

Are Young Borrowers Bad Borrowers? Evidence from the Credit CARD Act of 2009*

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Abstract

Young borrowers are the least experienced financially and, conventionally, thought to be most prone to financial mistakes. We study the relationship between age and financial problems related to credit cards. Our results challenge the notion that young borrowers are bad borrowers. We show that young borrowers are among the least likely to experience a serious credit card default. We then exploit the 2009 CARD Act to identify the selection of the types of individuals that get a credit card early in life. We find that early entrants default less and are more likely to get a mortgage while young.

Keywords: Consumer Protection; Household Finance; Life Cycle Borrowing; Credit Card Default.

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1 Introduction

Access to credit serves as an important means for consumption smoothing throughout the life cycle. Young individuals are particularly likely to be liquidity constrained because the beginning of the life cycle is a period of intensive investment in human capital and little wealth to self-insure against transitory income shocks. Credit cards serve as a valuable source of credit to such individuals, given the individuals' limited exposure to other means of credit. The literature on financial decision-making, on the other hand, has raised concerns about whether the benefits of early access to credit outweigh the costs. Temptation preferences (Gul and Pesendorfer [2004]), lack of adequate financial literacy (Lusardi, Mitchell, and Curto [2010]), and cognitive biases in financial decision-making (Stango and Zinman [2009, 2011]) provide reasons to limit early access to credit. In part motivated by these considerations, the Credit Card Accountability and Responsibility and Disclosure Act of 2009 (hereafter, CARD Act) made it illegal to issue a credit card to individuals under the age of 21 unless the individual has a cosigner or submits financial information "indicating an independent means of repaying any obligation arising from the proposed extension of credit."

Little to no empirical research exists, however, on the behavior of young individuals in credit markets. In particular, there is little empirical evidence on whether young individuals experience more financial problems related to credit cards than individuals of other age groups. The analysis of whether young borrowers are bad borrowers is complicated by self-selection of individuals into early credit card market entry. That is, early entrants may be better or worse credit risks than average debtors.

In this paper, we use the New York Federal Reserve Bank Consumer Credit Panel/Equifax (CCP) to analyze whether young borrowers are worse credit risks and to estimate the selection effect of early entry into the credit card market. To identify the selection effect, we use the CARD Act as a quasi-natural experiment. To our knowledge, ours is the first paper to estimate the relationship between age and default for very young individuals, to address the selection into early credit card use, as well as to study the provision of the CARD Act that

restricts credit to individuals under 21.¹

We first document empirical patterns between credit card default and age. Using data from the period prior to the Act, we find that individuals under the age of 21 are substantially less likely to experience serious default (90 days past due and longer) than individuals aged 21 to 23. The lower rate of serious default of the youngest individuals persists after we control for the length of the individual's experience with credit cards suggesting that the higher default rate among older individuals is not solely due to a longer period in which to accumulate credit card debt or to enter delinquency status.

Comparing default rates across the entire age distribution, rather than between the young and the very young, we find that serious default has an inverse U-shaped relation with age. In particular, individuals aged 35 to 44 are 10 percentage points more likely to have a serious default on a credit card than individuals aged 18-20. These differences are economically large considering that the share of serious delinquency in the population is less than 20 percent. There is some evidence that young credit card holders are more likely to experience minor delinquencies (30 or 60 days past due) than older card holders; however, the magnitudes of the differences in minor delinquency across ages are much smaller than those we find for serious delinquency.

We next estimate the type of individuals who are most likely to select into early credit card use. To identify the selection effect, we exploit Title 3 of the CARD Act, which restricts credit cards for individuals under the age of 21. In particular, we compare the default behavior of two groups of the same age who also enter the credit card market at the same age. The first group consists of individuals who get their first credit card at age 21 *after* the CARD Act. Some of these individuals enter at age 21 by choice while others would have entered the credit card market earlier in the absence of the Act. The second group consists of individuals who get their first credit card at age 21 but *before* the CARD Act passes. These

¹Agarwal, Driscoll, Gabaix, and Laibson (2009) estimate the relationship between age and delinquency for the population aged 20 and above. They find a similar inverse U-shaped relationship between age and default for credit cards.

individuals did not enter before age 21 by choice. We then use a difference-in-difference approach to identify selection into early credit card use.

Using a difference-in-difference approach, we show that the CARD Act indeed altered the credit available to individuals under the age of 21. Title 3 is thus a suitable instrument to identify selection into early credit card use. In particular, we find the following changes to credit card availability following the passage of the Act. First, individuals under the age of 21 are 8 percentage points (15 percent) less likely to have a credit card following the passage of the Act.² Second, conditional on having a credit card, an individual under 21 has fewer credit cards. Third, conditional on having a credit card, an individual under 21 is 3 percentage points (35 percent) more likely to have a cosigned card. We view these estimates as a lower bound of the effect of the Act because the passage of the CARD Act also likely reduced the representation of youth in the credit bureau data used in our analysis.

Using the passage of the Act to identify the selection effect, we find that individuals who would have entered the credit card market early in the absence of the Act are less likely to experience serious delinquency or default than the individuals who enter the credit card market later. Furthermore, these individuals are more likely to become homeowners early in life. We interpret these results as indicating that at least some young individuals may choose to enter the credit card market to establish a credit record and thus facilitate the transition to homeownership. Our findings contrast with the view that young individuals get credit cards early primarily as a myopic response to aggressive advertising to this demographic group.³

Finally, we examine whether early use of credit cards raises the risk of default in the future. We find that serious default is strongly correlated with the length of the individual's credit card experience such that the opportunity to accumulate debt dominates any learning

²The mean of the dependent variable is 55 percentage points such that 8 percentage points represents $\frac{8}{55} = 15\%$.

³Concerns about marketing credit cards to individuals under 21 have featured prominently in the sociology literature (for example, Manning [2001], Roberts and Jones [2001], Compton and Pfau [2004], and Borden, Lee, Serido, and Collins [2008]).

effect from a longer credit history. However, conditional on the length of the credit history, individuals who enter the credit card market early have a lower probability of experiencing serious delinquency later in life. In summary, we find no compelling evidence that young borrowers are bad borrowers.

This paper contributes to a literature that studies access to unsecured credit. Sullivan [2008] demonstrates that households use unsecured debt, such as credit cards, to buffer employment shocks. Karlan and Zinman [2010] find that access to microcredit, a particularly high cost form of credit, provides clear net benefits to borrowers across a range of outcomes. Banerjee and Duflo [2011] review much of the evidence on microcredit and find nothing to suggest that it is predatory. Chatterjee and Seamans [2012] show that greater access to credit cards increases entrepreneurial activity. Similarly, Morse [2011] and Morgan, Strain, and Seblani [2012] find that access to payday lenders may improve financial outcomes for households. Melzer [2011], Skiba and Tobacman [2011], Bhutta [2012a], Bhutta, Skiba, and Tobacman [2013], and Carrell and Zinman [2013] find evidence that payday lending does not improve or even worsens financial outcomes for borrowers.

Instead of default, Jiang and Dunn [2013] study credit card debt accumulation by young borrowers. Using survey data, they find that young borrowers accumulate credit card debt at higher rates than other age groups. Our results suggest that, despite this more rapid debt accumulation, young borrowers are not bad borrowers. Rather, Jiang and Dunn’s findings are consistent with a life cycle view of credit in which young individuals borrow against higher anticipated future income. Because many individuals under 21 are students, they may have especially steeply sloped income profiles leading them to acquire debt at higher rates than the rest of the population.

Our results, however, do not speak to the desirability of credit cards across the entire population or the consequences of other provisions of the CARD Act.⁴ Our results should

⁴Since Ausubel’s [1991] seminal study of the credit card industry, researchers have uncovered numerous facts about credit card borrowing that are difficult to reconcile with a traditional life cycle view of informed consumer borrowing devoid of behavioral biases. Calem and Mester [1995] document that the interest rates on credit cards are too sticky to be consistent with the behavioral assumptions underlying perfect competition.

also not be interpreted as implying that greater financial education for young adults would not be welfare improving. Indeed, Brown, van der Klaauw, Wen, and Zafar [2013] show that financial literacy education can improve financial outcomes for young adults, although the effect depends crucially on the content of the curriculum.

The remainder of the paper is structured as follows. Section 2 describes Title 3 of the CARD Act and the data. In section 3, we document the relationship between the incidence of credit card default and age using data from the period prior to the CARD Act. In section 4, we show that Title 3 of the CARD Act significantly reduced the availability of credit cards to its intended population. We then exploit the discrete cutoff age to identify differences between borrowers who enter the credit card market early and those who choose to enter later. In section 5, we examine whether early entry into credit card markets increases the risk of serious delinquency later in life. Section 6 concludes.

2 Background on the CARD Act and Data

2.1 The CARD Act

The CARD Act restricts many aspects of the credit card business, such as when lenders can change the interest rate on a credit card, the fees lenders may charge on credit cards, and credit card disclosures. Agarwal, Chomsisengphet, Mahoney, and Stroebe [2013], CFPB [2013], and Jambulapati and Stavins [2013] provide explanations and evaluations of the provisions of the Act other than Title 3. In addition to proscribing credit card issuance to individuals under the age of 21 unless the individual can provide written proof of a means of repaying the debt, Title 3 prohibited recruiting potential credit card users within 1000

Gross and Souleles [2002] and Telyukova [2013] note that a large fraction of households that pay interest on their credit cards simultaneously hold significant liquid assets. Laibson, Repetto, and Tobacman [2007] add credit card borrowing to an otherwise standard life cycle model and find substantial evidence of present-biased preferences. Meier and Sprenger [2010] document a correlation between present-biased preferences and credit card borrowing. Kuchler [2013] shows that present-biased preferences can explain consumers' failure to adhere to their own stated debt repayment plans.

feet of any college campus or at college events and sending pre-approved card solicitations to individuals under 21.

The House of Representatives approved a version of the law, known as the Credit Cardholder’s Bill of Rights Act of 2008, on September 23, 2008. That version of the law was never acted on by the Senate and, as such, never became law. The Credit Cardholder’s Bill of Rights Act passed by the House of Representatives in 2008 merely prohibited extending credit cards to individuals under the age of 18 (see H.R. 5244).

The timeline of the CARD Act of 2009 is as follows: On April 30, 2009, the bill passed the House of Representatives; on May 19, 2009, the Act passed the Senate; on May 22, 2009, President Obama signed the Act into law. Full compliance with Title 3 of the CARD Act was required by February 22, 2010.

2.2 Data

The data in the analysis are from the New York Federal Reserve Bank Consumer Credit Panel/Equifax. The CCP is an individual-level panel dataset that contains detailed records of individual debt and borrowing on a quarterly basis from the first quarter of 1999 to the most recent quarter. The CCP is a 5 percent random sample of all U.S. consumers with a credit record and a Social Security number. Individuals are selected into the panel based on the last two digits of their Social Security number. These individuals constitute the primary sample. In addition, the CCP sample contains information about individuals who reside at the same address as individuals in the primary sample. Some of these individuals may have very limited experience in credit markets and thus have so-called “thin” credit records. The individuals in the primary sample along with those who reside at the same address as individuals in the primary sample constitute the full sample.

In the analysis, we focus on the full sample because many of the young individuals whom we are interested in studying have thin credit records and are thus likely to be present in the full sample but not in the primary sample. Our main results hold in the primary sample as

well.⁵ Lee and van der Klaauw [2010] provide an excellent description of the CCP data and we refer the reader to their paper for additional details on the CCP.

