents means of these variables grouped by consumers' Equifax Risk Score as of 2006Q1, the first quarter of our sample period. Following Agarwal et al. (2015), we sort consumers into six groups and assign the groups a rank in a descending order: <620 (*Equifax Risk Score Rank* = 6), 620~659 (*Equifax Risk Score Rank* = 5), 660~710 (*Equifax Risk Score Rank* = 4), 720~759 (*Equifax Risk Score Rank* = 3), 760~799 (*Equifax Risk Score Rank* = 2), and 800+ (*Equifax Risk Score Rank* = 1). Naturally, *Non-prime* equals zero for Groups 1-4 and one for Groups 5-6. Moving from consumers with the worst scores (Group 6) to those with the best scores (Group 1), we observe the following patterns. First, the proportion of available credit from credit cards (*Credit Card/Total Debt*) increases monotonically, consistent with the expectation that persons with better credit quality enjoy access to more credit. Second and intuitively, credit cards are used more, and the

---

[9] Only "hard pulls" are included in the CCP, which are voluntary inquiries generated when a consumer authorizes lenders to request a copy of his or her credit report. It excludes inquiries made by creditors about existing accounts (for example, to determine whether they want to send the customer pre-approved credit applications or to verify the accuracy of customer-provided information) and inquiries made by consumers themselves. Note that inquiries are credit reporting company specific (Equifax, in our case) and not all inquiries associated with credit activities are reported to each credit reporting agency.

limits are exceeded more often by low-credit quality borrowers than by those with high-credit quality. Third, there are more credit inquiries, indicative of more demand for credit access, for low-credit quality borrowers than high-credit quality borrowers, which is sensible. Finally, the incidence rate of having a credit card or non-credit card account that is 60 or more days past due is much higher for low-credit quality borrowers than those with high-credit quality. Overall, the patterns are in line with economic intuition.

5.2. The CARD Act and Consumer Debt Structure

Table 2 presents our primary results of estimating equation (1). The adjusted R^2 of 0.647 suggests that our model does an excellent job of explaining the variation in the ratio of total credit limits on consumer cards to total available credit to the consumer. All of our test variables, the five interaction terms, load significantly negatively. Specifically, we observe a statistically significant coefficient of -0.0178 on $Non\text{-}prime_i \times Anticipation_t$ (two-tailed p-value < 0.01). It represents a reduction in the proportion of available credit from credit cards by 6 percent (= 0.0178/0.290) of the mean level for non-prime borrowers relative to prime borrowers from the pre-period (2006Q1–2007Q4) to the anticipation period (2008Q1–2009Q1), an economically meaningful effect. This result suggests that the reduction took place as early as the predecessor of the CARD Act was introduced in the House, and the Federal Reserve Board adopted a similar credit card regulation.

We observe a statistically significant coefficient of -0.0137 on $Non\text{-}prime_i \times Phase\ 1_t$ (two-tailed p-value < 0.01), indicating a reduction in the proportion of available credit from credit cards by 5 percent (= 0.0137/0.290) of the mean level for non-prime from the pre-period (2006Q1–2007Q4) to the Phase 1 period (2009Q2–2009Q4). We also observe a statistically significant coefficient of -0.0105 on $Non\text{-}prime_i \times Phase\ 2_t$ (two-tailed p-value < 0.01) and a statistically significant coefficient of -0.0210 on $Non\text{-}prime_i \times Phase\ 3_t$ (two-tailed p-value < 0.01). The coefficients represent reductions in the proportion of available credit from credit cards by 4 percent and 7 percent of the mean level for non-prime borrowers relative to prime borrowers from the pre-period (2006Q1–2007Q4) to the Phase 2 period (2010Q1–2010Q2) and Phase 3 period (2010Q3–2011Q4), respectively. These results suggest that the reduction persisted over the three-phase implementation after the passage of the CARD Act. These findings differ from Agarwal et al.'s (2015) in that they find no changes to credit limits on consumer card accounts during the three phases of the CARD Act's implementation. While our sample and design differ from theirs in many aspects, one key difference is that our anticipation period (2008Q1–2009Q1) largely overlaps their

pre-period (March 2008–April 2009).[10] Since the effect of the CARD Act first appears in our anticipation period and persists afterward, as shown in Table 2, it is unsurprising to observe insignificant changes from the anticipation period to the three-phase implementation as in Agarwal et al. (2015). Our findings highlight the importance of identifying the timing of the treatment effect and choosing the pre-period accordingly.

Finally, we find a statistically significant coefficient of -0.0137 on *Non-prime$_i$ × Post-Phase 3$_t$* (two-tailed p-value < 0.01). It indicates a reduction in the proportion of available credit from credit cards by 5 percent (= 0.0137/0.290) of the mean level from the pre-period (2006Q1–2007Q4) to the post-Phase 3 period (2012Q1–2016Q4), which is after the end of Agarwal et al.'s (2015) sample period. This result suggests that the reduction does not reverse in the long run.

With respect to the control variables, we observe that *Utilization Ratio* and *Utilization Ratio>1* load significantly positively (two-tailed p-value < 0.01 and < 0.05, respectively), consistent with the notion that more use of credit cards gives rise to higher credit limits. The negative coefficient on *Credit Inquiries* (two-tailed p-value < 0.01) and the positive coefficient on *Missing Inquiries* (two-tailed p-value < 0.01) suggest that more hard pulls of credit reports associated with general borrowing dilute the proportion of available credit from credit cards. Interestingly, we find a positive coefficient on *Card 60+ Day Past Due* (two-tailed p-value < 0.01) and a negative coefficient on *Non-card 60+ Day Past Due* (two-tailed p-value < 0.01). The results are consistent with the expectation that the proportion of available credit from credit cards is positively associated with a delinquent credit card account and negatively associated with a delinquent non-credit card account. We also observe a positive coefficient on *Unemployment Claims*, although it is statistically insignificant (two-tailed p-value = 0.197).

