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 problems. Our results challenge the notion that young borrowers are bad credit card users. We first show that the CARD Act of 2009 succeeded in its aim of reducing young borrowers' access to credit. We then exploit the Act to identify what types of individuals get a credit card before age 21. Early entrants default less and are more likely to get a mortgage early. Early entrants also have more affluent parents and parents that default less.

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 their limited exposure to other means of credit and lack of collateral. In an endowment economy with fully rational agents, more access to credit improves welfare (see, for example, Aiyagari (1994)). The literature on financial decision-making, however, has raised concerns about whether the benefits of early access to credit outweigh the costs. Lack of adequate financial literacy (Lusardi, Mitchell, and Curto [2010]) and cognitive biases in financial decision-making (e.g., Bertrand and Morse [2011], Stango and Zinman [2009, 2011]) may provide reasons to limit access to credit. In part motivated by these considerations, the Credit Card Accountability Responsibility and Disclosure Act of 2009 (hereafter, CARD Act) limited issuance of credit cards to individuals under the age of 21. Little to no empirical research exists, however, on the credit card default behavior of young individuals, or, especially, the risk profile of early entrants. There is also little research on credit market behavior over the life cycle. Studying these questions is important for understanding participation in financial markets, modeling financial behavior over the life cycle, and designing consumer finance policy.

In this paper, we study the credit card default behavior of young individuals using the New York Federal Reserve Bank Consumer Credit Panel/Equifax. The individuals who enter the credit card market early might be better or worse credit risks than the average debtor. We thus first focus on identifying the selection into early credit card use. Second, we document

the default pattern of young individuals in the context of the life cycle profile of credit card default. We identify the selection effect using the provision of the CARD Act that prohibits issuing credit cards to individuals under 21 (Title 3) as a quasi-natural experiment. In particular, the individuals who enter the credit card market at the age of 21 prior to the Act do so by choice while the pool of individuals who enter the credit card market at the age of 21 after the Act consists of those who enter at 21 by choice as well as those who would prefer to have a credit card earlier but could not because of the Act. A *ceteris paribus* comparison of the credit market behavior of the two pools identifies the selection effect.

We first establish that Title 3, the provision of the CARD Act addressing credit to individuals under 21, indeed altered the credit available to its target population. In particular, using a difference-in-difference approach, 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.[1] 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 our estimates as a lower bound of the effect of the Act because its passage also likely reduced the representation of youth in the credit bureau data used in our analysis.[2] To our knowledge, ours is the first paper to study Title 3 of the CARD Act.

We then use the Act to identify the selection effect by comparing two groups of individuals of the same age who also enter the credit card market at the same age. We find that early

[1]The mean of the dependent variable is 55 percentage points such that 8 percentage points represents 15%.

[2]To prevent sample bias induced by the CARD Act from contaminating our results, in estimating the effect of the Act, we include only individuals that are in the sample prior to passage of the Act.

entrant types are less likely to experience serious delinquency or default than late entrant types for a given entry age into the credit card market. Furthermore, early entrant types 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 homeownership. To provide insight into the selection effect, we link individuals at age 18 to their parents' credit records using data from before the CARD Act. We find that individuals who have a credit card by age 21 have parents who (i) live in higher income neighborhoods, (ii) are less likely to have a serious default, and (iii) are less credit constrained.

Although we find that young individuals who get a credit card early are less prone to default than those who get a card later, how do the default rates of younger individuals compare with those of the older borrowers? In the second part of the paper, we document life cycle patterns of credit card delinquency and serious default. Comparing default rates between the young and the very young individuals in the 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 than individuals aged 21 to 23, although they are more likely to experience delinquency in the 2005-2008 period. 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 serious default status. Comparing default rates across the entire age distribution, we find that serious default has an inverse U-shaped relation with age. Although some of the difference in default is because accounts can linger in certain default statuses for some time, we find that *entry* into serious

default also peaks in middle age. The inverse-U shaped pattern of default that we document is a challenge for standard life cycle models of default (e.g., Livshits, MacGee, and Tertilt [2007]) but it is broadly consistent with other empirical findings on the relationship between age and default.

Finally, how do the financial outcomes later in life of early entrants compare to those of the late entrants? Our finding of more delinquencies in the 2005-2008 period, but not serious default, among young borrowers raises the question of whether early entrants experience worse financial outcomes later in life. We find that, conditional on the length of the credit history, individuals who enter the credit card market early have a lower probability of experiencing serious default later in life (up to age 25).[3] We also find that delinquency decreases with the amount of experience the individual has with credit cards. Earlier entry into the credit card market is also associated with higher credit scores later in life. Part of the reason for the better scores of earlier entrants is because of the positive selection effect we identify in our analysis of the types of borrowers that get a credit card early. However, an additional channel through which early entry affects credit scores is that credit scores increase with the amount of experience the borrower has. As such, in addition to reducing their ability to smooth consumption while under 21, the CARD Act raises borrowers' credit costs later in life.

In summary, we find no evidence that early entrants are particularly risky borrowers or that early entry damages credit availability in the future. Rather than particularly vulnerable, our results indicate that early entrants are particularly capable borrowers.

[3]It is important to control for the length of the individual's credit card experience in such an analysis because we show that serious default is strongly correlated with it (i.e., the opportunity to accumulate debt dominates any learning effect from a longer credit history).

We caution that our results do not speak to the desirability of credit cards across the entire population or the consequences of other provisions of the CARD Act.[4] Given the existence of the selection effect that we uncover, any analysis of the causal effect of the CARD Act on the credit market outcomes of young borrowers will need to proceed carefully. Our results should 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 provides background on Title 3 of the CARD Act and describes our data. In section 3, we show that Title 3 of the CARD Act significantly reduced the availability of credit cards to its intended population. In section 4, we exploit the discrete cutoff age to identify differences between the types of borrowers who, in the absence of legal restrictions, enter the credit card market early and those who enter later. We also use identify the parental characteristics of early entrants using data from before the CARD Act. Section 5 documents the relationship between the incidence of credit card default and age using data from the period prior to the CARD Act. In section 6, we examine whether early entry into credit card markets is associated with worse outcomes later in life. Section 7 concludes.

[4]Since 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 interest rates on credit cards are too sticky to be consistent with the behavioral assumptions underlying perfect competition. 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. See also Laibson, Repetto, and Tobacman [2007] and Meier and Sprenger [2010]. Other research that studies the benefits and costs of access to unsecured credit includes Sullivan [2008], Karlan and Zinman [2010], Banerjee and Duflo [2011], Melzer [2011], Morse [2011], Chatterji and Seamans [2012], Morgan, Strain, and Seblani [2012], Bhutta, Skiba, and Tobacman [forthcoming], and Carrell and Zinman [2014].

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 Stroebel [forthcoming] and CFPB [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 prohibits recruiting potential credit card users within 1000 feet of any college campus or at college events and sending pre-approved card solicitations to individuals under 21.

The timeline of the CARD Act of 2009 is as follows[5]: 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.** Our data come from the New York Federal Reserve Bank Consumer Credit Panel/Equifax (CCP). The main advantage of our dataset is that, unlike household surveys such as the Survey of Consumer Finances (SCF), the sample size is large enough to have many individuals of each age in each sample year. Our dataset is also nationally representative. 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 onward. The CCP is a 5 percent random sample of all U.S. consumers with a credit record and a Social Security

[5]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).