Given the age cutoffs imposed by the CARD Act, knowing the exact age of an individual is important for our empirical strategy. For each individual, the CCP provides the individual's year of birth rather than their exact date of birth. We therefore focus on the data from the fourth quarter of each year such that we know the age of the individual with a high probability.

Table 1 presents the number of individuals in our sample by age (18 – 25) and year (2005 – 2012).⁶ Individuals aged 18 never comprise more than 6 percent of the total number of 18- to 25-year-olds in the sample. Because we have relatively few 18-year-olds, we verify the robustness of all our main results to excluding 18-year-olds. As can be seen from the table, after the CARD Act passes in 2009, 18- to 20-year-olds comprise a smaller portion of the total sample of young individuals. The shares of 18- to 20-year-olds in the 18-25 age category in the fourth quarter of 2008, 2010, and 2012 are 27.5, 24.5, and 23.2 percent, respectively.

One of the exercises in the paper involves a difference-in-difference approach to quantify the effect of the CARD Act on the probability that a young individual has a credit card. Since the data in the analysis represent a sample of the individuals with some credit history, our estimates represent a lower bound of the effect of the Act on young individuals' use of credit cards because the Act likely decreased the number of 18- to 20-year-olds with some credit history.

3 Default Patterns by Age

In this section, we document the empirical relationship between borrower age and credit card default. We use default as a proxy for financial problems related to credit card use

⁵The results using only individuals in the primary sample are in an appendix available from the authors.

⁶We exclude individuals residing in U.S. territories and protectorates (e.g., Palau).

because default is the easiest indicator of financial problems to identify in the data.⁷ We study the period from 2005Q4 to 2008Q4 in order to capture both an expansionary and a recessionary period before the CARD Act passed in 2009. In the analysis, we focus on 18- to 23-year-old individuals. We do this because the latest data available at the time of the study are from the fourth quarter of 2012, when the oldest individuals affected by the provisions of the Act are 23 years old.

We estimate default behavior by age for all individuals with at least one credit card. We exclude individuals who have a cosigned card from the sample. This restriction allows us to isolate individual card holders' behavior from the influence of parental or guardian supervision. All individuals who have a cosigned card at any date within 1999 – 2008 are excluded from the estimation.^{8,9}

We estimate

$$DEF_{i,t} = \Phi(\alpha_0 + \sum_{k=1}^5 \beta_k^{AGE} \mathbf{1}_{\{age_{i,t}=18+k\}} + \sum_{k=1}^3 \beta_k^{YEAR} \mathbf{1}_{\{Year_{i,t}=2005+k\}} + \gamma' \mathbf{X}_{i,t}), \quad (1)$$

where $DEF_{i,t}$ is the binary variable that denotes default, $\mathbf{X}_{i,t}$ is the vector of dummies for the individual's state of residence in period t , and $\Phi(\cdot)$ is the cumulative standard normal distribution function. We consider three different types of default ($DEF_{i,t}$): $30DPD_{i,t}$, $60DPD_{i,t}$, and $SERIOUS_{i,t}$. $30DPD_{i,t}$ and $60DPD_{i,t}$ take the value 1 if individual i has a

⁷Financial problems related to credit card use are not limited to default, however. For example, most households with credit cards roll over balances (see, e.g., Agarwal, Chomsisengphet, Mahoney, and Stroebl [2013]) and this behavior may be suboptimal for some individuals. However, it is not possible to distinguish between efficient borrowing on credit card and suboptimal borrowing without knowing the individual's preferences. It is likely that the same behavioral biases (e.g., myopia) that cause default also cause suboptimal borrowing.

⁸This procedure also excludes individuals who have individual cards in addition to cosigned cards. For robustness, we also estimate default patterns by age using a less restricted sample. In this alternative sample, we exclude all individuals for whom total credit limit on cosigned cards is not smaller than the total credit limit on all cards at any date during 1999–2008. Thus, we exclude those individuals who have only cosigned cards but include those individuals who have both individual and cosigned cards. The results from this alternative sample are similar to the results from the benchmark sample and are available upon request.

⁹We consider an individual as having a credit card if he has a positive value for the variable that indicates the number of credit cards, or a positive value for the variable that indicates the highest amount of credit available on credit cards. If an individual has a positive value for the credit available through joint credit card accounts, we consider that person as having a cosigned card.

flag for a 30-day delinquency or a 60-day delinquency on a credit card in period t , respectively. $SERIOUS_{i,t}$ takes the value 1 if the individual has a flag for a 90-day delinquency, a 120-day delinquency, a credit card account in collections, a severe derogatory event, or a credit card in bankruptcy in period t .

Table 2 presents the results for 18-to-23-year-old individuals. Because there are relatively few 18-year-old individuals in the sample, we also estimate the relationship between age and default excluding 18-year-olds. These results are contained in the appendix, Table A.1. The results in Table 2 indicate that the risk of serious default increases with age (column 3). To facilitate interpretation of the magnitudes, columns 4 – 6 present the results from the estimation using OLS. The OLS results indicate that a 23-year-old individual is 16 percentage points more likely than an 18-year-old individual and 8 percentage points more likely than a 19-year-old individual to experience a serious default (column 6).

The relationship between minor delinquency and age appears to be inverse U-shaped. In particular, the results in Table 2 show that 18-year-old individuals are less likely than older individuals to experience a minor delinquency event on a credit card (columns 1, 2, 4, and 5). Starting from age 19, the probability of experiencing a minor delinquency event on a credit card decreases with age (see also Table A.1). However, the economic magnitude of the difference in minor delinquencies never exceeds 1 percentage point.

We consider an alternative specification of equation (1) in which we control for the number of quarters the individual has had a credit card. We estimate this specification because it is possible that the youngest individuals in the sample simply have not had a credit card long enough to have a serious default. In an extreme case, an individual who received his first a credit card in the last quarter of the year mechanically has not had an opportunity to fall 90 days behind on his payments. More generally, individuals may need time to accumulate credit card debt in order to get into trouble.

Table 3 presents the results after controlling for how long the individual has had a credit card. As expected, controlling for the length of the experience with credit cards reduces the

magnitude of the difference across age groups in the likelihood of serious default considerably. More experience increases the likelihood of a serious default. After controlling for experience, 23-year-old individuals are only 11 percentage points (rather than 16) more likely than an 18-year-old and only 4 percentage points more likely than a 19-year-old to have a serious default. The relationship between age and serious default continues to be monotonically increasing although the slope flattens around age 20.

In contrast to the effect of experience on serious default, more experience reduces the risk of minor delinquency. As individuals learn from their experience of servicing credit card debt, minor delinquencies fall. Learning might include such simple techniques as automating bank payments of credit card bills, consolidating credit cards, better organization of financial documents, or learning to set aside time for paying bills. We continue to see minor delinquency risk peak at age 19 after we control for experience.

To obtain a complete picture of the correlation between age and credit card default, we estimate a specification similar to the one in equation (1) for individuals of all ages:

$$\begin{aligned}
DEF_{i,t} = & \Phi(\alpha_0 + \beta^{21-24}\mathbf{1}_{\{age_{i,t}>20\&age_{i,t}<25\}} + \beta^{25-29}\mathbf{1}_{\{age_{i,t}>24\&age_{i,t}<30\}} \\
& + \beta^{30-34}\mathbf{1}_{\{age_{i,t}>29\&age_{i,t}<35\}} + \beta^{35-39}\mathbf{1}_{\{age_{i,t}>34\&age_{i,t}<40\}} + \beta^{40-44}\mathbf{1}_{\{age_{i,t}>39\&age_{i,t}<45\}} \\
& + \beta^{45-49}\mathbf{1}_{\{age_{i,t}>44\&age_{i,t}<50\}} + \beta^{50-54}\mathbf{1}_{\{age_{i,t}>49\&age_{i,t}<55\}} + \beta^{55-59}\mathbf{1}_{\{age_{i,t}>54\&age_{i,t}<60\}} \\
& + \beta^{60-64}\mathbf{1}_{\{age_{i,t}>59\&age_{i,t}<65\}} + \beta^{65+}\mathbf{1}_{\{age_{i,t}>64\}} \\
& + \sum_{k=1}^3 \beta_k^{YEAR}\mathbf{1}_{\{Year_{i,t}=2005+k\}} + \gamma'\mathbf{X}_{i,t}). \tag{2}
\end{aligned}$$

Table 4 presents the results from estimating equation (2) across the full age distribution. The coefficients are also shown in Figure 1. The table shows that serious default peaks in middle age and is lowest among the young and elderly. The differences in the propensity to experience a serious default across age groups are economically large. For example, an individual aged 35 – 44 is 10 percentage points more likely to experience a serious default than an 18- to 20-year-old and 12 percentage points more likely than an individual 65 or

older.

What accounts for the rapid increase in serious default up to middle age that we observe in the cross-section? Given our finding that serious default is associated with greater experience with credit cards, it is likely that the longer credit histories of middle-aged individuals explain some of the pattern. However, we cannot directly test this hypothesis because the CCP data start in 1999 such that we do not have complete credit histories for most individuals in the sample.

Instead, we exploit the panel dimension of our data to examine the flow of individuals into serious default. In particular, chargeoffs (a subset of severe derogatory incidents) and bankruptcies, can linger on individuals' credit records for years. To consider how much of the pattern in age is explained by these persistent events, we estimate equation (2) using *new* serious default as the dependent variable. To identify new serious default, we look at the individual's payment history over the last year. We do not observe the status on each account separately; rather, we observe the total number of accounts in default. As such, we code a derogatory incident or bankruptcy as a new serious default only if the derogatory incident or bankruptcy was not present the previous year or if the number of credit card accounts with a derogatory incident or in bankruptcy increased during the year.¹⁰ We treat all 90-day delinquencies, 120-day delinquencies, and accounts in collections as new serious defaults. As such, new serious default better captures the flow into serious default rather than a stock measure of serious default.

Table 5 presents the results using new serious default as the dependent variable in equation (2). Figure 2 presents the coefficients. As in Table 2, new default peaks in middle age and reaches its nadir in old age. However, the magnitudes of the differences in ages fall substantially and 18- to 20-year-olds are no less likely to enter serious default than individuals in their 20s. Conversely, the elderly appear to be even better credit risks when we consider

¹⁰This definition may underestimate new serious defaults insofar as an individual could have one account removed from serious derogatory incident or bankruptcy status and another account enter that status within one year such that there is no change in the number of accounts in that status.

only new serious defaults.

The increase in default with age may be partly because younger people have fewer consumption commitments in the sense of Chetty and Szeidl (2007). If young people have fewer consumption commitments, they may be more easily able to curtail their consumption without resorting to default. Furthermore, as we show below, earlier entrants into the credit card market are positively selected in the sense of being lower default risk.

It is less clear why default declines after middle age. Both serious default and delinquency drop particularly sharply for elderly individuals. This is somewhat puzzling: These individuals are especially unlikely to face the consequences of default in the form of reduced access to credit later in life since they face a higher probability of death. It is worth noting that many of these individuals grew up during the Great Depression. Malmendier, Tate, and Yan [2011] show that individuals who grew up during the Great Depression have different attitudes toward debt than the rest of the population such that cohort effects may explain part of the decline in default among the elderly.

The relation between minor delinquency and age is less robust than the one between serious default and age. The economic differences in the delinquency propensities from one age category to the next are much smaller than the differences in the serious default propensities and generally do not exceed one percentage point. The greatest magnitude of the difference across ages in the likelihood of minor delinquency is for those ages 65 or above, who have a 1.85 percentage point lower chance of a 30-day delinquency than individuals aged 18 to 20.