Next, we entertain two potential alternative explanations for our findings. First, the reduction in the ratio of total credit limits on consumer cards to total available credit to the consumer starts in 2008Q1, which coincides with the freezing of securitization markets in the financial crisis. The freezing reduces the issuance of credit cards because it is more difficult to securitize credit card receivables. We take a close look at the issuance of asset-backed securities related to four major types of consumer debt: credit card debt, mortgages, student loans, and auto loans. The SIFMA reports that the total issuance of securities backed by credit card receivables

---

[10] Besides the different definitions of the pre-period, we use consumer-quarter level data from the Federal Reserve Bank of New York Equifax Consumer Credit Panel and compare non-prime borrowers with prime borrowers, whereas Agarwal et al. (2015) use account-month level data from the Credit Card Metrics data set assembled by the Office of the Comptroller of the Currency (OCC)and compare consumer cards with small business cards. We acknowledge that these differences may also drive the different results.

decreased from $96 billion in 2007 to $56 billion in 2008, representing a 31% decline. The SIFMA also reports that total issuance of securities backed by mortgages (student loans) [auto loans] decreased from $2.4 trillion ($60 billion) [$86 billion] to $1.4 trillion ($28 billion) [$36 billion] over the same period, representing a 41 percent (53 percent) [58 percent] decline.[11] Thus, credit card debt does not appear to suffer more than other types of consumer debt from the drying up of liquidity during the recent financial crisis. More importantly, as our difference-in-differences design compares prime borrowers with non-prime ones, it is unclear how the freezing influences these two types of borrowers differently. Thus, the differential exposure to liquidity risk during the crisis is unlikely to explain our results.[12]

Second, the Financial Accounting Standards Board (FASB) issued Statements of Financial Accounting Standards (SFAS) 166 and 167 (Financial Accounting Standards Board, 2009a, 2009b), effective in 2010, to tighten accounting rules for securitization. As a result, securitizing banks need to consolidate previously off-balance-sheet securitization entities onto their balance sheets. Dou et al. (2018) estimate that banks consolidated securitization entities holding assets of $811 billion under SFAS 166/167 in 2010. Of these newly consolidated assets, about 80 percent were held by other types of securitization entities, mostly credit card master trusts. Tian and Zhang (2018) find that the adoption of SFAS 166/167 reduces the total managed credit card receivables of consolidating banks. If this reduction because of SFAS 166/167 drives our findings, we should not observe the reduction as early as in 2008Q1, when the asymmetric impacts of the new standards on securitizations of credit card receivables versus other types of consumer loans were entirely unclear. For example, Dou et al. (2018) note: "Interestingly, FAS 166/167 caused very little consolidation of VIEs holding 1-4 family residential mortgages by banks, despite the fact that securitization of subprime and other types of credit-risky mortgages played significant roles in the genesis of the 2007–2009 financial crisis and in gaining general acceptance for the passage of FAS 166/167." In addition, since we implement a difference-in-differences design, it is unclear how the consolidations influence prime and non-prime borrowers differently. Thus, the adoption of the new accounting standards for securitizations is unlikely to be responsible for the entire findings.

---

[11] The data are available at https://www.sifma.org/resources/research/us-abs-issuance-and-outstanding/.

[12] One may argue that the financial crisis depletes regulatory capital of banks and thus tilt them toward prime borrowers. However, this "flight to safety" effect applies to both the numerator and the denominator of our dependent variable (i.e., the ratio of total credit limits on consumer cards to total available funds for borrowing). As such, we do not believe that this effect can fully explain our findings.

5.3. Validation of Parallel Trends Assumptions

A key assumption underlying our identification strategy is that non-prime and prime borrowers would have exhibited parallel trends in their debt structure in the absence of the CARD Act. To assess the validity of this assumption, we create an indicator for each of the six quarters before the anticipation period (i.e., *2006Q3*, *2006Q4*, *2007Q1*, *2007Q2*, *2007Q3*, and *2007Q4*) and interact the indicator with *Non-prime*. We add these interactions into equation (1) and reestimate the equation. Year-quarter fixed effects absorb the main effects of the six quarter indicators. In this new specification, the omitted group is the first two quarters of 2006, which serves as the benchmark period effectively.

Table 3 reports the results. We find insignificant coefficients on the six new interaction terms (two-tailed p-value ranges from 0.157 to 0.998). In contrast, our test variables, the five interaction terms, continue to load significantly negatively; all the two-tailed p-values are below 0.01. The results suggest that the proportion of available credit from credit cards does not change from the first two quarters of 2006 to any of the six quarters leading up to the anticipation period of the CARD Act. Instead, the ratio of total credit limits on consumer cards to total available credit to the borrower declines only after the introduction of the bill in Congress. These findings alleviate the concern that the result simply captures the continuation of divergent trends between non-prime and prime borrowers that began before the introduction of the bill.

5.4. An Alternative Dependent Variable

U.S. consumers rely heavily on credit cards as a source of unsecured debt. The denominator of our current dependent variable (*Credit Card/Total Debt*), however, does not distinguish between secured and unsecured debt. As a result, our results may be driven by changes to secured debt, which are unrelated to the CARD Act. To rule out this possibility, we construct an alternative dependent variable (*Credit Card/Unsecured Debt*) by excluding secured debt (i.e., mortgages, home equity lines of credit, and auto loans) from the denominator. Table 1 Panel A shows that total credit limits on consumer cards accounts for 56.6 percent of total available unsecured credit for an average consumer. Panel B reports that this ratio is increasing in the credit quality of consumers, consistent with the notion that consumers with a higher Equifax Risk Score have access to more credit card borrowings (larger credit limits).