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 "thin" credit records. The individuals in the primary sample, along with those who reside at the same address, constitute the full sample.[6]

We focus on the full sample because many of the young individuals we are interested in have thin credit records and are thus likely to be present in the full sample but not in the primary sample. Individuals with thin credit records might include those who have merely applied for a cell phone, an apartment, or car insurance. As such, our sample includes many young individuals with no experience in formal credit markets. Our main results hold in the primary sample as well, however.

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 so 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). 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. Individuals aged 18 never comprise more than 6 percent of the total number of

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

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.

In section 3, we employ 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.

In different estimations, we use different samples of the CCP and impose restrictions to prevent sample selection bias from contaminating our results. We describe the restrictions in the text. In an appendix, we also provide a table summarizing the sample restrictions for each table and figure in the paper.

3. The Effect of the Act on Credit Card Availability

Table 2 shows the share of individuals in the CCP that have a credit card by age and year. The share of individuals age 18-20 who have a credit card rises modestly between 2005 and 2008 and then sharply declines in 2009 and 2010. To identify the effects of the Act, we compare the behavior of the individuals affected by Title 3 (i.e., individuals turning 20 and 21 years old the year the law came into full effect, 2010) with the behavior of individuals of a very similar age but who were not affected (i.e., individuals aged 22 to 24 when the law came into full 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, 23, or 24 at some point in 2010, i.e., those born in 1986 to 1988. The inclusion of the latter group enables us to control for changes in macroeconomic factors

and other aspects of the consumer credit business affected by the Act that occurred between 2008 and 2010.

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. 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 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 potential anticipation of the Act. This restriction prevents us from capturing changes in the sample as a result of the Act. The second restriction ensures that the individuals in the control group and the ones in the treated group first enter the data when they are at most 18 years old. We impose this restriction because individuals who first enter the credit bureau data later in life may systematically differ from individuals who enter the data at age 18.

3.1. **Identification of the Effect of the CARD Act.** To identify the effect of Title 3, we compare credit available via credit cards before and after the Act took effect. 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 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.[7] Although full compliance with the Act was required in 2010Q1, we find evidence of anticipatory effects of the Act in the

[7]A 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.

period immediately before full compliance was required but after the bill had passed. Our analysis of the anticipatory effects is available in the appendix. We thus study changes in the indicators of the availability of credit via credit cards from 2008Q4 (the period before Title 3 can be anticipated) to 2010Q4 (the first period in our sample after full compliance with the act was required). Consistent with our earlier analysis, we use data from Q4 so that we can identify the individual's age from the birth year in our data. Our focus on data from only these two end quarters allows us to avoid the inference problems that arise from serially correlated disturbance terms in difference-in-difference estimation (see Bertrand, Duflo, and Mullainathan [2004]).

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

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

where $I^i_{i,t}$ is one of the three indicators of the credit available via credit cards. In particular, $I^i_{i,t}$ 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.

The sample for estimating equation (1) 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. Limiting the sample to individuals born in 1986 or later allows us to identify both the treatment effect and the age fixed effects; we cannot identify both the treatment effect and age fixed effects with only individuals born in 1987 – 1990 or 1988-1990. The sample for estimating equation (1) 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. Thus, observing the individuals from the five birth years in two time periods allows us to identify nine coefficients in equation (1): the 2010 year effects, six age coefficients, and two age-year interaction effects.

The coefficients on the interaction terms, α_{20}^{SHORT} and α_{21}^{SHORT}, capture the treatment effect, i.e., 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}^{SHORT} to be smaller than the magnitude of α_{20}^{SHORT} because an average individual who is 21 in 2010Q4 would experience only limited effects of the Act. We do not have treatment effects for individuals aged 18 or 19 because we include individuals age 18 and 19 only in 2008 not in 2010. This is because 18- and 19-year-olds in 2010 would be only 16 or 17 years old in 2008 and thus not in our sample.

3.2. **Results.** Table 3 presents the results from estimating (1). 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 consumers in the recovery from the financial crisis 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.[8]

We use individuals age 21 and age 22 to control for changes in the macroeconomic environment between 2008 and 2010. That is, 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, our control for changes in the macroeconomic environment is unlikely to be heavily biased due to differential employment trends between the treated and the untreated ages.

4. The Selection into Early Credit Card Use

Before the passage of the CARD Act, individuals could choose whether to enter the credit card market before or after the age of 21. We now turn to the question of what types of

[8]CFPB [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.

individuals get a credit card early in the absence of statutory restrictions. 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 motivates restricting early entry into the credit card market. We use data from the period around the passage of the CARD Act to estimate the behavioral characteristics of early and late entry types.

4.1. **What Types of Borrowers Are Early Credit Card Users?**

4.1.1. *Credit Card Default.* Having established that Title 3 of the CARD Act substantially reduced the availability of credit cards to individuals under the age of 21, we now use the Act to identify differences between the types of individuals who, in the absence of restrictions, get a credit card before age 21 and those who wait until later in life to enter the credit card market. We use default as a proxy for financial problems related to credit card use because it is the clearest indicator of such problems in the data.[9]

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

[9]Financial 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 Stroebel [forthcoming]) 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. Telyukova [2013], for example, proposes a model where individuals optimally carry balances on their credit cards for liquidity reasons. It is likely that the same behavioral biases (e.g., myopia) that cause default also cause suboptimal borrowing. Instead of default, Jiang and Dunn [2013] study credit card debt accumulation by young borrowers using survey data and find that young borrowers accumulate debt faster than older borrowers. However, their 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. More assumptions are required to infer that credit card debt accumulation is suboptimal.

$$I_{i,t} = \Phi(\alpha_0 + \theta \mathbf{1}_{\{age_{i,t}=22\}} \mathbf{1}_{\{YEAR_{i,t}=2012\}} + \beta^{25} \mathbf{1}_{\{age_{i,t}=25\}} + \beta^{2012} \mathbf{1}_{\{YEAR_{i,t}=2012\}} + \gamma' \mathbf{X}_{i,t}), \quad (2)$$

where $I_{i,t} \equiv SERIOUS_{i,t}$ such that the variable equals 1 if the individual has a serious default associated with a credit card, and 0 otherwise. In our benchmark specification, we take $\Phi() = 1 * ()$, i.e., we simply estimate an OLS regression; the results are very similar when we estimate probits and are in an appendix available from the authors.[10]

The 22-year-old individuals in 2009 who first got a credit card at age 21 are late entry types. They either 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. As such, the 22-year-old individuals in 2012 include some early entry types. 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. To ensure that we accurately identify the age of entry into the credit card market, in the estimation of (2) we exclude individuals who enter the CCP panel already having a credit card.[11]

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

[11] Although it might be desirable to control for whether the individual is a college student, we know only whether the individual has a student loan, not whether he or she is a student. Only 35% of undergraduate students have a student loan (Avery and Turner [2012]) such that the individuals that have no flag for a student loan are a very heterogeneous group: those fortunate enough to be able to attend college without taking on a student loan and non-students. A student loan indicator is thus not a good proxy for whether the individual is a student.

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. Our benchmark specification includes all 25-year-olds, regardless of entry age, but the results are very similar when we restrict the sample of 25-year-olds to only those who get their first credit card at age 21.

The interpretation of θ is thus one of selection. If $\theta > 0$, early entry types are worse credit risks, as revealed by their default behavior, than late entry types. If θ is statistically indistinguishable from 0, there is no difference in the propensities to default of early and late entry types. If $\theta < 0$, early entry types are better credit risks than late entry types.