The inverse U-shaped pattern suggests that financial literacy is not the main driver of serious delinquency since the probability of serious delinquency increases up until middle age and yet financial literacy is lowest among young people and seniors.

Our finding of an inverse U-shape in serious default is consistent with the findings of Agarwal, Driscoll, Gabaix, and Laibson [2009] who estimate the relationship using different data and a different sample period. Agarwal, Driscoll, Gabaix, and Laibson [2009] estimate

the relationship between age and default and credit card delinquency for individuals aged 20 and above using data from a single lender from the 2002–2004 period. They do not distinguish between serious default and minor delinquency such that our results are not directly comparable, however. Interestingly, they also find an inverse U-shape in the relationship between age and default on other credit products (e.g., home equity lines of credit).

4 The Selection into Early Credit Card Use

We next turn to the question of what types of individuals get a credit card early in life. Identifying the selection into early credit card use may help explain the correlations we documented in the previous section and will further our understanding of the financial decisions of very young adults. In particular, there is a concern that the individuals who obtain credit cards early in life are especially prone to financial problems and this concern serves as a motivation for restricting early entry into the credit card market.

We use data from the passage of the CARD Act to estimate the risk profile of individuals who enter the credit card market early. Our identification strategy relies on the CARD Act delaying entry into the credit card market for some young individuals. Thus, we first assess whether the Act restricted access to credit cards for individuals under the age of 21.

4.1 The Effect of the Act on Credit Card Availability

We use Title 3 of the Act as a quasi-natural experiment. The treated group in the experiment consists of individuals who are aged 18 – 20 at the time the Act is enacted, i.e., in 2010Q1. Since we do not have the exact age of an individual, we consider everyone who is 18 – 20 in 2010Q4 as a treated group. These are individuals born in 1990 – 1992. The control group consists of the individuals who were very close in age to the treated group but old enough not to be affected by the provision of the Act.

The CARD Act likely altered the entry rate of young individuals into the credit market.

Since the CCP data only contain individuals who have a credit record, the CARD Act likely reduced the number of young individuals in the CCP data. The credit record refers to any credit record (student loan, auto loan, cosigned card, etc.), not necessarily a record associated with having an individual credit card.

To control for such changes in the representativeness of the CCP sample, we focus on the set of individuals for whom our data contain (1) a credit record in 2008Q4 (the last quarter before potential anticipation of the Act), and (2) a credit record at the time the individual was 18 years of age. The first restriction ensures that in the analysis we focus on the individuals who were already in the credit market (i.e., had a credit record, which was not necessarily associated with a credit card) prior to when the Act was enacted (2008Q4). Removing this restriction would introduce a selection bias into our estimation results as the treated and control groups would likely be dissimilar individuals.

The second restriction ensures that the individuals in the control group and the ones in the treated group first enter credit markets when they are at most 18 years old. We impose this restriction because individuals who first enter the formal credit market later in life may systematically differ from individuals who enter the credit market at age 18, who are the focus of our analysis of the effect of the Act.

4.1.1 Anticipatory Effects

We first examine whether there is evidence of anticipatory effects of the Act prior to 2010Q1, i.e., whether the individuals who were 21 by the end of 2009Q4 were unaffected by the Act. This will allow us to establish the latest date at which we can assume that individuals were unaffected by the provision of the Act.

Although full compliance with the provisions of the Act was required by February 2010, borrowers and lenders might have altered their behavior in anticipation of the Act coming into full effect. On the borrowers' side, it is possible that the individuals who would be affected by the Act changed their behavior between the time the Act was first anticipated

and when the Act came into effect by, for example, obtaining an additional credit card that they would not have obtained otherwise. It is also possible that credit card issuers changed their behavior in anticipation of the law. Credit card issuers may have tried to increase their supply of credit to young individuals immediately prior to the Act to mitigate the effect of the Act on their profits. Alternatively, credit card lenders may have altered their systems and procedures in the months prior to the Act coming into effect to ensure that they were in compliance with the Act’s provisions when it came into effect. *A priori*, it is not obvious which effect dominates.

We assume that the first anticipated date of the law was 2009Q1, i.e., we take 2008Q4 as the last quarter prior to the period when the Act can be anticipated either by credit card borrowers or lenders. This is because the restriction on individuals below the age of 21 was not in the version of the bill that passed the House in September 2008.¹¹ We then study changes in the indicators of the availability of credit via credit cards from 2008Q4 (the period before Title 3 can be anticipated) to 2009Q4 (the last period before Title 3 takes effect). Our focus on only these two end quarters allows us to avoid the inference problems that arise from serially correlated disturbance terms (see Bertrand, Duflo, and Mullainathan [2004]).

To identify the anticipatory effects of the Act, we compare the behavior of the individuals who would be affected by Title 3 of the Act (i.e., individuals aged 19 or 20 years old at the time the law came into full effect (2010Q1)) with the behavior of individuals of a very similar age but who would not be affected by Title 3 (i.e., individuals aged 21 or 22 when the law came into effect). Thus, in the former group, we consider the individuals who turn 20 or 21 at some point in 2010, i.e., those born in 1990 or 1989. In the latter group, we consider the individuals who turn 22 or 23 at some point in 2010, i.e., those born in 1988 or 1987. The inclusion of the latter group enables us to control for the change in macroeconomic factors and changes in other aspects of the consumer credit business affected by the Act that

¹¹A Google news search for 2008Q4 reveals no news of the ban on credit cards to individuals below the age of 21, providing additional evidence for a lack of anticipation of Title 3 in 2008Q4.

occurred between 2008Q4 and 2009Q4.

We study the effects of the Act on the following indicators of credit available via credit cards: (1) the probability of having a credit card, (2) the number of credit cards, and (3) the probability of having a cosigned card. Using data from 2008Q4 and 2009Q4, we estimate the following specification for individuals born between 1987 and 1990

$$\begin{aligned}
I_{i,t}^i = & \Phi(\alpha_0^{ANTIC} + \alpha_{20}^{ANTIC} \mathbf{1}_{\{2009Q4\}} \mathbf{1}_{\{age_{i,t}=19\}} \\
& + \alpha_{21}^{ANTIC} \mathbf{1}_{\{2009Q4\}} \mathbf{1}_{\{age_{i,t}=20\}} + \delta^{ANTIC} \mathbf{1}_{\{2009Q4\}} \\
& + \sum_{k=1}^4 \beta_k^{ANTIC} \mathbf{1}_{\{age_{i,t}=18+k\}} + \gamma'^{ANTIC} \mathbf{X}_{i,t}), \tag{3}
\end{aligned}$$

where $I_{i,t}^i$ is one of the three indicators of the credit available via credit cards. In particular, $I_{i,t}^i$ stands for the following variables: (1) $HASCARD_{i,t}$, where $HASCARD_{i,t}$ equals 1 if the individual has at least one credit card in quarter t (including cosigned cards) and 0 otherwise; (2) $NCARDS_{i,t}|_{HASCARD_{i,t}=1}$, where $NCARDS_{i,t}|_{HASCARD_{i,t}=1}$ is the number of credit cards that the individual has in quarter t (including cosigned cards), conditional on having at least one credit card in quarter t ; and (3) $COSIGNCARD_{i,t}|_{HASCARD_{i,t}=1}$, where $COSIGNCARD_{i,t}|_{HASCARD_{i,t}=1}$ equals 1 if, conditional on having a credit card, at least one credit card is a joint account. If the equation is estimated for $HASCARD_{i,t}$ or $COSIGNCARD_{i,t}|_{HASCARD_{i,t}=1}$, then $\Phi(\cdot)$ is the cumulative standard normal distribution function. If the equation is estimated for $NCARDS_{i,t}|_{HASCARD_{i,t}=1}$, then $\Phi(Z) = Z + \varepsilon_{i,t}$ where $\varepsilon_{i,t}$ is the error term.

In equation (3), $\mathbf{1}_{\{2009Q4\}}$ is an indicator that equals 1 if t is 2009Q4 and 0 otherwise, $\mathbf{1}_{\{age_{i,t}=j\}}$ is an indicator that equals 1 if the individual is aged j at the end of year t , and $\mathbf{X}_{i,t}$ is the vector of dummies for the individual's state of residence in period t . When estimating equation (3) with the dependent variable $NCARDS_{i,t}|_{HASCARD_{i,t}=1}$ or $COSIGNCARD_{i,t}|_{HASCARD_{i,t}=1}$, we restrict the sample to individuals who have at least one credit card.

The sample for estimating (3) with the dependent variable $HASCARD_{i,t}$ consists of two observations for individuals born in 1990 (one observation for 2008 and one observation for 2009), two observations for individuals born in 1989, two observations for individuals born in 1988, and two observations for individuals born in 1987. The sample for estimating (3) with the dependent variable $NCARDS_{i,t}|_{HASCARD_{i,t}=1}$ or $COSIGNCARD_{i,t}|_{HASCARD_{i,t}=1}$ consists of up to two observations for each individual and exactly two for each individual who has at least one credit card in each period. Consequently, the individuals in the sample are of five different ages: 18 in 2008, 19 in 2008 and 2009, 20 in 2008 and 2009, 21 in 2008 and 2009, and 22 in 2009. Thus, observing the individuals from the four birth years in two time periods allows us to identify seven coefficients in equation (3): the 2009-year effects, four age effects, and two age-year interaction effects.

The coefficients α_{20}^{ANTIC} and α_{21}^{ANTIC} capture any differential impacts the Act had on individuals who turned 20 and 21 by the end of 2010, respectively. As such, we anticipate the magnitude of α_{21}^{ANTIC} to be smaller than the magnitude of α_{20}^{ANTIC} because an average individual who is 21 in 2010Q4 would experience only limited effects of the Act.

Table 6 contains the estimation results. The first two columns present the results from the probit estimation of whether an individual in the sample has a credit card and whether, conditional on having a card, the individual has a cosigned card. The last three columns present the OLS estimates of whether the individual has a card, the number of cards an individual has conditional on having a card, and whether, conditional on having a card, the individual has a cosigned card.

When $HASCARD$ and $NCARDS$ are the dependent variables, the estimated coefficients $\hat{\alpha}_{20}^{ANTIC}$ and $\hat{\alpha}_{21}^{ANTIC}$ are negative and strongly statistically significant, indicating that the individuals targeted by the Act are less likely to have a credit card after the Act passed and, conditional on having at least one card, have fewer cards. When $COSIGNCARD$ is the dependent variable, $\hat{\alpha}_{20}^{ANTIC}$ and $\hat{\alpha}_{21}^{ANTIC}$ are positive and statistically significant at the 1 percent level, indicating that individuals who have at least one card are more likely to

have a cosigned card as a result of the Act. In particular, individuals aged 19 in 2009 are 6 percentage points less likely to have a credit card and, conditional on having a card, 3 percentage points more likely to have a cosigned card. The effects are somewhat less pronounced for 20-year-olds in 2009: 20-year-olds are 2 percentage points less likely to have a card and, conditional on having at least one card, 2 percentage points more likely to have a cosigned card.

The results indicate that there is evidence of anticipatory effects of the CARD Act. We thus treat 2009 as part of the period affected by the provision of Title 3 of the Act.