We replace the original dependent variable with this new ratio (*Credit Card/Unsecured Debt*) and re-estimate equation (1). Table 4 presents the results. Our test variables, the five

interaction terms, continue to load significantly negatively (two-tailed p-value < 0.01 for all of them). The coefficients on the five variables range from -0.0120 to -0.0226, representing 2 percent to 4 percent decreases relative to the full sample mean (0.566). Thus, our findings are unlikely explained by shocks to secured debt of consumers that are unrelated to the CARD Act. The coefficients on control variables are mostly consistent with those reported in Table 2.

5.5. An Alternative Treatment Variable

Following Han et al. (2018) and Elliehausen and Hannon (2018), we use a dichotomous variable (*Non-prime*) to separate the treatment and control groups. We note, however, that this classification may obscure meaningful variations in the strength of the CARD Act's impacts within each group. For example, Table 1 Panel B reports the incidence rates of exceeding credit limits (*Utilization Ratio>1*) for the six credit score groups. Since exceeding credit limits often gives rise to changes to card terms (e.g., rate increases) and charging over-limit fees, practices that are directly regulated by the CARD Act, the incidence rates potentially reflect the reach of the act's impacts related to those practices.[13] We observe that borrowers in Group 6 (Equifax Risk Score <620) are more likely to exceed credit limits than those in Group 5 (620~659) on average. It suggests that, among non-prime borrowers, those with worse credit scores (<620) may be influenced more by the CARD Act than the others (with a score between 620 and 659). We also observe that the mean of *Utilization Ratio>1* monotonically decreases as we move from Group 4 to Group 1, suggesting differential impacts of the CARD Act on consumers with different credit scores even among prime borrowers.

To take advantage of the CARD Act's differential impacts, we use the Equifax Risk Score ranks as an alternative treatment variable. We replace *Non-prime* with *Equifax Risk Score Rank* in equation (1) and re-estimate the regression. Table 5 reports the results. Our test variables, the five interaction terms, continue to load significantly negatively (two-tailed p-value < 0.01 for all of them). The coefficients on the five variables range from -0.00503 to -0.0139, representing 2 percent to 5 percent decreases relative to the full sample mean (0.290) for consumers compared with those in the next credit score group.

---

[13] Notably, we do not argue that *Utilization Ratio>1* captures *all* the CARD Act's impacts, as the act also regulates many practices unrelated to exceeding credit limits (e.g., charging late fees and raising interest rates for late payments). As such, we construct our treatment variables based on consumers' credit scores to capture the comprehensive impacts of the CARD Act, following the methodology of Han et al. (2018) and Elliehausen and Hannon (2018).

5.6. Robustness Tests

We conduct three additional tests to assess the robustness of our results. First, as the FRBNY Equifax CCP reports consumers' credit status on a quarterly basis, the first quarter of each subperiod is a transition quarter and thus contains measurement error. For example, the anticipation period started in February 2008, whereas we set *Anticipation* to 1 for the entire 2008Q1. To alleviate the concern about the measurement error, we exclude all the transition quarters (i.e., 2008Q1, 2009Q2, 2010Q1, 2010Q3, and 2012Q1) and reestimate equation (1) with 3,125,338 consumer-quarter observations. As shown in the first column of Table 6, the five test variables continue to load significantly negatively (two-tailed p-value < 0.01 for all five variables). The coefficients on the five variables range from -0.0113 to -0.0309, representing 4 percent to 11 percent decreases relative to the full sample mean (0.290). The economic magnitude of the reductions is slightly greater than that in Table 2, consistent with measurement error biases attenuating coefficients toward zero.

Second, regulatory and economic changes within a state may influence consumers' debt structure. For example, Sandler and Romeo (2018) examine four new state laws and regulations since 2009 that restrict the conduct of debt collectors. They find that the restrictions reduce consumers' access to credit card debt and raise prices for such debt. Additionally, changes in real estate prices across states over time may also influence the debt structure of consumers. Our current year-quarter fixed effects and state fixed effects cannot control for these state-specific changes. To mitigate the concern that these and other state-level changes explain our results, we replace year-quarter fixed effects and state fixed effects with state–year–quarter fixed effects. The inclusion of the state–year–quarter fixed effects enables us to compare changes in debt structure within the same state–year–quarter across consumers influenced disparately by the CARD Act (i.e., non-prime versus prime borrowers). As shown in the second column of Table 6, the five test variables continue to load significantly negatively (two-tailed p-value < 0.01 for all five variables). The coefficients on the five variables range from -0.0103 to -0.0315, representing 4 percent to 11 percent decreases relative to the full sample mean (0.290). The economic magnitude of the reductions is slightly greater than that in Table 2, suggesting that controlling for state-level changes yields stronger results.

Finally, in the original specification, we use the static Equifax Risk Score as of the first quarter of our sample period (i.e., 2006Q1) to separate non-prime borrowers from prime borrowers. This approach eases the interpretation of the results because a consumer does not switch between the treatment and control groups. It, however, does not incorporate news on the

creditworthiness of consumers after 2006Q1 and thus creates measurement error in the treatment variable. We re-define *Non-prime* using dynamic Equifax Risk Scores (i.e., the updated Equifax Risk Scores as of each quarter-end) and re-estimate equation (1). As shown in the third column of Table 6, the five test variables continue to load significantly negatively (two-tailed p-value < 0.01 for all five variables). The coefficients on the five variables range from -0.0207 to -0.0378, representing 7 percent to 13 percent decreases relative to the full sample mean (0.290). The economic magnitude of the reductions is greater than that in Table 2, consistent with measurement error biases estimated coefficients toward zero.