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. Other research that finds that greater financial literacy often encourages greater participation in financial markets, including Calvet, Campbell, and Sodini [2007, 2009], van Rooij, Lusardi, and Alessie [2011], and Babenko and Sen [forthcoming]. Given this research, it seems likely that individuals with more financial literacy get their first credit card at a younger age. In contrast, the sociology literature (e.g., Manning [2001], Roberts and Jones [2001], Compton and Pfau [2004], and Borden, Lee, Serido, and Collins [2008]) portrays early entry into the credit card market as a response to

aggressive advertising, wherein individuals who self-select into early credit card use may be the ones most susceptible to marketing and thus less financially sophisticated.

The results in column 3 of Table 4 indicate that early entry types are better credit risks, i.e., less likely to experience a serious default associated with a credit card, than late entrant types. The selection effect for serious default is statistically significant at the 1 percent level. The sample of 22-year-olds in equation (2) 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 4.

Columns 1 and 2 of Table 4 also show the results for estimating the selection effect for 30- and 60-day delinquency on credit cards. As can be seen from the table, early entry types are slightly more likely to experience minor delinquencies. The magnitude of the difference in minor delinquencies between early and late entrant types 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 (see appendix Table C.3). Thus, the selection effect for minor delinquencies is less robust than that for serious default.

4.1.2. *Mortgage Credit.* We also test whether early entry types are disproportionately people who prefer or are able to get a mortgage early in life. 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 individuals with cosigned cards in 1999 – 2012, we estimate

$$\begin{aligned} MTG_{i,t} &= \Phi(\alpha_0 + \theta \mathbf{1}_{\{age_{i,t}=22\}} \mathbf{1}_{\{YEAR_{i,t}=2012\}} \\ &\quad + \beta^{25} \mathbf{1}_{\{age_{i,t}=25\}} + \beta^{2012} \mathbf{1}_{\{YEAR_{i,t}=2012\}} + \gamma' \mathbf{X}_{i,t}). \end{aligned} \tag{3}$$

In our benchmark specification, we take $\Phi() = 1*()$ such that we estimate an OLS regression; the results are very similar when we estimate probits and are in an appendix.

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. Our benchmark specification includes all 25-year-olds, regardless of entry age, but the results are very similar when we restrict the sample of 25-year-olds to only those who get their first credit card at age 21. If $\theta > 0$, individuals who first enter the credit card market at age 21 after the Act have unobservable characteristics that make them more likely to get a mortgage than those who, in the absence of the Act, first enter the credit card market at age 21.

Column 4 of Table 4 reveals that, indeed, the types of individuals who wait until later to get a credit card, rather than those types 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 may be homeownership.

4.1.3. *Discussion of Identification of Selection Effect.* 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 control age (25) is quite close to

age 22, 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. Hence, we 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.[12]

Although we find that Title 3 had its intended effect of reducing credit card usage by those under the age of 21, it is unlikely that the Act completely blocked the flow of new credit cards to individuals under the age of 21. Thus, one might be concerned about selection within selection. That is, the set of individuals under 21 who were blocked by the CARD Act are a particular subset of individuals that would have entered before age 21 in the absence of the Act. The CARD Act only allows individuals under 21 who can provide proof of a means of repaying the debt to get credit cards. The types of borrowers who get a credit card after the Act are more financially secure borrower types than those the CARD Act prevents getting a CARD. Thus, it is unlikely that those blocked by the Act are systematically better credit risks than early entrants that were not blocked by the Act. As such, any selection within selection works against our finding that earlier entrant types are better credit risks.

4.2. **Parental Characteristics of Early Entrants.** The previous subsection established that the types of individuals that get a credit card early default less and are more likely to get a mortgage early in life. The types are identified based on behavior rather than observable

[12]Nevertheless, 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 when we use 2009 as the base year and are available in an appendix.

characteristics. In this subsection, we use data from before the CARD Act to provide insight into how early entrants differ from late entrants based on observable characteristics. In particular, we link children at age 18 to their parents and follow them to age 21. We are able to do so because the CCP sample is designed such that it includes the records of all individuals with credit records who live at the same address.

For this exercise, we draw a sample from the CCP of 18-year-olds whom we can match to parental residence for the years 1999-2005. We define a 'parent' as an individual 33 years of age or older and drop individuals who have more than two 'parents' to reduce the risk of linking a child to a non-parent. Our sample of 18-year-olds who we match with parents includes 30% of 18-year-olds in the CCP. We define the year in which the child is 18 as time t_0. For each of these 18-year-olds, we construct the following variables:

- an indicator variable for if the child has a non-cosigned credit card by age 21 ($child\_hascardby21$),
- average income in the parental zip code at time t_0 (par_zipinc),
- an indicator variable for whether the parent (either parent if there are two parents) has a serious default on any account on his or her credit record at time t_0 (par_sdef),
- the ratio of the parent's credit used relative to credit available (maximum if there are two parents) (par_const) at time t_0, and
- the parent's credit score (average score if there are two parents) at time t_0 (par_score).

To understand how representative our parents are, Table 5 provides some summary statistics about the parents in our sample and adults aged 33+ in the 1998-2010 waves of the Survey of Consumer Finances (SCF). On most dimensions, our parents look fairly similar to the US population of adults aged 33+. In our sample, 60% of the adults have a mortgage

while, in the SCF, 65% of adults have a mortgage. 8% of our parents have a bankruptcy flag on their credit record while 8.3% parents in the SCF report having had a bankruptcy within the last 10 years (the longest time a bankruptcy can be retained on a credit record). The average age of our parents is 48 while the average age of the parents in the SCF is 45. The average number of individuals 18+ in the household is 2.85 in the CCP while it is 2.98 in the SCF. The largest difference between the parents we match and the adult population is that we have a significantly smaller fraction of singles than in the national data: only 16% of our parents are single while 27% of adults in the SCF are single.

We then run the following regressions by OLS and probit:

(1) $child\_hascardby21$ on par_sdef, par_const, year fixed effects, and fixed effects for the state of residence at t_0,

(2) $child\_hascardby21$ on par_score, year fixed effects, and fixed effects for the state of residence at t_0,

(3) $child\_hascardby21$ on par_zipinc, year fixed effects, and fixed effects for the state of residence at t_0,

(4) $child\_hascardby21$ on par_sdef, par_const, par_zipinc, year fixed effects, and fixed effects for the state of residence at t_0, and

(5) $child\_hascardby21$ on par_score, par_zipinc, year fixed effects, and fixed effects for the state of residence at t_0.

We estimate separate specifications in which we control for the parent's risk score and in which we control for the major components that comprise the parent's risk score to understand the economic drivers of early entry.

Table 6 presents the OLS results; the probit results are qualitatively very similar. The parents of individuals who get a credit card by age 21 are 0.5 percentage points less likely to have a serious default and are less credit constrained. The parents of early entrants have higher credit scores: a 100 point increase in the parental credit score is associated with a three percentage point higher probability of early entry. Furthermore, parents of early entrants live in higher income neighborhoods. The relationship between parental default and early entry is significant at the 5% level while the coefficients on parental credit constraint, parental credit score, and neighborhood income are significant at the 1% level.