4.1.2 Cumulative Change in Credit Availability from the Act

To identify the effect of Title 3, we would like to compare credit available via credit cards before the Act and immediately after the Act took effect. As the above results suggest, the period immediately before full compliance with the Act was required but after the bill had passed shows evidence of anticipatory effects of the Act. Thus, to identify the total effect of the Act on credit, we compare the difference in credit card indicators between 2008Q4 and 2010Q4. Full compliance with the Act was required in 2010Q1. Using 2010Q4 allows us to identify the age of an individual from his birth year with a high degree of certainty.

Using the data from the two periods, 2008Q4 and 2010Q4, we estimate the following equation for individuals born between 1986 and 1990

$$\begin{aligned}
I_{i,t}^i = & \Phi(\alpha_0^{SHORT} + \alpha_{20}^{SHORT} \mathbf{1}_{\{2010Q4\}} \mathbf{1}_{\{age_{i,t}=20\}} \\
& + \alpha_{21}^{SHORT} \mathbf{1}_{\{2010Q4\}} \mathbf{1}_{\{age_{i,t}=21\}} + \delta^{SHORT} \mathbf{1}_{\{2010Q4\}} \\
& + \sum_{k=1}^6 \beta_k^{SHORT} \mathbf{1}_{\{age_{i,t}=18+k\}} + \gamma'^{SHORT} \mathbf{X}_{i,t}),
\end{aligned} \tag{4}$$

where the dependent variable $I_{i,t}^i$ is one of the three indicators described after equation (3), and $\Phi(\cdot)$ is the function described after equation (3).

The sample for estimating equation (4) with $HASCARD_{i,t}$ as the dependent variable

consists of two observations for individuals born in 1990 (one observation for 2008 and one observation for 2010), two observations for individuals born in 1989, two observations for individuals born in 1988, two observations for individuals born in 1987, and two observations for individuals born in 1986. Consequently, the individuals in the sample are of seven different ages: 18 in 2008, 19 in 2008, 20 in 2008 and 2010, 21 in 2008 and 2010, 22 in 2008 and 2010, 23 in 2010, and 24 in 2010. Relative to the sample that we use to identify the anticipatory effects, we add the individuals born in 1986 because we cannot identify both the treatment effect and the age fixed effects with only individuals born in 1987 – 1990 when individuals have aged another year relative to the time before the Act became effective. The sample for estimating equation (4) with dependent variable $NCARDS_{i,t}|_{HASCARD_{i,t}=1}$ or $COSIGNCARD_{i,t}|_{HASCARD_{i,t}=1}$ consists of up to two observations for each individual and exactly two for each individual who has at least one credit card in each period from the 1986 – 1990 cohorts.

Table 7 presents the results from estimating (4). Individuals aged 20 in 2010Q4, who received the largest dose of treatment from Title 3, are 8 percentage points less likely to have a credit card and, if they have a credit card at all, 3 percentage points more likely to have a cosigned card. Conditional on having at least one credit card, they are likely to have a smaller number of cards, although the magnitude of this last effect is small: The reduction in the number of credit cards for individuals aged 20 in 2010Q4 is 0.04 cards. All of these effects are statistically significant at the 1 percent level. Our findings regarding the Act having reduced the supply of credit indicate that at least some of the deleveraging of the American consumer in the recovery from the financial crisis (see Bhutta [2012b]) was involuntary.

We view our estimates as lower bounds on the effect of the Act on credit availability to individuals under 21 because, as we illustrate in Table 1, the Act likely reduced the number of individuals in our sample. Indeed, our estimates of the effect of the CARD Act on the availability of credit to individuals under the age of 21 is much smaller than the drop that

the CFPB [2013] notes in its annual report. Our estimates of the effect of the Act on credit availability to individuals under 21 are also likely lower than the numbers the CFPB lists in its report because we control for changes in the macroeconomic environment using older individuals unaffected by Title 3.¹²

We use individuals age 21 and age 22 to control for changes in the macroeconomic environment between 2008 and 2010. Our identification strategy assumes that the employment situation for individuals age 19 and 20 changed similarly to that for individuals aged 21 and 22. To understand the extent to which the unemployment and labor force participation rates differ for our treated and untreated ages, we use micro-data from the Current Population Survey (CPS) to construct annual unemployment rates by age. Not surprisingly, younger people have higher unemployment and lower labor force participation rates. However, the difference in the rates between our ‘high dose’ 19-year-olds and our untreated 21- and 22-year-olds was similar in 2008 and 2010. In 2008, the unemployment rate of 19-year-olds was about 4.6 percentage points higher than that for 21-year-olds and about 4.9 percentage points higher than that for 22-year-olds. By 2010, the same gaps had risen to 5.3 and 5.9. The differences in the trends for labor force participation rates are even smaller: In 2008, 19-year-olds had a labor force participation rate 10 percentage points lower than that of 21-year-olds and 15 percentage points lower than that of 22-year-olds. In 2010, the same gaps stood at 10 and 16 percentage points. Thus, it appears that our control for changes in the macroeconomic environment, while not perfect, are unlikely to be heavily biased due to differential employment trends between the treated and the untreated ages.

¹²CFPB [2013] notes that there are likely changes in the macroeconomic environment over this period that make it difficult to interpret the numbers they report as exclusively caused by the Act.

4.2 Who Are Early Credit Card Users?

4.2.1 Credit Card Default and Entry Age

Having established that Title 3 of the CARD Act had a material effect on the availability of credit cards to individuals under the age of 21, we now use the effect of the Act to identify differences between individuals who get a credit card before age 21 and those who wait until later in life to enter the credit card market. Our identification strategy is as follows. We use data from 2009Q4 and 2012Q4 on individuals aged 22 who got their first credit card at age 21 and all individuals aged 25. After dropping all individuals with cosigned cards in any period prior to the observation date, we estimate

$$\begin{aligned} I_{i,t} = & \Phi(\alpha_0 + \beta^{selection} \mathbf{1}_{\{age_{i,t}=22\}} \mathbf{1}_{\{YEAR_{i,t}=2012\}} \\ & + \beta^{25} \mathbf{1}_{\{age_{i,t}=25\}} + \beta^{2012} \mathbf{1}_{\{YEAR_{i,t}=2012\}} + \gamma' \mathbf{X}_{i,t}), \end{aligned} \quad (5)$$

where $I_{i,t} \equiv SERIOUS_{i,t}$ such that the variable equals 1 if the individual has a serious delinquency incident associated with a credit card, and 0 otherwise.¹³

The 22-year-old individuals in 2009 who first got a credit card at age 21 did not get a credit card earlier by choice. Either they chose not to apply for a credit card or lenders chose not to approve their application; borrowers and lenders were unconstrained by the Act. In contrast, at least some of the 22-year-old individuals in 2012 who first got a credit card at age 21 would have gotten a credit card earlier, at age 19 or 20, but were unable to do so because of the CARD Act. Both sets of individuals aged 22 have a very similar length of credit history (roughly one year), and thus the same timespan to learn firsthand about servicing their credit cards and to accumulate credit card debt. We take the first date the individual has a credit card as the entry age into the credit card market regardless of whether the individual subsequently has no credit card during some periods. To ensure that

¹³In addition to data from 2009 to 2012, we use data from 1999 to 2008 to identify the entry age.

we accurately identify the age of entry into the credit card market, in the estimation of (5) we exclude individuals who enter the CCP panel already having a credit card.

The 25-year-olds are untreated in both periods. An individual aged 25 in 2009Q4 or in 2012Q4 was at least 21 in 2008Q4 just before the Act was passed. We include the 25-year-olds to capture changes over time in default behavior. In particular, it is likely that there are differences in default behavior over time due to the changes in macroeconomic conditions and the changes in other provisions of the CARD Act that affect individuals of all ages.

The interpretation of $\beta^{selection}$ is thus one of selection. If $\beta^{selection} > 0$, individuals who, in the absence of being constrained by the CARD Act, enter the credit card market earlier are worse credit risks than those who first enter the credit card market at age 21. If $\beta^{selection}$ is statistically indistinguishable from 0, there is no difference in the propensities to default of individuals who enter the credit card market at the age of 21 and individuals who enter the credit card market earlier than 21. If $\beta^{selection} < 0$, individuals who enter the credit card market earlier are better credit risks than those who enter at age 21.

Our strategy is agnostic regarding the extent to which the selection is on the part of borrowers or on the part of lenders. *A priori*, the direction of the selection effect is unclear. Brown, van der Klaauw, Wen, and Zafar [2013] show that greater financial literacy increases credit market participation such that individuals who self-select into early credit card use are more likely to be financially sophisticated. However, the sociology literature (e.g., Manning [2001]) portrays early entry into the credit card market as a response to aggressive advertising such that the individuals who self-select into early credit card use may be the ones most susceptible to marketing and thus less financially sophisticated. Furthermore, lenders may be unwilling to provide credit to higher risk young borrowers. Although we believe lenders do restrict credit cards to the highest risk borrowers, the findings of Han, Keys, and Li [2011] regarding the widespread marketing of credit cards to bankrupt individuals suggests that U.S. lenders do not tightly ration credit cards.

The results in Table 8 indicate that individuals who enter the credit card market ear-

lier in life are better credit risks, i.e., less likely to experience a serious default associated with a credit card, than individuals who enter later in life. The selection effect for serious delinquency is statistically significant at the 1 percent level. The sample of 22-year-olds in equation (5) all have the same number of *years* of experience with credit cards. However, to further reduce sampling variability, we also consider a specification in which we control for the number of *quarters* of experience with a credit card. The results, available in an appendix from the authors, are very similar to those in Table 8.

Table 8 also shows the results for estimating the selection effect for 30- and 60-day delinquency on credit cards. As can be seen from the table, individuals who enter the credit card market early are slightly more likely to experience minor delinquencies. The magnitude of the selection effect on minor delinquencies is much smaller than that on serious delinquencies. Furthermore, the selection coefficient on 60-day delinquencies is statistically significant at only the 10 percent level when we use 2008 as the base year rather than 2009. Thus, the selection effect for minor delinquencies appears to be less robust than the selection effect for serious default.

Our identification strategy relies on the experiences of individuals aged 25 being able to broadly capture changes in the macroeconomic environment between 2009 and 2012. While the treated and untreated ages are quite close to one another, it is still important to consider whether it is likely that differential trends in the employment of the two ages severely affect the identification strategy. We thus use data from the CPS to construct age-specific unemployment and labor force participation rates. The gap between the unemployment rates of 22- and 25-year-olds was 2.4 percentage points in 2009 and 2.2 percentage points in 2012. The gap between the labor force participation rates of the two groups was 8.2 percentage points in both 2009 and 2012. Thus, the two groups experienced similar labor market trends.¹⁴

¹⁴Nevertheless, as a robustness exercise, we also consider using 2008 as a base year. The gap between the unemployment rate for individuals aged 22 and 25 in 2008 is 3.4 percentage points as compared to the 2.2 percentage point gap in 2012. The gaps in the labor force participation rates are 7.2 percentage points in 2008 and 8.2 percentage points in 2012. The results of using 2008 as the base year are extremely similar to

4.2.2 Mortgage Credit and Entry Age

One of the concerns about access to credit early in life is that young individuals risk adversely affecting their credit history and, with it, their ability to get credit when they really need it, such as to purchase a home or to finance a small business. In this section, we therefore explore whether early access to credit cards affects the likelihood that the individual has a mortgage at age 22 or age 23. Mortgage credit in the United States is a particularly important type of credit because of its strong association with homeownership.¹⁵ Young individuals are especially likely to need a mortgage to access homeownership since they have had little time to accumulate wealth.