6. Conclusions

We investigate whether the Credit Card Accountability and Disclosure (CARD) Act of 2009 influenced the debt structure of consumers, or the proportion of available credit from credit cards. The CARD Act enhances disclosures of contractual and related information and restricts card issuers' ability to raise interest rates or charge late or over-limit fees, and primarily affects non-prime borrowers. Using the credit history via the FRBNY/Equifax Consumer Credit Panel during 2006–2016, we find that the average ratio of total credit limits on consumer cards to total available credit to the borrower declined for non-prime consumers relative to prime consumers after the introduction of the act. The decline did not occur before the bill was first introduced in Congress and persisted during the passage and implementation of the act and periods afterward. The results are robust to using an alternative dependent variable, an alternative treatment variable, and alternative specifications. Together, the results suggest that the CARD Act, which was intended to protect credit card users better, significantly reduced the proportion of available credit from credit cards. The results suggest that the CARD Act likely had an adverse effect on non-prime borrowers.

Appendix A: Variable Definitions

Variables	Definitions
Credit Card/Total Debt	The ratio of total credit limits on consumer cards to total available credit to the borrower as of a quarter-end for a consumer. The numerator is the sum of credit limits on credit card accounts of the consumer. The denominator is the sum of credit limits on revolving accounts (e.g., credit cards and home equity lines of credit) and the highest unpaid balances over the history of the loan on installment accounts (e.g., student loans and mortgages). Source: FRBNY/Equifax Consumer Credit Panel.
Credit Card/Unsecured Debt	The ratio of total credit limits on consumer cards to total available unsecured credit as of a quarter-end for a consumer. The numerator is the sum of credit limits on credit card accounts of the consumer. The the denominator is the sum of credit limits on unsecured revolving loans (e.g., credit cards) and the highest unpaid balances over the history of the unsecured loan on installment accounts (e.g., student loans). This ratio is the same as *Credit Card/Total Debt* except that we exclude mortgages, home equity lines of credit, and auto loans from the denominator. Source: FRBNY/Equifax Consumer Credit Panel.
Non-prime	An indicator variable set to 1 for consumers with a Risk Score less than 660 as of 2006Q1, and zero otherwise. Source: FRBNY/Equifax Consumer Credit Panel.
Equifax Risk Score Rank	An ordinal variable that takes values based on the consumer's Equifax Risk Score as of 2006Q1: 1. 800+ 2. 760~799 3. 720~759 4. 660~719 5. 620~659 6. <620 Source: FRBNY/Equifax Consumer Credit Panel.
Anticipation	An indicator variable set to 1 for the anticipation period of the CARD Act (2008Q1–2009Q1), and zero otherwise. Source: FRBNY/Equifax Consumer Credit Panel.
Phase 1	An indicator variable set to 1 for Phase 1 of the CARD Act period (2009Q2–2009Q4), and zero otherwise. Source: FRBNY/Equifax Consumer Credit Panel.
Phase 2	An indicator variable set to 1 for Phase 2 of the CARD Act period (2010Q1–2010Q2), and zero otherwise. Source: FRBNY/Equifax Consumer Credit Panel.
Phase 3	An indicator variable set to 1 for Phase 3 of the CARD Act period (2010Q3–2011Q4), and zero otherwise. Source: FRBNY/Equifax Consumer Credit Panel.
Post-Phase 3	An indicator variable set to 1 for the post-Phase 3 of the CARD Act period (2012Q1–2016Q4), and zero otherwise. Source: FRBNY/Equifax Consumer Credit Panel.
Utilization Ratio	The ratio of total credit card unpaid balance to total credit card limits at the end of a quarter for a consumer. We cap this ratio at one and include an indicator variable for this case. Source: FRBNY/Equifax Consumer Credit Panel.

Utilization Ratio>1	An indicator variable set to 1 if the ratio of total credit card unpaid balance to total credit card limits at the end of a quarter for a consumer is greater than 1, and zero otherwise. Source: FRBNY/Equifax Consumer Credit Panel.
Credit Inquiries	The number of credit inquiries in the past 12 months. We set it to zero and include an indicator variable in the event the number of credit inquiries is coded as "missing" in the credit report. Source: FRBNY/Equifax Consumer Credit Panel.
Missing Inquiries	An indicator variable set to 1 if the number of credit inquiries is coded as "missing" in the credit report. Source: FRBNY/Equifax Consumer Credit Panel.
Card 60 Day Past Due	An indicator variable set to 1 for consumers with a credit card account more than 60 days past due as of a quarter-end, and zero otherwise. Source: FRBNY/Equifax Consumer Credit Panel.
Non-card 60 Day Past Due	An indicator variable set to 1 for consumers with a non-credit card account more days past due as of a quarter-end, and zero otherwise. Source: FRBNY/Equifax Consumer Credit Panel.
Unemployment Claims	The ratio of the total number of initial unemployment insurance claims during a quarter to the total workforce at the beginning of the quarter, multiplied by 100. This variable is calculated at the state-quarter level. Source: BLS, retrieved from Haver Analytics.

References

Agarwal, S., S. Chomsisengphet, N. Mahoney, and J. Stroebel. 2015. "Regulating Consumer Financial Products: Evidence from Credit Cards." *Quarterly Journal of Economics* 130: 111–164.

An Act to Amend the Truth in Lending Act to Establish Fair and Transparent Practices Relating to the Extension of Credit under an Open End Consumer Credit Plan, and for Other Purposes. Public Law 111-124. *U.S. Statutes at Large* 123 (2009): 1734–1766.

Angrist, J., and J. Pischke. 2009. *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton: Princeton University Press.

Bar-Gill, O., and R. Bubb. 2012. "Credit Card Pricing: The CARD Act and Beyond." *Cornell Law Review* 97: 1–52.