Comparison of the 18-year-olds whom we are able to match to their parents with those whom we are unable to match further supports the idea that one reason early entrants are better borrowers relates to parental influences. The unmatched 18-year-olds consist mainly of individuals that do not live with their parents at age 18.[13] Compared to the matched 18-year-olds, the unmatched 18-year-olds are 28 percentage points less likely to have a non-cosigned credit card by age 21. Conditional on having a credit card, the unmatched 18-year-olds have slightly higher rates of delinquency and serious default at age 21 than the matched 18-year-olds. Finally, the matched 18-year-olds have credit scores 11 points higher on average than the unmatched 18-year-olds.

5. Default Patterns by Age

Although we have found that the types of young individuals who get a credit card early are less prone to default, one proxy for financial problems related to credit card use, it is possible that the life-cycle profile of default is such that young borrowers default at much higher rates.

[13]Other unmatched 18-year-olds are individuals that we are unable to follow for three years and a small number of individuals that have at least one cosigned card.

In this section, we therefore document the empirical relationship between borrower age and credit card default.

5.1. **Incidence of Default.** We estimate default behavior by age for all individuals with at least one credit card.[14] We exclude the small number of individuals who have a cosigned card from the sample. As columns 2 and 5 of Table 3 show, cosigned cards are rare among young people, particularly prior to the CARD Act. Excluding youth with cosigned cards allows us to isolate individual card holders' behavior from the direct influence of parental or guardian supervision.[15]

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 (i.e., the individuals are 21 years old in 2010). To capture both an expansionary and a recessionary period before the CARD Act, we study the period from 2005 to 2008. We estimate

$$DEF_{i,t} = \Phi(\alpha_0 + \sum_{k=1}^{5} \beta_k^{AGE} \mathbf{1}_{\{age_{i,t}=18+k\}} + \sum_{k=1}^{3} \beta_k^{YEAR} \mathbf{1}_{\{Year_{i,t}=2005+k\}} + \gamma' \mathbf{X}_{i,t}), \qquad (4)$$

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 either the equation itself (OLS) or the standard normal cumulative distribution function. We consider three different types

[14] We 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.

[15] All individuals who have a cosigned card at any date within 1999 – 2008 are excluded from the estimation. This 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.

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 flag for a 30-day or 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.

Columns 1 - 3 of Table 7 presents the OLS results for 18-to-23-year-old individuals; the probit results are nearly identical and are available in an appendix. 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. The results in column 3 of Table 7 indicate that the risk of serious default increases with age. The estimates imply that a 23-year-old is 15.4 percentage points more likely than an 18-year-old and 8 percentage points more likely than a 19-year-old to have a serious default.

The relationship between minor delinquency and age appears to be inverse U-shaped. In particular, the results in columns 1 and 2 of Table 7 show that 18-year-old individuals are less likely than older individuals to experience a minor delinquency event on a credit card. Starting from age 19, the probability of experiencing a minor delinquency event decreases with age. However, the magnitude of the difference in minor delinquencies between individuals one year apart never exceeds one percentage point.

We consider an alternative specification of equation (4) 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 credit card in the last quarter of the year in which we observe him mechanically has not had

an opportunity to fall 90 days behind on his payments. More generally, it might take time for individuals to accumulate enough credit card debt to get into financial trouble.

Columns 4-6 of Table 7 presents the results after controlling for how long the individual has had a credit card.[16] This reduces the magnitude of the difference across age groups in the likelihood of serious default. More experience increases the likelihood of a serious default. After controlling for experience, 23-year-old individuals are only 9 (rather than 16) percentage points more likely than an 18-year-old and only 3 percentage points more likely than a 19-year-old to have a serious default.

In contrast to the effect of experience on serious default, more experience reduces the risk of minor delinquency due to learning. Learning might include techniques such 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.

[16]To ensure that we accurately identify the age of entry into the credit card market, in the estimation of (4) we exclude individuals who enter the CCP panel already having a credit card. This restriction applies to all columns of Table 7; however, the results are qualitatively similar when we do not impose this restriction.

To obtain a complete picture of the correlation between age and credit card default, we estimate a specification similar to the one in equation (4) for individuals of all ages:

$$
\begin{aligned}
DEF_{i,t} = \Phi(\alpha_0 &+ \beta^{21-24}\mathbf{1}_{\{age_{i,t}>20\&age_{i,t}<25\}} + \beta^{25-29}\mathbf{1}_{\{age_{i,t}>24\&age_{i,t}<30\}} \\
&+ \beta^{30-34}\mathbf{1}_{\{age_{i,t}>29\&age_{i,t}<35\}} + \beta^{35-39}\mathbf{1}_{\{age_{i,t}>34\&age_{i,t}<40\}} + \beta^{40-44}\mathbf{1}_{\{age_{i,t}>39\&age_{i,t}<45\}} \\
&+ \beta^{45-49}\mathbf{1}_{\{age_{i,t}>44\&age_{i,t}<50\}} + \beta^{50-54}\mathbf{1}_{\{age_{i,t}>49\&age_{i,t}<55\}} + \beta^{55-59}\mathbf{1}_{\{age_{i,t}>54\&age_{i,t}<60\}} \\
&+ \beta^{60-64}\mathbf{1}_{\{age_{i,t}>59\&age_{i,t}<65\}} + \beta^{65+}\mathbf{1}_{\{age_{i,t}>64\}} \\
&+ \sum_{k=1}^{3} \beta_k^{YEAR}\mathbf{1}_{\{Year_{i,t}=2005+k\}} + \gamma'\mathbf{X}_{i,t}). \qquad (5)
\end{aligned}
$$

The sample for estimating equation (5) is not directly comparable to that for equation (4) because, when estimating (4), we restrict the sample to individuals for whom we can identify entry into the credit card market using data from earlier years of the CCP sample. Because the CCP sample begins in 1999, we cannot identify when, for example, a 45-year-old first got a credit card.

Figure 1 presents the age category coefficients from estimating equation (5) using OLS; the coefficients on year dummies and probit results are in the appendix. The figure 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 have a serious default than an 18- to 20-year-old and 12 percentage points more likely than an individual 65 or older.

Table 8 shows the results from estimating equation (5) separately for each of the finer categories of serious default (i.e., 90-day delinquency, 120-day delinquency, severe derogatory incident, or bankruptcy) on age and year dummies; probit regressions are available in an appendix. While bankruptcies account for a small fraction of serious defaults, severe derogatory incidents account for the majority of serious defaults (see the last line of Table 8). Credit card accounts usually enter that status after four months of delinquency and banks are required to move accounts to that status after at most six months of delinquency. A severe derogatory incident usually indicates that the borrower cannot or will not come up with the money to pay off the debt. 18- to 20-year-olds have more 90- and 120-day delinquencies, although the magnitudes of the differences across ages are small, particularly when comparing 18- to 20-year-olds with 21- to 24-year-olds. Thus, as Table 8 shows, the main reason for the hump-shaped age pattern of serious defaults is that young and old individuals have fewer severe derogatory incidents and bankruptcies.

5.2. **Entry into Serious Default.** Given our finding that serious default is associated with more experience with credit cards, and that the key driver of the lower serious default rate of young individuals is that they have fewer derogatory incidents, it is likely that the longer credit histories of middle-aged individuals explain some of the pattern. We cannot directly test this hypothesis because the CCP data start in 1999 such that we do not have complete credit histories for most older individuals in the sample. Instead, we exploit the panel dimension of our data to examine the flow of individuals into serious default. Accounts can linger in collections (a subset of severe derogatory incidents) or bankruptcy status for years. To consider whether the age pattern is explained by the persistence of derogatory incidents or bankruptcy, we estimate equation (5) using *new* serious default as the dependent variable.