We first estimate the reduced form relationship between the probability of having a mortgage and age of entry into credit card markets, i.e.,

$$\begin{aligned}
 MTG_{i,t} = & \Phi(\alpha_0 + \beta^{22_earlyentry} \mathbf{1}_{\{entryage_{i,t} < 21\}} \mathbf{1}_{\{age_{i,t}=22\}} \\
 & + \beta^{23_earlyentry} \mathbf{1}_{\{entryage_{i,t} < 21\}} \mathbf{1}_{\{age_{i,t}=23\}} \\
 & + \beta^{23} \mathbf{1}_{\{age_{i,t}=23\}} + \sum_{k=1}^3 \beta_k^{YEAR} \mathbf{1}_{\{Year_{i,t}=2005+k\}} + \gamma' \mathbf{X}_{i,t}), \quad (6)
 \end{aligned}$$

where $MTG_{i,t}$ takes the value 1 if individual i has a mortgage in period t and 0 otherwise. The mean of the dependent variable is 3.9 percent. The base category for (6) is thus individuals aged 22 who first got a credit card when they were younger than 21. The sample consists of all individuals aged 22 or 23 in 2005 – 2008 for whom we can precisely identify the age at which they enter the credit card market. Thus, as in our estimation of the relationship between entry age and default, we exclude individuals who enter the CCP panel already having a credit card since we cannot determine when such individuals first received a credit card.

Table 9 presents the results from estimating (6). The results show that individuals who

when we use 2009 as the base year and are available in an appendix.

¹⁵See Bostic and Gabriel (2006) and Caplin, Cororaton, and Tracy (2013) regarding U.S. policies to promote homeownership.

enter the credit card market early are more likely to have a mortgage by age 22 or 23. Thus, any damage individuals who enter early inflict on their credit history may be dominated by the benefit of a longer credit history.

Another possibility that may partly explain the results in Table 9 is that individuals who choose to get credit early are disproportionately people who prefer to get a mortgage early in life. To consider this possibility, we again exploit the exogenous variation in entry age provided by the CARD Act to identify whether individuals who choose to enter the credit card market earlier are more or less likely to get a mortgage because of unobservable individual characteristics rather than causal effects of early access to credit. To do so, we use data from 2009Q4 and 2012Q4 on individuals aged 22 who got their first credit card at age 21 and all individuals aged 25. After dropping all individuals with cosigned cards in 1999 – 2012, we estimate

$$\begin{aligned} MTG_{i,t} = & \Phi(\alpha_0 + \beta^{selection} \mathbf{1}_{\{age_{i,t}=22\}} \mathbf{1}_{\{YEAR_{i,t}=2012\}} \\ & + \beta^{25} \mathbf{1}_{\{age_{i,t}=25\}} + \beta^{2012} \mathbf{1}_{\{YEAR_{i,t}=2012\}} + \gamma' \mathbf{X}_{i,t}). \end{aligned} \quad (7)$$

As before, both sets of individuals aged 22 have roughly the same length of credit history (about one year), and thus the same timespan to learn firsthand about credit cards and to accumulate credit card debt. As before, we include the 25-year-olds (who are untreated in both periods) to capture changes over time in the propensity to have a mortgage. If $\beta^{selection} > 0$, individuals who first enter credit card markets at age 21 have unobservable characteristics that make them more likely to get a mortgage than those who, in the absence of the Act, would enter the credit card market at below age 21.

Table 10 reveals that, indeed, the individuals who wait until later in life to get a credit card, rather than those who are forced to delay entry by the CARD Act, are less likely to have a mortgage at an early age. One motivation for entering the credit card market below the age of 21 thus appears to be homeownership.

5 Does Early Entry Increase Default Later in Life?

In this section, we study default behavior by entry age to examine the effect of early entry into the credit card market on default behavior later in life. We estimate an equation in which we control for the age at which an individual enters the credit card market rather than the individual's current age. This allows us to control for the length of the individual's experience in the credit card market. The length of an individual's experience in the credit card market is a key determinant of serious default because the longer an individual's credit history is, the more time he or she has had to accumulate debt. In particular, we estimate

$$\begin{aligned}
 DEF_{i,t} = & \Phi(\alpha_0 + \sum_{k=1}^6 \beta_k^{entry} \mathbf{1}_{\{entryage_{i,t}=17+k\}} + \beta^{exp} QuarterExp_{i,t} \\
 & + \beta^{expsq} (QuarterExp_{i,t})^2 + \sum_{k=1}^3 \beta_k^{YEAR} \mathbf{1}_{\{Year_{i,t}=2005+k\}} + \gamma' \mathbf{X}_{i,t}), \quad (8)
 \end{aligned}$$

where $QuarterExp_{i,t}$ is the number of quarters of experience the individual has in the credit card market.

We use data from 2005 – 2008 to estimate (8). We include individuals aged 21 – 25 who entered the credit card market between the ages of 18 and 24.¹⁶ As before, to avoid the confounding influence of parental or guardian supervision, we exclude from the analysis individuals who have (or previously had) a cosigned card. We also exclude individuals who enter the CCP panel already having a credit card, since we cannot accurately date these individuals' entry into the credit card market.

The estimation of the effect of early entry into the credit card market on default thus keeps credit history constant but varies the age of entry into the credit market. Individuals differ according to their current age and when they enter the credit market. A positive coefficient on β_k^{entry} would indicate that earlier entry is associated with greater default risk.

To allow for the possibility that experience in the credit market affects default in a fashion

¹⁶We exclude the few individuals who entered the credit card market before age 18. This exclusion does not affect the results.

not captured by our quadratic functional form, we also estimate

$$\begin{aligned}
DEF_{i,t} = & \Phi(\alpha_0 + \sum_{k=1}^6 \beta_k^{entry} \mathbf{1}_{\{entryage_{i,t}=17+k\}} \\
& + \sum_{k=1}^6 \beta_k^{exp} \mathbf{1}_{\{YearsExp_{i,t}=k\}} \\
& + \sum_{k=1}^3 \beta_k^{YEAR} \mathbf{1}_{\{Year_{i,t}=2005+k\}} + \gamma' \mathbf{X}_{i,t}).
\end{aligned} \tag{9}$$

The results from estimating (8) and (9) are shown in Tables 11 and 12, respectively. The results in the tables show that earlier entrants are less likely to experience a serious default later in life. The results provide no evidence in favor of the notion that early entry into the credit card market results in more financial problems later in life.

These results show that either the selection effect dominates any adverse effects of entering the credit card market earlier, or there is no adverse effect of entering the credit card market earlier. Unfortunately, our results do not causally identify the effect of delaying access to credit cards. To be able to completely disentangle the selection effects, we would need several years of data from after the CARD Act had passed such that we could use the CARD Act as a clean instrument for delaying access to credit cards. However, even if researchers find that delaying access to credit cards reduces default later in life, such evidence would have to be weighed against the consumption-smoothing benefits of early access to credit as well as the fact that the individuals who get credit earlier are in general better borrowers and are more likely to get a mortgage earlier in life.

6 Conclusions

The emerging literature on consumer financial protection (e.g., Campbell, Jackson, Madrian, and Tufano [2011]) and the passage of the CARD Act in 2009 have generated interest in understanding the risks associated with consumer credit. In this paper, we study the credit

card default behavior of young individuals in particular. Title 3 of the CARD Act specifically addresses the issuance of credit cards to young people. We show that Title 3 reduces credit card use by individuals under 21. Individuals affected by Title 3 were 8 percentage points (15 percent) less likely to have a credit card following the Act. We are thus able to use the Act as a quasi-natural experiment to study who chooses to get a credit card at a young age.

We find that individuals under the age of 21 are much less likely to experience a serious default than older individuals. Second, individuals selected into early credit card use are lower risk borrowers than people who enter the credit card market later. Third, we find no evidence that entry into the credit card market before age 21 increases the risk of financial problems later in individuals' 20s. Finally, early credit card entry is associated with a higher likelihood of getting a mortgage early in life. The relation between mortgages and early credit card use indicates that young people may choose to enter the credit card market to build a strong credit history to later access homeownership.

Our results regarding the selection of individuals into early entry into the credit card market caution against interpreting early entry as a consequence of suboptimal or myopic behavior. A useful topic for future research would be to investigate further why early entrants are better borrowers. Research on financial literacy suggests that greater literacy often encourages greater participation in financial markets.¹⁷ Given this research, it seems likely that individuals with more financial literacy get their first credit card at a younger age. As such, young people with credit cards may be more financially literate than young people without credit cards. Although we exclude individuals with cosigned cards in our analysis, such that we rule out explicit parental involvement, young individuals that participate in the credit card market may also have more involved parents that guide them in their financial decisions. Regardless of the reason for the better behavior of earlier entrants, there is no evidence that young borrowers are bad borrowers.

¹⁷See, for example, Calvet, Campbell, and Sodini [2007, 2009], van Rooij, Lusardi, and Alessie [2011], Babenko and Sen [2012], and Brown, van der Klaauw, Wen, and Zafar [2013].

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Figure 1: Default by Age, 18+ y.o. Individuals

The figure presents the coefficients from an OLS regression of default on age (equation (2) of the text). The gray dashed lines represent 95% confidence intervals. The omitted category is age 18-20.

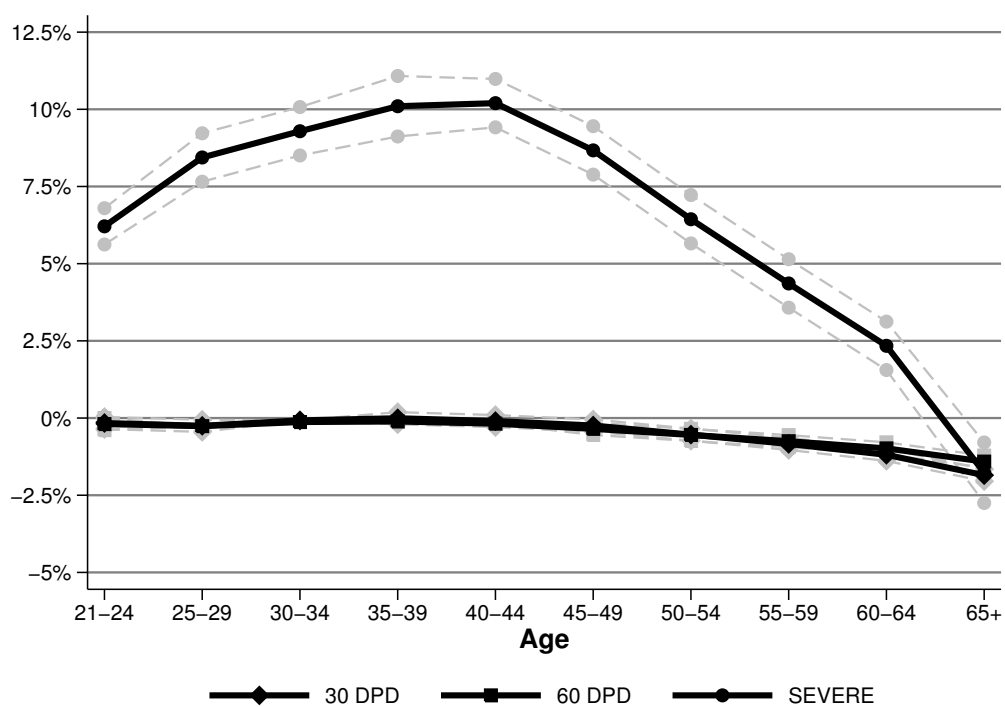


Figure 2: Default by Age, New Serious Defaults Only

The figure presents the coefficients from an OLS regression of default on age (equation (2) of the text) where only new entries into serious default are coded as serious defaults. The gray dashed lines represent 95% confidence intervals. The omitted category is age 18-20.