Campbell, J., H. Jackson, B. Madrian, and P. Tufano. 2011. "Consumer Financial Protection." *Journal of Economic Perspectives* 25: 91–114.

Debbaut, P., A. Ghent, and M. Kudlyak. 2016. "The CARD Act and Young Borrowers: The Effects and the Affected." *Journal of Money, Credit and Banking* 48: 1495–1513.

Dou, Y., G. Li, and J. Ronen. 2019. "Does Price Regulation Affect Competition? Evidence from Credit Card Solicitations." Working Paper. Finance and Economics Discussion Series 2019-018. Washington: Board of Governors of the Federal Reserve System, https://doi.org/10.17016/FEDS.2019.018.

Dou, Y., S. Ryan, and B. Xie. 2018. "The Real Effects of FAS 166/167 on Banks' Mortgage Approval and Sale Decisions." *Journal of Accounting Research* 56: 843–882.

Durkin, T. A., G. Elliehausen, and M. Hwang. 2016. "Rate Ceilings and the Distribution of Small Dollar Installment Loans from Consumer Finance Companies: Results of a New Survey of Small Dollar Cash Lenders." Washington: Federal Reserve Board and George Washington University Working Paper.

Elliehausen, G., and S. Hannon. 2018. "The Credit Card Act and Consumer Finance Company Lending." *Journal of Financial Intermediation* 34: 109–119.

Federal Reserve Board of Governors. 2008. "Federal Reserve Proposes Rules to Prohibit Unfair Practices Regarding Credit Cards and Overdraft Services." Press Release, May 2, 2008. https://www.federalreserve.gov/newsevents/pressreleases/bcreg20080502a.htm.

Federal Reserve Board of Governors. 2010a. "Federal Reserve Approves Final Rules to Protect Credit Card Users from a Number of Costly Practices." Press Release, January 12, 2010. https://www.federalreserve.gov/newsevents/pressreleases/bcreg20100112a.htm.

Federal Reserve Board of Governors. 2010b. *Report to the Congress on the Use of Credit Cards by Small Businesses and the Credit Card Market for Small Businesses*. May 2010. https://www.federalreserve.gov/boarddocs/rptcongress/creditcard/2010/052010_cc_use_smbusiness.htm

Financial Accounting Standards Board (FASB). 2009a. *Statement of Financial Accounting Standards 166: Accounting for Transfers of Financial Assets, an Amendment of FASB Statement 140*. Norwalk, CT: FASB.

Financial Accounting Standards Board (FASB). 2009b. *Statement of Financial Accounting Standards No. 167: Amendments to FASB Interpretation 46(R)*. Norwalk, CT: FASB.

Gow, I., G. Ormazabal, and D. Taylor. 2010. "Correcting for Cross-Sectional and Time-Series Dependence in Accounting Research." *The Accounting Review* 85: 483–512.

Han, S., B. Keys, and G. Li. 2018. "Unsecured Credit Supply, Credit Cycles, and Regulation." *Review of Financial Studies* 31: 1184–1217.

Jambulapati, V., and J. Stavins. 2014. "Credit CARD Act of 2009: What Did Banks Do?" *Journal of Banking and Finance* 46: 21–30.

Lee, D., and W. van der Klaauw. 2010. "An Introduction to the FRBNY Consumer Credit Panel. Staff Report 479. https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr479.pdf.

Levitin, A. 2011. "Rate-Jacking: Risk-Based & Opportunistic Pricing in Credit Cards." *Utah Law Review* 2: 339–367

Mian, A., and A. Sufi. 2009. "The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis." *Quarterly Journal of Economics* 124: 1449–1496.

Nelson, S. 2020. "Private Information and Price Regulation in the US Credit Card Market. University of Chicago Working Paper.

Pinheiro, T., and J. Ronen. 2016. "Unintended Consequences of the Credit Card Act." *Journal of Law, Finance, and Accounting* 1: 93–138.

Sandler, R., and C. Romeo. 2018. "The Effect of Debt Collection Laws on Access to Credit." Consumer Finance Protection Bureau Office of Research Working Paper 2018-01.

Santucci, L. 2015. "A Tale of Two Vintages: Credit Limit Management Before and After the CARD Act and Great Recession." Federal Reserve Bank of Philadelphia Discussion Paper. https://www.philadelphiafed.org/-/media/consumer-finance-institute/payment-cards-center/publications/discussion-papers/2015/d-2015-credit-limit-management.pdf.

Santucci, L. 2016. "What Happened to the Revolving Credit Card Balances of 2009?" Federal Reserve Bank of Philadelphia Discussion Paper. https://www.philadelphiafed.org/-/media/consumer-finance-institute/payment-cards-center/publications/discussion-papers/2016/dp16-01_what-happened-to-revolving-credit-card-balances-2009.pdf.

Tian, X., and H. Zhang. 2018. "Impact of FAS 166/167 on the Securitization of Credit Card Loans." Georgetown University and University of Minnesota Working Paper.

U.S. Congress. House. *Credit Cardholders' Bill of Rights Act of 2008*. HR 5244. 110th Congress, 2nd sess. Introduced in House February 7, 2008. https://www.congress.gov/bill/110th-congress/house-bill/5244.

Zywicki, T. 2016. "No, the Credit Card Act Is Not a Free Lunch." *The Washington Post*, January 13.