The sample is very similar to the one used in Table 1 since the only additional restriction is that we have at least one year of credit history for each individual (see appendix Tables C.6 and C.8 for a comparison of sample sizes).

To identify new serious default, we look at the individual's payment history over the last year. In the CCP, 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.[17] We treat all 90-day delinquencies, 120-day delinquencies, and accounts in collections as new serious defaults. As such, new serious default captures the flow into serious default rather than a stock measure of serious default.

Figure 2 presents the coefficients on the age categories using new serious default as the dependent variable in equation (5). As in Figure 1, 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 only new serious defaults.

5.3. **Discussion.** To understand why young individuals have more delinquencies but fewer serious defaults than other age groups, it is helpful to consider their credit limits. As Figure 3 shows, young people have much lower credit limits than older individuals: the median

[17]This definition may underestimate new serious defaults insofar as an individual could have one account removed from severe 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.

credit limit for an 18- to 20-year old is only $1000.[18] It is unclear whether the lower credit limits are due to lenders rationing credit to them, or a decision on the part of borrowers to apply for less credit. However, a delinquency on a lower balance is likely easier to repay.

The increase in serious default with age may also 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 have shown, earlier entrants into the credit card market are positively selected in the sense of being lower default risk types.

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 since 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. One possible explanation is cohort effects. For example, 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.

However, as Figure 4 shows, we find the same broad pattern for young borrowers when we estimate the relationship between age and default using data from 2001-2004 rather than 2005-2008. In the 2001-2004 period, young people do not even have higher minor delinquencies. If cohort effects explain the low default rates for young individuals, they are therefore very low-frequency cohort effects. Dettling and Hsu [2014] also find that the balance sheets of young adults today do not appear substantively worse than those of young

[18]The low credit limits of young individuals are similar to the theoretical predictions of Livshits, MacGee, and Tertilt [2007] under fresh start bankruptcy but, in the version of their model without fresh start bankruptcy, credit limits are quite high for young borrowers and decline sharply for individuals over the age of 40 in contrast to the data.

borrowers of their parents' generations indicating that cohort effects are unlikely to account for much of the difference in default between young and middle-aged borrowers that we document.

The economic differences in the delinquency propensities from one age category to the next are 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. Furthermore, in section 6, we show that earlier entry into the credit card market is not associated with more serious default later in life despite these higher delinquencies while young. As such, we do not view the higher delinquency rate of youth as alarming.

The inverse U-shaped pattern between age and serious default suggests that financial literacy is not the main driver of serious default since the probability of serious default increases up until middle age, 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 between age and credit card delinquency for the population aged 20 and above using data from a single lender from 2002–2004. They do not distinguish between serious default and minor delinquency, though, so our results are not directly comparable.[19]

Our finding that people in their 20s default less than those in their 30s is also consistent with the empirical results of Avery, Brevoort, and Canner [2009] and Livshits, MacGee, and Tertilt [2007]. Avery, Brevoort, and Canner's sampling procedure appears to be more

[19]Interestingly, Agarwal, Driscoll, Gabaix, and Laibson [2009] also find an inverse U-shape in the relationship between age and default on other credit products such as auto loans.

similar to our estimation of entry into serious default in Figure 2 than our purely cross-sectional results in Figure 1. However, Avery, Brevoort, and Canner [2009] do not distinguish between products; therefore, our results are not closely comparable to theirs. It is likely that there are important differences in the life cycle pattern of default across products. For example, young individuals are more likely to choose high leverage mortgages to smooth consumption (Chambers, Garriga, and Schlagenhauf [2009]) implying that they should have higher mortgage default rates.

Livshits, MacGee, and Tertilt [2007] document the same inverse U-shaped pattern in bankruptcy filings as we find for credit card default. Livshits, MacGee, and Tertilt's theoretical model reproduces the decline in default in old age but has difficulty reproducing the gradual rise in default in individuals' twenties.

6. Early Entry and Credit Outcomes Later in Life

In this section, we study outcomes by entry age to examine the effect of early entry into the credit card market on outcomes 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 is a key determinant of serious default because the longer an individual's credit card history is, the more time he or she has had to accumulate debt.

6.1. **Is Early Entry Associated with More Default Later in Life?** We estimate

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

where $QuarterExp_{i,t}$ is the number of quarters of experience the individual has in the credit card market. The estimation of the effect of early entry into the credit card market on default thus keeps the length of the individual's 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 entry before age 24 (the omitted entry age category) is associated with greater default risk.

We evaluate the effect of entry on outcomes using data from 2005-2008 to avoid the confounding influence of the Act. We include individuals aged 21 – 25 who entered the credit card market between the ages of 18 and 24. Age 25 is the highest age we include because, given that our data to identify entry start in 1999, we can observe individuals who enter at age 18 that are now 25 in both the expansionary year of 2006 and the contractionary year of 2008. 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 results from estimating (6) are shown in columns 1 to 3 of Table 9. The results 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.

To allow for the possibility that experience in the credit market affects default in a fashion not captured by our quadratic functional form, we also estimate

$$\begin{aligned} DEF_{i,t} &= \Phi(\alpha_0 + \sum_{k=1}^{6} \beta_k^{entry} \mathbf{1}_{\{entryage_{i,t}=17+k\}} \\ &\quad + \sum_{k=1}^{7} \beta_k^{\exp} \mathbf{1}_{\{YearsExp_{i,t}=k\}} \\ &\quad + \sum_{k=1}^{3} \beta_k^{YEAR} \mathbf{1}_{\{Year_{i,t}=2005+k\}} + \gamma' \mathbf{X}_{i,t}). \end{aligned} \tag{7}$$

The results, available in an appendix, are similar to the results from estimating 6.

6.2. **Early Entry and Credit Scores Later in Life.** Columns 4 and 5 of Table 9 present the coefficients from estimating a regression of the individual's credit score on the age at which the individual first gets a credit card. Without controlling for experience (column 4), the credit score is strictly decreasing in the age at which the individual first gets a credit card indicating that individuals who enter the credit card market earlier in life increase, rather than reduce, their access to credit later in life. In column 5, we control for the length of the individual's credit card history. There is no clear pattern between entry age and credit scores after we control for the amount of experience the individual has in credit markets. The results indicate that early entry does not put individuals at greater risk of ruining their access to credit.

6.3. **Discussion.** These results show that either there is no adverse effect of entering the credit card market earlier or that the selection effect dominates any adverse effect of early

entry. Our results do not causally identify the effect of delaying access to credit cards. Once several more years of data from after the CARD Act become available, such that 18-year-olds in 2010, 18-year-olds in 2011, 18-year-olds in 2012, etc., can be followed to an age at which they can be compared to individuals of the same age that were completely unaffected by the Act (individuals aged 21 or over in 2010), researchers may be able to identify the causal effects of the CARD Act. However, if any evidence of a positive effect from delaying access to credit cards can later be identified, such evidence must 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, are more likely to get a mortgage earlier in life, and have higher credit scores later in life.

The association that we document between the amount of experience an individual has with credit cards and credit scores does, however, highlight an unintended consequence of the CARD Act. Because it delays credit card access, affected individuals will face higher costs of credit later in life. One additional quarter of experience raises an individual's credit score by 2.4 points. As such, a delay of 12 quarters in getting a credit card results in a credit score approximately 20 points lower. Data from bankrate.com indicate that the interest rate for a 30 year fixed rate mortgage with a 20% down payment falls by roughly 13 basis points for each 20 point increase in an individual's credit score. For a representative mortgage amount of $165,000, a credit score 20 points higher results in savings of approximately $150 per year or more than $1000 over the number of years most individuals typically stay in the same mortgage.[20]

[20]See Campbell [2006] regarding households refinancing their mortgages too infrequently.