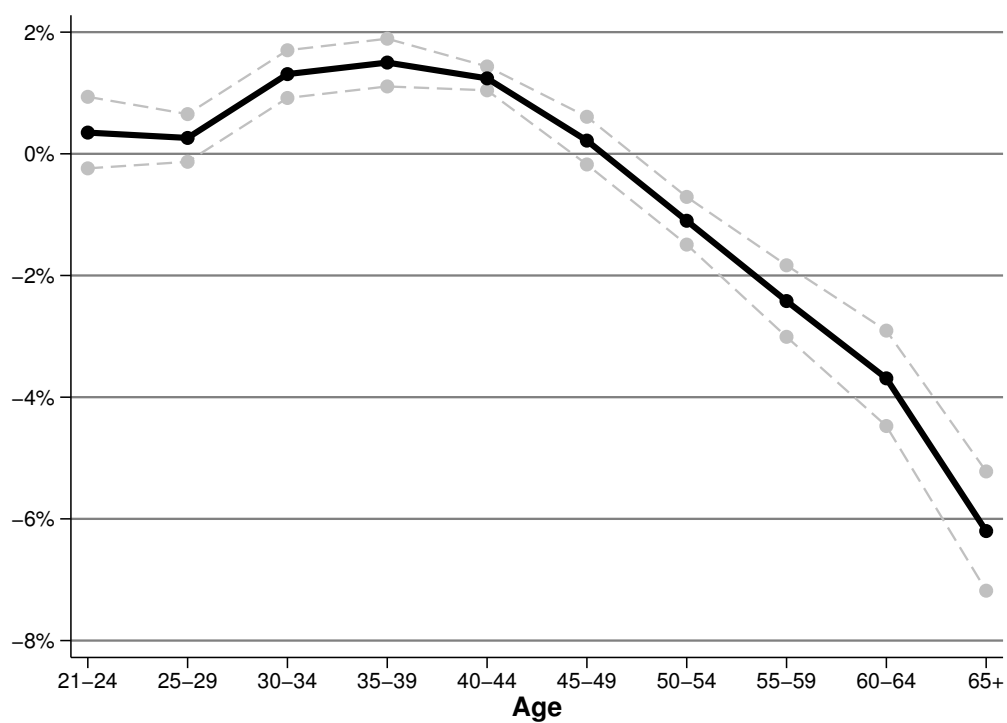


Table 1: Number of Individuals in the Sample

Notes: 1) Each entry in the table presents the number of individuals in our sample in the fourth quarter of the indicated year. 2) The number in parentheses is the percentage share of the individuals of the specified age in the total sample of 18- to-25-year-olds. 3) All data are from the fourth quarter of the indicated year.

	2005	2006	2007	2008	2009	2010	2011	2012
18	268,522 (5.71)	279,617 (5.93)	268,187 (5.74)	236,586 (5.34)	188,955 (4.50)	188,352 (4.76)	150,967 (4.07)	155,641 (4.30)
19	472,117 (10.03)	480,902 (10.21)	480,750 (10.29)	438,616 (9.90)	381,815 (9.09)	331,154 (8.37)	305,764 (8.24)	295,855 (8.18)
20	576,553 (12.25)	577,823 (12.26)	572,875 (12.27)	543,850 (12.27)	494,377 (11.78)	448,205 (11.32)	390,113 (10.51)	388,504 (10.74)
21	707,405 (15.03)	637,038 (13.52)	623,862 (13.36)	595,541 (13.44)	568,554 (13.54)	531,534 (13.43)	486,544 (13.11)	451,578 (12.48)
22	643,659 (13.68)	734,998 (15.60)	658,544 (14.10)	623,030 (14.06)	603,894 (14.38)	588,466 (14.87)	553,791 (14.92)	531,520 (14.69)
23	674,603 (14.34)	654,632 (13.89)	739,542 (15.84)	643,859 (14.53)	620,982 (14.79)	610,986 (15.44)	595,165 (16.04)	574,684 (15.88)
24	677,499 (14.40)	674,926 (14.32)	655,514 (14.04)	716,436 (16.17)	637,026 (15.17)	622,983 (15.74)	610,769 (16.46)	605,794 (16.74)
25	684,978 (14.56)	671,968 (14.26)	670,579 (14.36)	632,719 (14.28)	702,490 (16.73)	635,986 (16.07)	618,532 (16.66)	615,372 (17.00)

Table 2: Default by Age, 18-23-Year-Old Individuals

Notes: 1) The omitted age category is 18-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) 30DPD and 60DPD take the value 1 if the individual is 30 or 60 days delinquent on a credit card, respectively. SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or other serious derogatory incident on a credit card account. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	Probit			OLS		
	30DPD	60DPD	SERIOUS	30DPD	60DPD	SERIOUS
	(1)	(2)	(3)	(4)	(5)	(6)
d_age19	0.115*** (0.015)	0.148*** (0.019)	0.664*** (0.009)	0.00770*** (0.001)	0.00717*** (0.001)	0.0795*** (0.004)
d_age20	0.102*** (0.020)	0.129*** (0.024)	0.858*** (0.013)	0.00666*** (0.001)	0.00610*** (0.001)	0.120*** (0.005)
d_age21	0.0936*** (0.022)	0.113*** (0.027)	0.923*** (0.016)	0.00608*** (0.001)	0.00523*** (0.001)	0.135*** (0.006)
d_age22	0.0778*** (0.022)	0.0878*** (0.029)	0.961*** (0.018)	0.00496*** (0.001)	0.00394*** (0.001)	0.145*** (0.006)
d_age23	0.0637*** (0.024)	0.0707** (0.029)	1.008*** (0.019)	0.00400*** (0.001)	0.00309** (0.001)	0.157*** (0.007)
d_year2006	0.0130*** (0.003)	0.0367*** (0.005)	0.0336*** (0.005)	0.000882*** (0.000)	0.00179*** (0.000)	0.00733*** (0.001)
d_year2007	0.0690*** (0.005)	0.0991*** (0.008)	0.105*** (0.007)	0.00497*** (0.000)	0.00516*** (0.000)	0.0236*** (0.001)
d_year2008	-0.00587 (0.005)	0.0269*** (0.010)	0.117*** (0.009)	-0.000393 (0.000)	0.00130*** (0.000)	0.0264*** (0.002)
_cons	-1.975*** (0.019)	-2.196*** (0.026)	-2.069*** (0.014)	0.0239*** (0.001)	0.0133*** (0.001)	-0.00823 (0.005)
<i>mean</i> (depvar)	0.0312	0.0214	0.156	0.0312	0.0214	0.156
<i>N</i>	5,650,341	5,650,341	5,650,341	5,650,341	5,650,341	5,650,341

Table 3: Default by Age, 18-23-Year-Old Individuals, Control for Credit Card Experience

Notes: 1) The omitted age category is 18-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) 30DPD and 60DPD take the value 1 if the individual is 30 or 60 days delinquent on a credit card, respectively. SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or other serious derogatory incident on a credit card account. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008. 7) *qtrs_exp* is the number of quarters the individual has had a credit card for.

	Probit			OLS		
	30DPD (1)	60DPD (2)	SERIOUS (3)	30DPD (4)	60DPD (5)	SERIOUS (6)
d_age19	0.124*** (0.015)	0.157*** (0.019)	0.633*** (0.009)	0.00830*** (0.001)	0.00762*** (0.001)	0.0716*** (0.003)
d_age20	0.119*** (0.019)	0.147*** (0.024)	0.792*** (0.013)	0.00792*** (0.001)	0.00704*** (0.001)	0.104*** (0.004)
d_age21	0.120*** (0.021)	0.140*** (0.026)	0.823*** (0.017)	0.00798*** (0.001)	0.00664*** (0.001)	0.111*** (0.004)
d_age22	0.114*** (0.020)	0.125*** (0.027)	0.826*** (0.020)	0.00752*** (0.001)	0.00584*** (0.001)	0.112*** (0.004)
d_age23	0.110*** (0.022)	0.118*** (0.027)	0.834*** (0.020)	0.00727*** (0.001)	0.00553*** (0.001)	0.114*** (0.005)
d_year2006	0.0121*** (0.003)	0.0358*** (0.005)	0.0379*** (0.005)	0.000820*** (0.000)	0.00174*** (0.000)	0.00813*** (0.001)
d_year2007	0.0682*** (0.005)	0.0983*** (0.008)	0.110*** (0.006)	0.00492*** (0.000)	0.00512*** (0.000)	0.0242*** (0.001)
d_year2008	-0.00374 (0.005)	0.0291*** (0.010)	0.112*** (0.009)	-0.000253 (0.000)	0.00140*** (0.000)	0.0246*** (0.002)
qtrs_exp	-0.00554*** (0.000)	-0.00572*** (0.000)	0.0199*** (0.001)	-0.000381*** (0.000)	-0.000283*** (0.000)	0.00494*** (0.000)
_cons	-1.970*** (0.020)	-2.191*** (0.027)	-2.090*** (0.014)	0.0242*** (0.001)	0.0136*** (0.001)	-0.0121** (0.006)
<i>mean</i> (depvar)	0.0312	0.0214	0.156	0.0312	0.0214	0.156
<i>N</i>	5,650,341	5,650,341	5,650,341	5,650,341	5,650,341	5,650,341

Table 4: Default by Age, 18+ Year Old Individuals

Notes: 1) The omitted age category is 18- to 20-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variables are defined as follows: 30DPD and 60DPD take the value 1 if the individual is 30 or 60 days delinquent on a credit card, respectively. SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or other serious derogatory incident on a credit card account. 5) We include a constant as well as year and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	Probit			OLS		
	30DPD (1)	60DPD (2)	SERIOUS (3)	30DPD (4)	60DPD (5)	SERIOUS (6)
d_age21_24	-0.0227*** (0.008)	-0.0376*** (0.010)	0.272*** (0.011)	-0.00161*** (0.001)	-0.00195*** (0.001)	0.0621*** (0.003)
d_age25_29	-0.0362*** (0.007)	-0.0518*** (0.009)	0.354*** (0.013)	-0.00251*** (0.001)	-0.00261*** (0.000)	0.0844*** (0.004)
d_age30_34	-0.0105 (0.007)	-0.0247*** (0.007)	0.383*** (0.011)	-0.000753 (0.000)	-0.00128*** (0.000)	0.0929*** (0.004)
d_age35_39	-0.000696 (0.008)	-0.0214*** (0.007)	0.412*** (0.011)	-0.0000509 (0.001)	-0.00110*** (0.000)	0.101*** (0.005)
d_age40_44	-0.0138* (0.008)	-0.0356*** (0.008)	0.413*** (0.011)	-0.000975* (0.001)	-0.00182*** (0.000)	0.102*** (0.004)
d_age45_49	-0.0355*** (0.009)	-0.0712*** (0.009)	0.362*** (0.013)	-0.00242*** (0.001)	-0.00350*** (0.001)	0.0867*** (0.004)
d_age50_54	-0.0814*** (0.007)	-0.116*** (0.009)	0.280*** (0.014)	-0.00537*** (0.001)	-0.00546*** (0.001)	0.0644*** (0.004)
d_age55_59	-0.133*** (0.007)	-0.168*** (0.008)	0.198*** (0.016)	-0.00837*** (0.001)	-0.00749*** (0.001)	0.0436*** (0.004)
d_age60_64	-0.201*** (0.008)	-0.234*** (0.011)	0.112*** (0.020)	-0.0119*** (0.001)	-0.00982*** (0.001)	0.0234*** (0.004)
d_age65andabove	-0.363*** (0.011)	-0.392*** (0.013)	-0.0928*** (0.029)	-0.0185*** (0.001)	-0.0141*** (0.001)	-0.0177*** (0.005)
d_year2006	0.0226*** (0.004)	0.0354*** (0.004)	0.0304*** (0.003)	0.00130*** (0.000)	0.00136*** (0.000)	0.00785*** (0.001)
d_year2007	0.0778*** (0.007)	0.124*** (0.009)	-0.0585*** (0.008)	0.00475*** (0.000)	0.00527*** (0.000)	-0.0153*** (0.002)
d_year2008	0.0513*** (0.011)	0.0916*** (0.015)	-0.113*** (0.016)	0.00303*** (0.001)	0.00374*** (0.001)	-0.0287*** (0.004)
_cons	-1.920*** (0.008)	-2.107*** (0.012)	-1.241*** (0.015)	0.0279*** (0.001)	0.0183*** (0.001)	0.105*** (0.003)
mean (depvar)	0.0263	0.0173	0.179	0.0263	0.0173	0.179
N	54,269,650	54,269,650	54,269,650	54,269,650	54,269,650	54,269,650