Table 1. Descriptive Statistics

Panel A: Summary Statistics

Variable	Mean	StdDev	P25	Median	P75
Credit Card/Total Debt	0.290	0.347	0.013	0.124	0.482
Credit Card/Unsecured Debt	0.566	0.394	0.102	0.684	0.954
Non-prime	0.332	0.471	0.000	0.000	1.000
Equifax Risk Score Rank	3.545	1.794	2.000	4.000	5.000
Utilization Ratio	0.269	0.351	0.000	0.068	0.488
Utilization Ratio>1	0.048	0.213	0.000	0.000	0.000
Credit Inquiries	1.422	2.244	0.000	1.000	2.000
Missing Inquiries	0.298	0.458	0.000	0.000	1.000
Card Past Due 60+	0.073	0.260	0.000	0.000	0.000
Non-card Past Due 60+	0.112	0.316	0.000	0.000	0.000
Unemployment Claims	3.529	1.577	2.365	3.281	4.354

Panel B: Variable Means by Equifax Risk Score Rank

Non-prime =	1		0			
Equifax Risk Score Rank =	6	5	4	3	2	1
Variable	<620	620~659	660~719	720~759	760~799	800+
Credit Card/Total Debt	0.160	0.221	0.273	0.316	0.374	0.411
Credit Card/Unsecured Debt	0.316	0.448	0.558	0.655	0.709	0.755
Utilization Ratio	0.404	0.409	0.342	0.247	0.144	0.084
Utilization Ratio>1	0.133	0.072	0.038	0.014	0.005	0.002
Credit Inquiries	2.526	1.785	1.414	1.143	0.840	0.566
Missing Inquiries	0.143	0.209	0.251	0.299	0.390	0.513
Card Past Due 60+	0.183	0.113	0.068	0.032	0.013	0.004
Non-card Past Due 60+	0.310	0.160	0.086	0.040	0.016	0.005
Unemployment Claims	3.405	3.477	3.544	3.560	3.576	3.636

Notes: Table 1 reports descriptive statistics. The unit of observations is at the consumer-quarter level. Panel A reports summary statistics of variables used in regression analyses for the full sample (N = 3,437,849). Panel B reports the means of the variables by *Equifax Risk Score Rank*. Detailed variable definitions are presented in Appendix A. *Credit Card/Total Debt* is the ratio of total credit limits on consumer cards to total available credit to the borrower as of a quarter-end for a consumer. *Credit Card/Unsecured Debt* is the ratio of total credit limits on consumer cards to total available unsecured credit as of a quarter-end for a consumer. *Non-prime* is an indicator set to one for consumers with risk scores below 660. *Equifax Risk Score Rank* is an ordinal variable set to one, two, three, four, five, and six for consumers with Risk Scores above 800, between 760 and 799, between 720 and 759, between 660 and 719, between 620 and 659, and below 620, respectively. *Utilization Ratio* is the ratio of total credit card unpaid balance to total credit card limits, capped at one. *Utilization Ratio>1* is an indicator set to one if the ratio of total credit card unpaid balance to total credit card limits is greater than one. *Credit Inquiries* is the number of credit inquiries in the past 12 months and zero for missing numbers. *Missing Inquiries* is an indicator set to one for missing numbers of credit inquiries in the credit report. *Card Past Due 60+* is an indicator set to one for consumers with a credit card account more than 60 days past due. *Non-card Past Due 60+* is an indicator set to one for consumers with a non-credit card account more than 60 days past due. *Unemployment Claims* is the state-level total number of initial unemployment insurance claims divided by the entire workforce, multiplied by 100.

Source: FRBNY/Equifax Consumer Credit Panel

Table 2. CARD Act and Consumer Debt Structure

	Credit Card/Total Debt
	(1)
Non-prime × Anticipation	-0.0178***
	(0.000)
Non-prime × Phase 1	-0.0137***
	(0.000)
Non-prime × Phase 2	-0.0105***
	(0.001)
Non-prime × Phase 3	-0.0210***
	(0.000)
Non-prime × Post-Phase 3	-0.0311***
	(0.000)
Utilization Ratio	0.131***
	(0.000)
Utilization Ratio>1	0.00802**
	(0.038)
Credit Inquiries	-0.00326***
	(0.009)
Missing Inquiries	0.0135***
	(0.001)
Card Past Due 60+	0.101***
	(0.000)
Non-card Past Due 60+	-0.0730***
	(0.000)
Unemployment Claims	0.00105
	(0.197)
Consumer FE	Yes
Year-Quarter FE	Yes
State FE	Yes
Observations	3,437,849
Adj. R^2	0.647

Notes: Table 2 presents coefficients, and p-values in parentheses, from a pooled regression of the dependent variable shown in the column header on the independent variables listed. *Credit Card/Total Debt* is the ratio of total credit limits on consumer cards to total available credit to the borrower as of a quarter-end. *Non-prime* is an indicator set to one for consumers with risk scores below 660. *Anticipation* is an indicator set to one for 2008Q1–2009Q1. *Phase 1* is an indicator set to one for 2009Q2–2009Q4. *Phase 2* is an indicator set to one for 2010Q1–2010Q2. *Phase 3* is an indicator set to one for 2010Q3–2011Q4. *Post-Phase 3* is an indicator set to one for 2012Q1–2016Q4. *Utilization Ratio* is the ratio of total credit card unpaid balance to total credit card limits, capped at one. *Utilization Ratio>1* is an indicator set to one if the ratio of total credit card unpaid balance to total credit card limits is greater than one. *Credit Inquiries* is the number of credit inquiries in the past 12 months and zero for missing numbers. *Missing Inquiries* is an indicator set to one for missing numbers of credit inquiries in the credit report. *Card Past Due 60+* is an indicator set to one for consumers with a credit card account more than 60 days past due. *Non-card Past Due 60+* is an indicator set to one for consumers with a non-credit card account more than 60 days past due. *Unemployment Claims* is the state-level total number of

initial unemployment insurance claims divided by the entire workforce, multiplied by 100. Detailed variable definitions are presented in Appendix A. Standard errors are two-way clustered by consumer and subperiod. We define five subperiods: the pre-period (2006Q1–2007Q4), the anticipation period (2008Q1–2009Q1), Phase 1 (2009Q2–2009Q4), Phase 2 (2010Q1–2010Q2), Phase 3 (2010Q3–2011Q4), and the post-Phase 3 period (2012Q1–2016Q4), which is after the end of Agarwal et al.'s (2015) sample period. *, (**), and [***] denote two-tailed statistical significance at 10%, (5%), and [1%] levels, respectively.