7. 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 examine the effectiveness of the CARD Act at restricting access to credit to young borrowers and analyze the credit market behavior of young borrowers along three different dimensions. We find 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. As such, the restriction on individuals under the age of 21 is not innocuous.

We find that the types of borrowers who get a credit card before 21 are lower risk borrowers than the types of people who get a credit card later and they are the types of individuals more likely to get a mortgage early in life. Individuals who get a credit card by age 21 also come from higher income neighborhoods, have parents who have a lower likelihood of serious default, and have parents who are less credit constrained. Second, individuals under the age of 21 are much less likely to experience a serious default than older individuals. In the 2005-2008 period, however, individuals under 21 are more likely to experience delinquency than individuals of some other ages. Third, despite their higher delinquency rates in some periods, we find no evidence that entry into the credit card market before age 21 leads to worse financial outcomes later in individuals' twenties. More experience with credit cards is associated with higher credit scores for young people. As such, blocking access to credit card markets raises the cost of credit for young people in the future.

Our findings provide facts to ground models of consumer behavior over the life cycle that can help to explain, for example, bankruptcy. We hope our results will also prompt further

research on the financial lives of young adults. At present, however, there is little evidence that young borrowers are bad borrowers.

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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 for that year.

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

TABLE 2. Share of Individuals in the Sample with a Credit Card
Notes: Each entry in the table presents the share of individuals in our sample who have a credit card (excluding cosigned cards) in the fourth quarter of the indicated year.

	2005	2006	2007	2008	2009	2010	2011	2012
18	0.29	0.33	0.35	0.30	0.21	0.13	0.15	0.17
19	0.41	0.43	0.47	0.45	0.34	0.25	0.23	0.25
20	0.47	0.48	0.52	0.53	0.46	0.37	0.32	0.32
21	0.46	0.52	0.54	0.56	0.51	0.46	0.41	0.39
22	0.53	0.49	0.56	0.57	0.53	0.51	0.48	0.45
23	0.55	0.55	0.52	0.58	0.54	0.52	0.51	0.51
24	0.56	0.56	0.58	0.52	0.55	0.54	0.53	0.53
25	0.55	0.56	0.58	0.59	0.50	0.54	0.54	0.54

TABLE 3. 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.

	Probit		OLS		
	HASCARD	COSIGNCARD	HASCARD	NCARDS	COSIGNCARD
	(1)	(2)	(3)	(4)	(5)
d_age19	0.502***	-0.141***	0.192***	0.298***	-0.0205***
	(0.009)	(0.027)	(0.003)	(0.012)	(0.005)
d_age20	0.690***	-0.124***	0.265***	0.537***	-0.0185***
	(0.021)	(0.032)	(0.008)	(0.022)	(0.006)
d_age21	0.747***	0.0234	0.286***	0.701***	0.00293
	(0.030)	(0.034)	(0.012)	(0.030)	(0.005)
d_age22	0.801***	-0.00624	0.306***	0.869***	-0.00204
	(0.038)	(0.043)	(0.015)	(0.033)	(0.007)
d_age23	0.853***	0.0451	0.326***	0.994***	0.00505
	(0.046)	(0.050)	(0.018)	(0.037)	(0.007)
d_age24	0.898***	0.0643	0.343***	1.116***	0.00790
	(0.054)	(0.053)	(0.020)	(0.038)	(0.008)
d_year2010	-0.160***	-0.0887***	-0.0596***	-0.309***	-0.0125***
	(0.006)	(0.019)	(0.003)	(0.013)	(0.002)
d_year2010_age20	-0.202***	0.194***	-0.0807***	-0.0386***	0.0279***
	(0.013)	(0.019)	(0.005)	(0.008)	(0.003)
d_year2010_age21	-0.0614***	-0.0283**	-0.0248***	-0.00788	-0.00477**
	(0.009)	(0.014)	(0.004)	(0.008)	(0.002)
mean (depvar)	0.552	0.0796	0.552	1.641	0.0796
N	1,395,004	769,804	1,395,004	769,793	769,804

TABLE 4. OLS Estimation of 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). MTG takes a value of 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 2009 and 2012. 7) Only individuals aged 22 that got their first credit card at age 21 are included. All 25 year olds are included; the results are very similar with only 25 year olds that got their first credit card at age 21 are included. 8) $\theta < 0$ in columns 1-3 indicates that young entrant types are less likely to have a delinquency or serious default than older entrant types. 9) $\theta < 0$ in column 4 indicates that young entrant types are less likely to have a mortgage than older entrant types.

	30DPD	60DPD	SERIOUS	MTG
	(1)	(2)	(3)	(4)
θ	0.00793***	0.00552***	-0.0195***	0.0244***
	(0.001)	(0.001)	(0.005)	(0.002)
d_age25	0.00242**	0.00205**	0.0196***	0.0799***
	(0.001)	(0.001)	(0.004)	(0.006)
d_year2012	-0.00392***	-0.00519***	-0.0279***	-0.0290***
	(0.001)	(0.001)	(0.004)	(0.003)
mean (depvar)	0.0221	0.0137	0.154	0.0754
N	293,256	293,256	293,256	293,256

TABLE 5. Matched Parents vs. US Population Aged 33+
Notes: 1) SCF statistics are weighted by population weights given in SCF. 2) Matched parents are those parents we match to 18-year-old children to estimate the relationship between parental characteristics and early entrants in table 6. 3) Data from SCF is for 1998-2010 waves.

	Matched Parents	SCF Adults 33+
Has a Mortgage	60%	65%
Has a Bankruptcy in Last 10 Years	8.0%	8.3%
Avg. Age	47.8	45.0
Avg. No. of Individuals 18+ in Household	2.85	2.98
Not Married	16%	27%

TABLE 6. Parental Characteristics of Early Entrants

Notes: 1) The dependent variable takes a value of 1 if the individual has a non-cosigned credit card by age 21. 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 independent variables are defined as follows: par_sdef=1 if parent has account in serious default status, par_const is ratio of credit used to credit available, par_score is parent's risk score (credit score similar to a FICO), par_zipinc is the average adjusted gross income of the zip code that the child and parent live in when the child is 18. 5) All parental variables are measured at the time the child is 18. 6) Includes children aged 18 in 1999-2005. 7) Estimation is via OLS; probit results are very similar qualitatively.

	(1)	(2)	(3)	(4)	(5)
par_sdef	-0.0046**			-0.0037**	
	(0.0019)			(0.0019)	
par_const	-0.033***			-0.033***	
	(0.002)			(0.002)	
par_score		0.029***			0.027***
(x100)		(0.001)			(0.001)
par_zipinc			0.046***	0.013***	0.020***
(x100,000)			(0.002)	(0.002)	(0.002)
mean (depvar)	0.741	0.724	0.721	0.741	0.724
N	431,334	491,828	500,441	431,326	491,812

TABLE 7. OLS Regressions of 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. 7) *qtrs_exp* is the number of quarters the individual has had a credit card for.