Table 5: Default by Age, 18+ Year Old Individuals, Flow into Serious Default

Notes: 1) The omitted age category is 18- to 20-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variable, SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or a *new* serious derogatory incident on a credit card account. 5) We include a constant as well as year and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	Probit (1)	OLS (2)
d_age21_24	0.0186 (0.013)	0.00349 (0.003)
d_age25_29	0.0143 (0.012)	0.00261 (0.002)
d_age30_34	0.0649*** (0.008)	0.0131*** (0.002)
d_age35_39	0.0738*** (0.008)	0.0150*** (0.002)
d_age40_44	0.0616*** (0.008)	0.0124*** (0.001)
d_age45_49	0.0116 (0.010)	0.00217 (0.002)
d_age50_54	-0.0573*** (0.011)	-0.0110*** (0.002)
d_age55_59	-0.132*** (0.013)	-0.0242*** (0.003)
d_age60_64	-0.211*** (0.018)	-0.0369*** (0.004)
d_age65andabove	-0.401*** (0.024)	-0.0620*** (0.005)
d_year2006	0.0414*** (0.006)	0.00733*** (0.001)
d_year2007	0.00695 (0.008)	0.00145 (0.001)
d_year2008	0.0615*** (0.015)	0.0113*** (0.003)
_cons	-1.286*** (0.014)	0.0999*** (0.003)
<i>mean</i> (depvar)	0.109	0.109
<i>N</i>	51,391,150	51,391,150

Table 6: Anticipatory Effects of CARD Act on Availability of Credit Cards

Notes: 1) The omitted age category is 18-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variables are defined as follows: HASCARD takes the value 1 if the individual has a credit card. COSIGNCARD takes the value 1 if, conditional on having at least one credit card, the individual has a cosigned card with a positive balance. NCARDS is the number of credit cards the individual has conditional on having at least one credit card. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2008-2009. 7) The number of observations differs slightly for NCARDS than for COSIGNED because, occasionally, we are missing an observation for the number of cards but know that the individual has some balance that is cosigned.

	Probit		OLS		
	HASCARD (1)	COSIGNCARD (2)	HASCARD (3)	NCARDS (4)	COSIGNCARD (5)
d_19	0.511*** (0.009)	-0.134*** (0.026)	0.195*** (0.003)	0.298*** (0.011)	-0.0192*** (0.005)
d_20	0.706*** (0.020)	-0.111*** (0.033)	0.270*** (0.008)	0.534*** (0.021)	-0.0165*** (0.006)
d_21	0.767*** (0.029)	0.0413 (0.033)	0.293*** (0.011)	0.692*** (0.029)	0.00566 (0.005)
d_22	0.817*** (0.037)	0.121*** (0.040)	0.312*** (0.014)	0.833*** (0.036)	0.0169*** (0.005)
d_2009	-0.116*** (0.005)	-0.125*** (0.014)	-0.0439*** (0.002)	-0.173*** (0.011)	-0.0185*** (0.002)
d_2009_19	-0.159*** (0.010)	0.236*** (0.025)	-0.0630*** (0.004)	-0.0149*** (0.005)	0.0341*** (0.005)
d_2009_20	-0.0613*** (0.007)	0.135*** (0.019)	-0.0245*** (0.003)	-0.0280*** (0.006)	0.0200*** (0.003)
<i>mean</i> (depvar)	0.524	0.0772	0.524	1.545	0.0772
<i>N</i>	1,305,474	683,642	1,305,474	683,636	683,642

Table 7: Short-Term Effects of CARD Act on the Availability of Credit Cards

Notes: 1) The omitted age category is 18-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variables are defined as follows: HASCARD takes the value 1 if the individual has a credit card. COSIGNCARD takes the value 1 if, conditional on having at least one credit card, the individual has a cosigned card with a positive balance. NCARDS is the number of credit cards the individual has conditional on having at least one credit card. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2008 and 2010. 7) The number of observations differs slightly for NCARDS than for COSIGNED because, occassionally, we are missing an observation for the number of cards but know that the individual has some balance that is cosigned.

	Probit		OLS		
	HASCARD (1)	COSIGNCARD (2)	HASCARD (3)	NCARDS (4)	COSIGNCARD (5)
d_19	0.502*** (0.009)	-0.141*** (0.027)	0.192*** (0.003)	0.298*** (0.012)	-0.0205*** (0.005)
d_20	0.690*** (0.021)	-0.124*** (0.032)	0.265*** (0.008)	0.537*** (0.022)	-0.0185*** (0.006)
d_21	0.747*** (0.030)	0.0234 (0.034)	0.286*** (0.012)	0.701*** (0.030)	0.00293 (0.005)
d_22	0.801*** (0.038)	-0.00624 (0.043)	0.306*** (0.015)	0.869*** (0.033)	-0.00204 (0.007)
d_23	0.853*** (0.046)	0.0451 (0.050)	0.326*** (0.018)	0.994*** (0.037)	0.00505 (0.007)
d_24	0.898*** (0.054)	0.0643 (0.053)	0.343*** (0.020)	1.116*** (0.038)	0.00790 (0.008)
d_2010	-0.160*** (0.006)	-0.0887*** (0.019)	-0.0596*** (0.003)	-0.309*** (0.013)	-0.0125*** (0.002)
d_2010_20	-0.202*** (0.013)	0.194*** (0.019)	-0.0807*** (0.005)	-0.0386*** (0.008)	0.0279*** (0.003)
d_2010_21	-0.0614*** (0.009)	-0.0283** (0.014)	-0.0248*** (0.004)	-0.00788 (0.008)	-0.00477** (0.002)
<i>mean</i> (depvar)	0.552	0.0796	0.552	1.641	0.0796
<i>N</i>	1,395,004	769,804	1,395,004	769,793	769,804

Table 8: Default and Self-Selection into Early Credit Card Use

Notes: 1) Only individuals 22 and 25 years old are included such that the omitted age category is 22-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variables are defined as follows: 30DPD and 60DPD take the value 1 if the individual is 30 or 60 days delinquent on a credit card, respectively. SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or other serious derogatory incident on a credit card account (e.g., credit card account is in collections). 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2009 and 2012. 7) Only individuals aged 22 that got their first credit card at age 21 are included. 8) $\beta^{selection} < 0$ indicates that young entrants are less likely to default than older entrants.

	Probit			OLS		
	30DPD	60DPD	SERIOUS	30DPD	60DPD	SERIOUS
	(1)	(2)	(3)	(4)	(5)	(6)
$\beta^{selection}$	0.148*** (0.022)	0.160*** (0.029)	-0.111*** (0.022)	0.00793*** (0.001)	0.00552*** (0.001)	-0.0195*** (0.005)
d_age25	0.0456** (0.018)	0.0537** (0.025)	0.0814*** (0.015)	0.00242** (0.001)	0.00205** (0.001)	0.0196*** (0.004)
d_year2012	-0.0751*** (0.010)	-0.151*** (0.015)	-0.117*** (0.016)	-0.00392*** (0.001)	-0.00519*** (0.001)	-0.0279*** (0.004)
mean (depvar)	0.0221	0.0137	0.154	0.0221	0.0137	0.154
N	293,256	293,256	293,256	293,256	293,256	293,256

Table 9: Mortgages and Entry Age

Notes: 1) The omitted age category is 22-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variable takes the value 1 if the individual has a mortgage. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	Probit (1)	OLS (2)
d_age22.entryunder21	0.0892*** (0.014)	0.00585*** (0.001)
d_age23.entryunder21	0.0853*** (0.013)	0.00823*** (0.001)
d_age23	0.248*** (0.006)	0.0189*** (0.002)
d_year2006	0.00669 (0.006)	0.000527 (0.001)
d_year2007	-0.00148 (0.011)	-0.0000471 (0.001)
d_year2008	-0.0499*** (0.017)	-0.00384*** (0.001)
<i>mean</i> (depvar)	0.0390	0.0390
<i>N</i>	1,095,693	1,095,693

Table 10: Mortgages and Self-Selection into Early Credit Card Use

Notes: 1) Only individuals 22 and 25 years old are included such that the omitted age category is 22-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variable takes the value 1 if the individual has mortgage. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2009 and 2012. 7) Only individuals aged 22 that got their first credit card at age 21 are included. 8) $\beta^{selection} < 0$ indicates that young entrants are less likely to have a mortgage than older entrants.

	Probit		OLS	
	(1)	(2)	(3)	(4)
$\beta^{selection}$	0.0727*** (0.027)	0.0803*** (0.027)	0.0244*** (0.002)	0.0255*** (0.002)
d_age25	0.769*** (0.020)	0.675*** (0.022)	0.0799*** (0.006)	0.0666*** (0.006)
d_year2012	-0.191*** (0.012)	-0.195*** (0.012)	-0.0290*** (0.003)	-0.0296*** (0.003)
qtrs_exp		0.00922*** (0.001)		0.00134*** (0.000)
<i>mean</i> (depvar)	0.0754	0.0754	0.0754	0.0754
<i>N</i>	293,256	293,256	293,256	293,256