Source: FRBNY/Equifax Consumer Credit Panel

Table 3. Validation of Parallel Trends

	Credit Card/Total Debt
	(1)
Non-prime × 2006Q3	-0.0002
	(0.157)
Non-prime × 2006Q4	0.0068
	(0.971)
Non-prime × 2007Q1	0.0105
	(0.949)
Non-prime × 2007Q2	-0.0003
	(0.998)
Non-prime × 2007Q3	-0.0061
	(0.953)
Non-prime × 2007Q4	-0.0063
	(0.935)
Non-prime × Anticipation	-0.0173***
	(0.000)
Non-prime × Phase 1	-0.0131***
	(0.000)
Non-prime × Phase 2	-0.00993***
	(0.000)
Non-prime × Phase 3	-0.0205***
	(0.000)
Non-prime × Post-Phase 3	-0.0305***
	(0.000)
Controls	Yes
Consumer FE	Yes
Year-Quarter FE	Yes
State FE	Yes
Observations	3,437,849
Adj. R^2	0.647

Notes: Table 3 presents coefficients, and p-values in parentheses, from a pooled regression of the dependent variable shown in the column header on the independent variables listed. Controls include all control variables listed in Table 2. *Credit Card/Total Debt* is the ratio of total credit limits on consumer cards to total available credit to the borrower as of a quarter-end. *Non-prime* is an indicator set to 1 for consumers with risk scores below 660. The benchmark period is 2006Q1–2006Q2. *2006Q3* is an indicator set to 1 for 2006Q3; *2006Q3*, *2006Q4*, *2007Q1*, *2007Q2*, *2007Q3*, and *2007Q4* are defined in the same fashion. *Anticipation* is an indicator set to 1 for 2008Q1–2009Q1. *Phase 1* is an indicator set to 1 for 2009Q2–2009Q4. *Phase 2* is an indicator set to 1 for 2010Q1–2010Q2. *Phase 3* is an indicator set to one for 2010Q3–2011Q4. *Post-Phase 3* is an indicator set to 1 for 2012Q1–2016Q4. Detailed variable definitions are presented in Appendix A. Standard errors are two-way clustered by consumer and subperiod. We define five subperiods: the pre-period (2006Q1–2007Q4), the anticipation period (2008Q1–2009Q1), Phase 1 (2009Q2–2009Q4), Phase 2 (2010Q1–2010Q2), Phase 3 (2010Q3–2011Q4), and the post-Phase 3 period (2012Q1–2016Q4), which is after the end of Agarwal et al.'s (2015) sample period. *, (**), and [***] denote two-tailed statistical significance at 10%, (5%), and [1%] levels, respectively.

Source: FRBNY/Equifax Consumer Credit Panel

Table 4. Using an Alternative Measure of Consumer Debt Structure

	Credit Card/Unsecured Debt
	(1)
Non-prime × Anticipation	-0.0150***
	(0.000)
Non-prime × Phase 1	-0.0120***
	(0.000)
Non-prime × Phase 2	-0.0121***
	(0.000)
Non-prime × Phase 3	-0.0266***
	(0.000)
Non-prime × Post-Phase 3	-0.0165***
	(0.000)
Utilization Ratio	0.301***
	(0.000)
Utilization Ratio>1	0.00166
	(0.589)
Credit Inquiries	-0.000622*
	(0.053)
Missing Inquiries	-0.00331
	(0.243)
Card Past Due 60+	0.131***
	(0.000)
Non-card Past Due 60+	-0.0947***
	(0.000)
Unemployment Claims	0.00350**
	(0.016)
Consumer FE	Yes
Year-Quarter FE	Yes
State FE	Yes
Observations	3,437,849
Adj. R^2	0.695

Notes: Table 4 presents coefficients, and p-values in parentheses, from a pooled regression of the dependent variable shown in the column header on the independent variables listed. *Credit Card/Unsecured Debt* is ratio of total credit limits on consumer cards to total available unsecured credit (i.e., excluding mortgages, home equity lines of credit, and auto loans) as of a quarter-end for a consumer. *Non-prime* is an indicator set to 1 for consumers with risk scores below 660. *Anticipation* is an indicator set to one for 2008Q1–2009Q1. *Phase 1* is an indicator set to one for 2009Q2–2009Q4. *Phase 2* is an indicator set to one for 2010Q1–2010Q2. *Phase 3* is an indicator set to one for 2010Q3–2011Q4. *Post-Phase 3* is an indicator set to one for 2012Q1–2016Q4. *Utilization Ratio* is the ratio of total credit card unpaid balance to total credit card limits, capped at one. *Utilization Ratio* is the ratio of total credit card unpaid balance to total credit card limits, capped at one. *Utilization Ratio>1* is an indicator set to one if the ratio of total credit card unpaid balance to total credit card limits is greater than one. *Credit Inquiries* is the number of credit inquiries in the past 12 months and zero for missing numbers. *Missing Inquiries* is an indicator set to one for missing numbers of credit inquiries in the credit report. *Card Past Due 60+* is an indicator set to one for consumers with a credit card account more than

60 days past due. *Non-card Past Due 60+* is an indicator set to one for consumers with a non-credit card account more than 60 days past due. *Unemployment Claims* is the state-level total number of initial unemployment insurance claims divided by the entire workforce, multiplied by 100. Detailed variable definitions are presented in Appendix A. Standard errors are two-way clustered by consumer and subperiod. We define five subperiods: the pre-period (2006Q1–2007Q4), the anticipation period (2008Q1-2009Q1), Phase 1 (2009Q2–2009Q4), Phase 2 (2010Q1–2010Q2), Phase 3 (2010Q3–2011Q4), and the post-Phase 3 period (2012Q1–2016Q4), which is after the end of Agarwal et al.'s (2015) sample period. *, (**), and [***] denote two-tailed statistical significance at 10%, (5%), and [1%] levels, respectively.