	30DPD	60DPD	SERIOUS	30DPD	60DPD	SERIOUS
	(1)	(2)	(3)	(4)	(5)	(6)
d_age19	0.00824***	0.00794***	0.0694***	0.00841***	0.00811***	0.0592***
	(0.000877)	(0.000655)	(0.00331)	(0.000871)	(0.000647)	(0.00291)
d_age20	0.00701***	0.00663***	0.110***	0.00739***	0.00702***	0.0867***
	(0.00104)	(0.000885)	(0.00509)	(0.00102)	(0.000857)	(0.00429)
d_age21	0.00669***	0.00610***	0.128***	0.00730***	0.00671***	0.0914***
	(0.00128)	(0.000983)	(0.00602)	(0.00121)	(0.000908)	(0.00491)
d_age22	0.00583***	0.00523***	0.139***	0.00668***	0.00608***	0.0877***
	(0.00118)	(0.00105)	(0.00659)	(0.00112)	(0.000938)	(0.00517)
d_age23	0.00511***	0.00433***	0.154***	0.00624***	0.00547***	0.0855***
	(0.00115)	(0.00107)	(0.00701)	(0.00105)	(0.000911)	(0.00508)
d_year2006	0.000398	0.00153***	0.00794***	0.000367	0.00150***	0.00981***
	(0.000297)	(0.000328)	(0.000973)	(0.000294)	(0.000326)	(0.000897)
d_year2007	0.00467***	0.00533***	0.0244***	0.00464***	0.00530***	0.0267***
	(0.000419)	(0.000514)	(0.00135)	(0.000414)	(0.000509)	(0.00138)
d_year2008	-0.00164***	0.000716	0.0256***	-0.00162***	0.000731	0.0247***
	(0.000453)	(0.000574)	(0.00222)	(0.000453)	(0.000577)	(0.00206)
qtrs_exp				-0.000121***	-0.000121***	0.00728***
				(0.0000399)	(0.0000356)	(0.000376)
mean (depvar)	0.0315	0.0215	0.153	0.0315	0.0215	0.153
N	2,356,997	2,356,997	2,356,997	2,356,997	2,356,997	2,356,997

TABLE 8. OLS Regressions of Subcategories of Serious Default by Age
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) 90DPD takes the value 1 if the individual is 90 days delinquent on a credit card. 120DPD take the value 1 if the individual is 120 days delinquent on a credit card or the account is in collections; the raw data contain a single indicator that combines these two statuses. DEROGATORY takes the value 1 if the individual has a card in derogatory incident status (includes chargeoffs). BANKRUPTCY takes the value 1 if the individual has a card in bankruptcy status. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	90DPD	120DPD	DEROGATORY	BANKRUPTCY
	(1)	(2)	(3)	(4)
d_age21_24	-0.00177***	-0.00281***	0.0681***	0.00193***
	(0.000510)	(0.000883)	(0.00370)	(0.000198)
d_age25_29	-0.00227***	-0.00571***	0.0906***	0.00760***
	(0.000423)	(0.000778)	(0.00483)	(0.000613)
d_age30_34	-0.000966***	-0.00454***	0.0948***	0.0125***
	(0.000319)	(0.000657)	(0.00474)	(0.000985)
d_age35_39	-0.000906***	-0.00496***	0.102***	0.0156***
	(0.000329)	(0.000699)	(0.00497)	(0.00119)
d_age40_44	-0.00153***	-0.00617***	0.102***	0.0179***
	(0.000335)	(0.000795)	(0.00484)	(0.00125)
d_age45_49	-0.00295***	-0.00897***	0.0893***	0.0185***
	(0.000412)	(0.000934)	(0.00453)	(0.00118)
d_age50_54	-0.00464***	-0.0124***	0.0702***	0.0185***
	(0.000438)	(0.00102)	(0.00421)	(0.00114)
d_age55_59	-0.00639***	-0.0155***	0.0527***	0.0183***
	(0.000448)	(0.00110)	(0.00406)	(0.00106)
d_age60_64	-0.00822***	-0.0188***	0.0365***	0.0174***
	(0.000562)	(0.00128)	(0.00390)	(0.00101)
d_age65andabove	-0.0116***	-0.0240***	0.00554	0.0106***
	(0.000626)	(0.00143)	(0.00404)	(0.000762)
d_year2006	0.00134***	0.00338***	-0.000987	0.00565***
	(0.0000980)	(0.000222)	(0.000932)	(0.000761)
d_year2007	0.00468***	0.0108***	-0.0203***	-0.00667***
	(0.000335)	(0.000629)	(0.00249)	(0.000375)
d_year2008	0.00374***	0.00636***	-0.0299***	-0.00693***
	(0.000565)	(0.00100)	(0.00391)	(0.000417)
mean (depvar)	0.0137	0.0256	0.142	0.0129
N	54,269,650	54,269,650	54,269,650	54,269,650

TABLE 9. OLS Regressions of Outcomes Later in Life on Entry Age
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. RISKSCORE is the individual's credit score. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	30DPD	60DPD	SERIOUS	RISKSCORE	RISKSCORE
	(1)	(2)	(3)	(4)	(5)
d_entry18	-0.00309***	-0.00117*	-0.0685***	33.71***	15.47***
	(0.000773)	(0.000591)	(0.00382)	(1.304)	(1.162)
d_entry19	-0.000626	-0.000976*	-0.0446***	22.40***	5.771***
	(0.000808)	(0.000557)	(0.00242)	(0.695)	(0.802)
d_entry20	-0.000275	-0.000314	-0.0301***	15.62***	2.813***
	(0.000761)	(0.000638)	(0.00254)	(0.765)	(0.757)
d_entry21	-0.000835	-0.00110*	-0.0379***	12.68***	5.801***
	(0.000631)	(0.000609)	(0.00271)	(0.838)	(0.823)
d_entry22	-0.00249***	-0.00184***	-0.0331***	13.24***	8.361***
	(0.000637)	(0.000525)	(0.00218)	(0.870)	(0.824)
d_entry23	-0.00178***	-0.00166***	-0.0195***	9.051***	6.421***
	(0.000568)	(0.000601)	(0.00190)	(0.645)	(0.623)
qtrs_exp	-0.000262**	-0.000342***	0.0138***		2.381***
	(0.000104)	(0.000121)	(0.000550)		(0.0990)
qtrs_exp_sqd	0.00000367	0.00000649	-0.000331***		-0.0537***
	(0.00000362)	(0.00000410)	(0.0000163)		(0.00479)
d_year2006	0.000606**	0.000905***	0.00319**	0.276	0.414*
	(0.000236)	(0.000324)	(0.00141)	(0.218)	(0.220)
d_year2007	0.00369***	0.00473***	0.00363*	-2.620***	-2.485***
	(0.000418)	(0.000460)	(0.00201)	(0.584)	(0.578)
d_year2008	-0.00117***	0.000811*	-0.0110***	5.095***	4.719***
	(0.000430)	(0.000475)	(0.00349)	(0.810)	(0.816)
mean (depvar)	0.0308	0.0206	0.186	625.3	625.3
N	2,594,077	2,594,077	2,594,077	2,594,060	2,594,060

FIGURE 1. Default by Age, 18+ y.o. Individuals

Notes: The figure presents the coefficients from an OLS regression of default on age (equation (5) of the text) estimated using data from 2005Q4 to 2008Q4. The gray dashed lines represent 95% confifidence intervals. The omitted category is age 18-20. Severe default is defined as a delinquency of 90 days or greater, a derogatory incident, or a bankruptcy.