Table 11: Entry Age and Default Later in Life

Notes: 1) The omitted entry age category is 24-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variables are defined as follows: 30DPD and 60DPD take the value 1 if the individual is 30 or 60 days delinquent on a credit card. SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or other serious derogatory incident on a credit card account. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	Probit			OLS		
	30DPD (1)	60DPD (2)	SERIOUS (3)	30DPD (4)	60DPD (5)	SERIOUS (6)
d_entry18	-0.0449*** (0.011)	-0.0218* (0.012)	-0.267*** (0.012)	-0.00302*** (0.001)	-0.00117* (0.001)	-0.0679*** (0.004)
d_entry19	-0.00832 (0.011)	-0.0183* (0.011)	-0.187*** (0.010)	-0.000624 (0.001)	-0.000979* (0.001)	-0.0446*** (0.002)
d_entry20	-0.00326 (0.010)	-0.00459 (0.012)	-0.134*** (0.011)	-0.000282 (0.001)	-0.000313 (0.001)	-0.0301*** (0.003)
d_entry21	-0.0113 (0.009)	-0.0203* (0.011)	-0.167*** (0.010)	-0.000840 (0.001)	-0.00110* (0.001)	-0.0379*** (0.003)
d_entry22	-0.0350*** (0.009)	-0.0351*** (0.010)	-0.145*** (0.009)	-0.00250*** (0.001)	-0.00184*** (0.001)	-0.0332*** (0.002)
d_entry23	-0.0243*** (0.008)	-0.0311*** (0.011)	-0.0853*** (0.007)	-0.00178*** (0.001)	-0.00166*** (0.001)	-0.0196*** (0.002)
qtrs_exp	-0.00353** (0.001)	-0.00662*** (0.002)	0.0584*** (0.001)	-0.000257** (0.000)	-0.000344*** (0.000)	0.0138*** (0.001)
qtrs_exp_sqd	0.00004 (0.000)	0.0001 (0.000)	-0.0015*** (0.000)	0.000003 (0.000)	0.000007 (0.000)	-0.000331*** (0.000)
d_year2006	0.00888** (0.003)	0.0194*** (0.007)	0.0151*** (0.005)	0.000604** (0.000)	0.000912*** (0.000)	0.00325** (0.001)
d_year2007	0.0517*** (0.006)	0.0926*** (0.008)	0.0198*** (0.008)	0.00370*** (0.000)	0.00475*** (0.000)	0.00372* (0.002)
d_year2008	-0.0176*** (0.007)	0.0173* (0.010)	-0.0360*** (0.013)	-0.00116*** (0.000)	0.000828* (0.000)	-0.0108*** (0.004)
<i>mean</i> (depvar)	0.0308	0.0206	0.186	0.0308	0.0206	0.186
<i>N</i>	2,590,362	2,590,362	2,590,362	2,590,362	2,590,362	2,590,362

Table 12: Entry Age and Default Later in Life, Experience in Categories

Notes: 1) The omitted entry age category is 24-year-olds and the omitted experience category is less than one year of experience with credit cards. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variables are defined as follows: 30DPD and 60DPD take the value 1 if the individual is 30 or 60 days delinquent on a credit card. SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or other serious derogatory incident on a credit card account. 5) We include a constant as well as state and year fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	Probit			OLS		
	30DPD (1)	60DPD (2)	SERIOUS (3)	30DPD (4)	60DPD (5)	SERIOUS (6)
d_entry18	-0.0470*** (0.011)	-0.00897 (0.011)	-0.253*** (0.013)	-0.00313*** (0.001)	-0.000483 (0.001)	-0.0643*** (0.004)
d_entry19	-0.00684 (0.011)	0.00106 (0.011)	-0.155*** (0.010)	-0.000520 (0.001)	-0.0000113 (0.001)	-0.0369*** (0.002)
d_entry20	-0.000493 (0.010)	0.0114 (0.012)	-0.118*** (0.011)	-0.0000877 (0.001)	0.000510 (0.001)	-0.0266*** (0.003)
d_entry21	-0.0111 (0.009)	-0.0115 (0.012)	-0.140*** (0.010)	-0.000822 (0.001)	-0.000633 (0.001)	-0.0319*** (0.003)
d_entry22	-0.0354*** (0.009)	-0.0282*** (0.010)	-0.128*** (0.008)	-0.00252*** (0.001)	-0.00147*** (0.001)	-0.0293*** (0.002)
d_entry23	-0.0243*** (0.008)	-0.0272** (0.011)	-0.0835*** (0.007)	-0.00178*** (0.001)	-0.00144** (0.001)	-0.0191*** (0.002)
d_years_exp1	-0.0151* (0.008)	-0.0340*** (0.012)	0.323*** (0.006)	-0.00112* (0.001)	-0.00183*** (0.001)	0.0741*** (0.002)
d_years_exp2	-0.0255*** (0.007)	-0.0658*** (0.011)	0.393*** (0.009)	-0.00184*** (0.001)	-0.00341*** (0.001)	0.0923*** (0.004)
d_years_exp3	-0.0337*** (0.010)	-0.0858*** (0.014)	0.409*** (0.010)	-0.00242*** (0.001)	-0.00439*** (0.001)	0.0966*** (0.004)
d_years_exp4	-0.0497*** (0.009)	-0.0944*** (0.016)	0.466*** (0.011)	-0.00353*** (0.001)	-0.00481*** (0.001)	0.113*** (0.004)
d_years_exp5	-0.0657*** (0.011)	-0.0997*** (0.013)	0.536*** (0.013)	-0.00458*** (0.001)	-0.00505*** (0.001)	0.133*** (0.006)
d_years_exp6	-0.0468*** (0.011)	-0.0982*** (0.012)	0.555*** (0.015)	-0.00335*** (0.001)	-0.00499*** (0.001)	0.139*** (0.006)
d_years_exp7	-0.0281 (0.019)	-0.0545** (0.024)	0.585*** (0.018)	-0.00219* (0.001)	-0.00292** (0.001)	0.146*** (0.006)
d_year2006	0.00801** (0.004)	0.0188*** (0.007)	0.00824 (0.005)	0.000544** (0.000)	0.000883** (0.000)	0.00199 (0.001)
d_year2007	0.0503*** (0.006)	0.0919*** (0.008)	0.0146* (0.007)	0.00360*** (0.000)	0.00472*** (0.000)	0.00282 (0.002)
d_year2008	-0.0187*** (0.006)	0.0173* (0.010)	-0.0416*** (0.013)	-0.00124*** (0.000)	0.000826* (0.000)	-0.0116*** (0.004)
mean (depvar)	0.0308	0.0206	0.186	0.0308	0.0206	0.186
N	2,590,362	2,590,362	2,590,362	2,590,362	2,590,362	2,590,362

A Not-for-Publication Appendix

Table A.1: Default by Age, 19-to-23-Year-Old Individuals

Notes: 1) The omitted age category is 19-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variables are defined as follows: 30DPD and 60DPD take the value 1 if the individual is 30 or 60 days delinquent on a credit card. SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or other serious derogatory incident on a credit card account. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	Probit			OLS		
	30DPD (1)	60DPD (2)	SERIOUS (3)	30DPD (4)	60DPD (5)	SERIOUS (6)
d_age20	-0.0137** (0.006)	-0.0188*** (0.007)	0.194*** (0.006)	-0.00103** (0.000)	-0.00107** (0.000)	0.0404*** (0.002)
d_age21	-0.0217*** (0.008)	-0.0350*** (0.010)	0.258*** (0.011)	-0.00162** (0.001)	-0.00194*** (0.001)	0.0559*** (0.003)
d_age22	-0.0374*** (0.009)	-0.0601*** (0.012)	0.297*** (0.014)	-0.00274*** (0.001)	-0.00322*** (0.001)	0.0653*** (0.004)
d_age23	-0.0516*** (0.011)	-0.0773*** (0.013)	0.344*** (0.014)	-0.00371*** (0.001)	-0.00408*** (0.001)	0.0774*** (0.004)
d_year2006	0.0101*** (0.003)	0.0347*** (0.005)	0.0332*** (0.005)	0.000700*** (0.000)	0.00171*** (0.000)	0.00750*** (0.001)
d_year2007	0.0610*** (0.005)	0.0939*** (0.007)	0.103*** (0.007)	0.00445*** (0.000)	0.00495*** (0.000)	0.0241*** (0.001)
d_year2008	-0.0114** (0.005)	0.0227** (0.010)	0.114*** (0.009)	-0.000762** (0.000)	0.00112** (0.000)	0.0268*** (0.002)
_cons	-1.850*** (0.007)	-2.039*** (0.012)	-1.403*** (0.010)	0.0323*** (0.001)	0.0209*** (0.001)	0.0701*** (0.003)
<i>mean</i> (depvar)	0.0315	0.0217	0.163	0.0315	0.0217	0.163
<i>N</i>	5,360,848	5,360,848	5,360,848	5,360,848	5,360,848	5,360,848

Table A.2: Default and Self-Selection into Early Credit Card Use, Control for Experience
Notes: 1) Only individuals 22 and 25 years old are included such that the omitted age category is 22-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variables are defined as follows: 30DPD and 60DPD take the value 1 if the individual is 30 or 60 days delinquent on a credit card, respectively. SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or other serious derogatory incident on a credit card account (e.g., credit card account is in collections). 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2009 and 2012. 7) Only individuals aged 22 that got their first credit card at age 21 are included. 8) $\beta^{selection} < 0$ indicates that young entrants are less likely to default than older entrants. 9) *qtrs_exp* is the number of quarters the individual has had a credit card for.

	Probit			OLS		
	30DPD (1)	60DPD (2)	SERIOUS (3)	30DPD (4)	60DPD (5)	SERIOUS (6)
$\beta^{selection}$	0.149*** (0.023)	0.160*** (0.029)	-0.0960*** (0.023)	0.00798*** (0.001)	0.00553*** (0.001)	-0.0172*** (0.005)
d_age25	0.0334* (0.018)	0.0487* (0.027)	-0.0411** (0.018)	0.00178* (0.001)	0.00187* (0.001)	-0.00786* (0.004)
d_year2012	-0.0757*** (0.009)	-0.151*** (0.015)	-0.128*** (0.016)	-0.00394*** (0.001)	-0.00520*** (0.001)	-0.0291*** (0.004)
qtrs_exp	0.00123* (0.001)	0.000511 (0.001)	0.0122*** (0.001)	0.0000647* (0.000)	0.0000186 (0.000)	0.00278*** (0.000)
<i>mean</i> (depvar)	0.0221	0.0137	0.154	0.0221	0.0137	0.154
<i>N</i>	293,256	293,256	293,256	293,256	293,256	293,256

Table A.3: Default and Self-Selection into Early Credit Card Use, 2008 Base Year

Notes: 1) Only individuals 22 and 25 years old are included such that the omitted age category is 22-year-olds. 2) The numbers in parentheses are standard errors clustered by state. 3) ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels for a two-sided test, respectively. 4) The dependent variables are defined as follows: 30DPD and 60DPD take the value 1 if the individual is 30 or 60 days delinquent on a credit card, respectively. SERIOUS takes the value 1 if the individual has a 90-day or greater delinquency or other serious derogatory incident on a credit card account (e.g., credit card account is in collections). 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2008 and 2012. 7) Only individuals aged 22 that got their first credit card at age 21 are included. 8) $\beta^{selection} < 0$ indicates that young entrants are less likely to default than older entrants.

	Probit			OLS		
	30DPD (1)	60DPD (2)	SERIOUS (3)	30DPD (4)	60DPD (5)	SERIOUS (6)
$\beta^{selection}$	0.0925*** (0.024)	0.0810*** (0.028)	-0.165*** (0.019)	0.00482*** (0.001)	0.00221* (0.001)	-0.0335*** (0.004)
d_age25	-0.00159 (0.016)	-0.00888 (0.019)	-0.0976*** (0.011)	-0.000182 (0.001)	-0.000585 (0.001)	-0.0225*** (0.003)
d_year2012	-0.165*** (0.010)	-0.235*** (0.014)	-0.175*** (0.013)	-0.00943*** (0.001)	-0.00890*** (0.001)	-0.0414*** (0.003)
qtrs_exp	-0.000777 (0.001)	-0.00151*** (0.001)	0.0111*** (0.001)	-0.0000468 (0.000)	-0.0000608*** (0.000)	0.00262*** (0.000)
mean (depvar)	0.0255	0.0162	0.163	0.0255	0.0162	0.163
N	309,794	309,794	309,794	309,794	309,794	309,794