Source: FRBNY/Equifax Consumer Credit Panel

Table 5. Using an Alternative Treatment Variable

	Credit Card/Total Debt
	(1)
Equifax Risk Score Rank × Anticipation	-0.00503***
	(0.005)
Equifax Risk Score Rank × Phase 1	-0.00691***
	(0.003)
Equifax Risk Score Rank × Phase 2	-0.00689***
	(0.003)
Equifax Risk Score Rank × Phase 3	-0.00976***
	(0.001)
Equifax Risk Score Rank × Post-Phase 3	-0.0139***
	(0.000)
Controls	Yes
Consumer FE	Yes
Year-Quarter FE	Yes
State FE	Yes
Observations	3,437,849
Adj. R^2	0.648

Notes: Table 5 presents coefficients, and p-values in parentheses, from a pooled regression of the dependent variable shown in the column header on the independent variables listed. Controls include all control variables listed in Table 2. *Credit Card/Total Debt* is the ratio of total credit limits on consumer cards to total available credit as of a quarter-end for a consumer. *Equifax Risk Score Rank* is an ordinal variable set to one, two, three, four, five, and six for consumers with risk scores above 800, between 760 and 799, between 720 and 759, between 660 and 719, between 620 and 659, and below 620, respectively. *Phase 1* is an indicator set to one for 2009Q2–2009Q4. *Phase 2* is an indicator set to one for 2010Q1–2010Q2. *Phase 3* is an indicator set to one for 2010Q3–2011Q4. *Post-Phase 3* is an indicator set to one for 2012Q1–2016Q4. Detailed variable definitions are presented in Appendix A. Standard errors are two-way clustered by consumer and subperiod. We define five subperiods: the pre-period (2006Q1–2007Q4), the anticipation period (2008Q1–2009Q1), Phase 1 (2009Q2–2009Q4), Phase 2 (2010Q1–2010Q2), Phase 3 (2010Q3–2011Q4), and the post-Phase 3 period (2012Q1–2016Q4), which is after the end of Agarwal et al.'s (2015) sample period. *, (**), and [***] denote two-tailed statistical significance at 10%, (5%), and [1%] levels, respectively.

Source: FRBNY/Equifax Consumer Credit Panel

Table 6. Robustness Tests

	Credit Card/Total Debt		
	Drop Transition Quarters	Add State–Year–Quarter Fixed Effects	Use Dynamic Credit Scores to Identify Non-prime Consumers
	(1)	(2)	(3)
Non-prime × Anticipation	-0.0203***	- 0.0182***	-0.0245***
	(0.000)	(0.000)	(0.000)
Non-prime × Phase 1	-0.0140***	- 0.0136***	-0.0222***
	(0.000)	(0.000)	(0.000)
Non-prime × Phase 2	-0.0113***	- 0.0103***	-0.0207***
	(0.001)	(0.001)	(0.000)
Non-prime × Phase 3	-0.0223***	- 0.0206***	-0.0263***
	(0.000)	(0.000)	(0.000)
Non-prime × Post-Phase 3	-0.0309***	- 0.0315***	-0.0378***
	(0.000)	(0.000)	(0.000)
Controls	Yes	Yes	Yes
Consumer FE	Yes	Yes	Yes
Year-Quarter FE	Yes	No	Yes
State FE	Yes	No	Yes
State–Year–Quarter FE	No	Yes	No
Observations	3,125,338	3,437,849	3,437,849
Adj. R^2	0.644	0.647	0.647

Notes: Table 6 presents coefficients, and p-values in parentheses, from pooled regressions of the dependent variable shown in the column header on the independent variables listed. Controls include all control variables listed in Table 2. *Credit Card/Total Debt* is the ratio of total credit limits on consumer cards to total available credit as of a quarter-end for a consumer. *Non-prime* is an indicator set to 1 for consumers with risk scores below 660. *Anticipation* is an indicator set to one for 2008Q1–2009Q1. *Phase 1* is an indicator set to one for 2009Q2–2009Q4. *Phase 2* is an indicator set to one for 2010Q1–2010Q2. *Phase 3* is an indicator set to one for 2010Q3–2011Q4. *Post-Phase 3* is an indicator set to one for 2012Q1–2016Q4. In column 1, we drop the Transition quarter for each subperiod (i.e., 2008Q1, 2009Q2, 2010Q1, 2010Q3, and 2012Q1). In column 2, we replace state fixed effects and year-quarter fixed effects with state–year–quarter fixed effects. In column 3, we use the credit scores as of each quarter-end to identify non-prime consumers (i.e., credit scores < 660). Detailed variable definitions are presented in Appendix A. Standard errors are two-way clustered by consumer and subperiod. We define five subperiods: the pre-period (2006Q1–2007Q4), the anticipation period (2008Q1–2009Q1), Phase 1 (2009Q2-2009Q4), Phase 2 (2010Q1–2010Q2), Phase 3 (2010Q3-2011Q4), and the post-Phase 3 period (2012Q1-2016Q4), which is after the end of Agarwal et al.'s (2015) sample period. *, (**), and [***] denote two-tailed statistical significance at 10%, (5%), and [1%] levels, respectively.

Source: FRBNY/Equifax Consumer Credit Panel