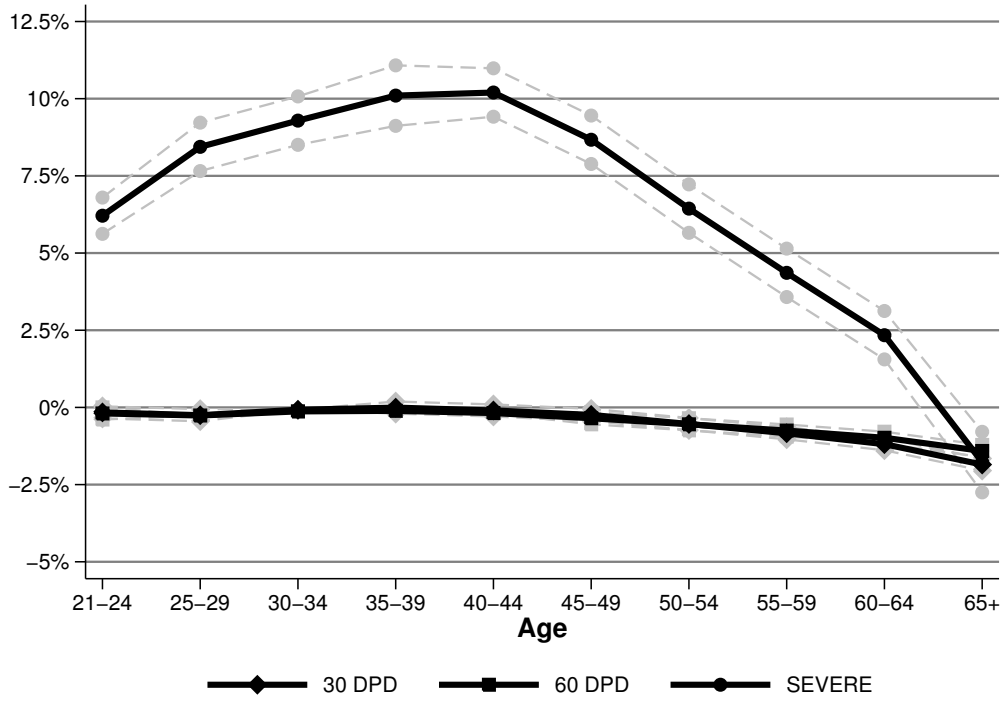


FIGURE 2. Default by Age, New Serious Defaults Only

Notes: The figure presents the coefficients from an OLS regression of default on age (equation (5) of the text) estimated using data from 2005Q4 to 2008Q4 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. Severe default is defined as a delinquency of 90 days or greater, a derogatory incident, or a bankruptcy.

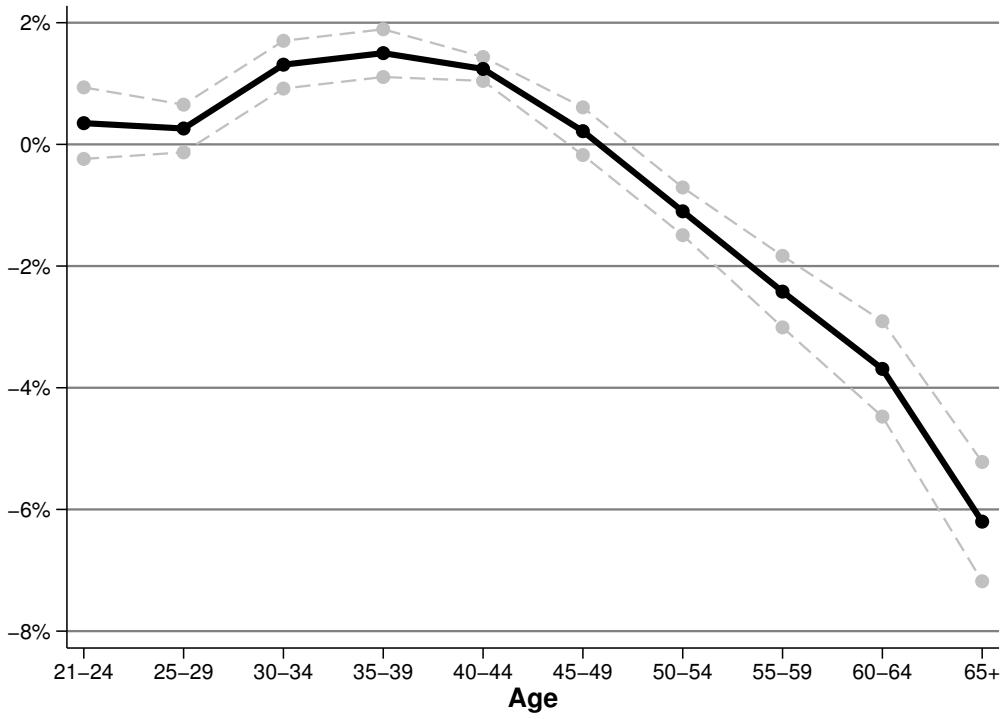


FIGURE 3. Credit Card Limits by Age

Notes: The figure presents the individual's combined credit limit on all credit cards by age for individuals that have at least one credit card. The data are from 2005Q4 to 2008Q4.

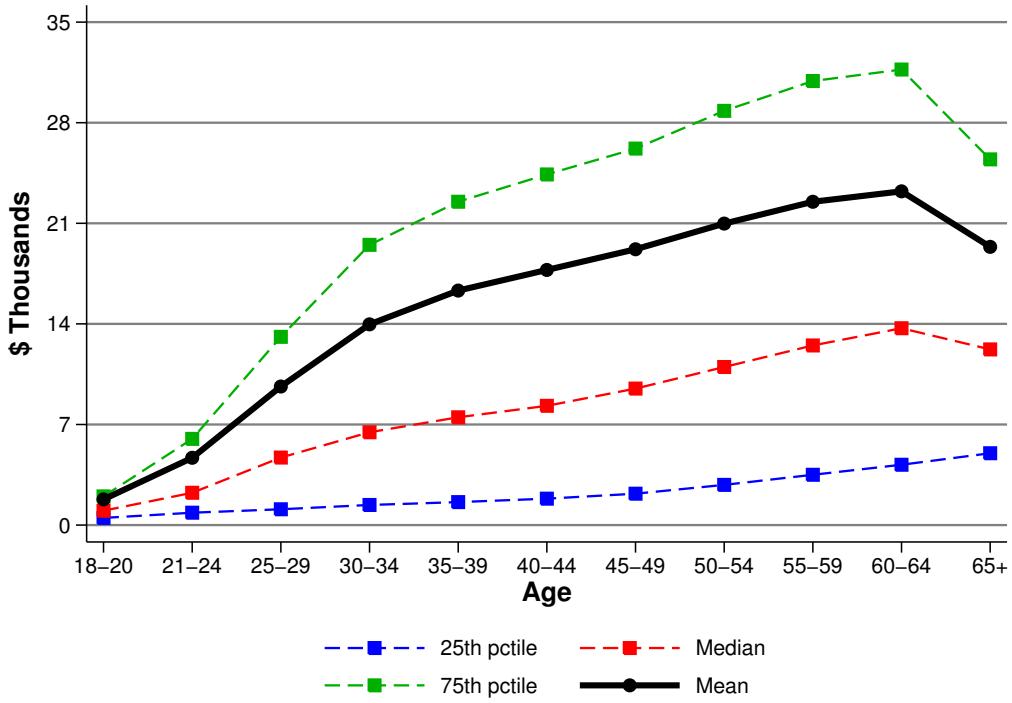
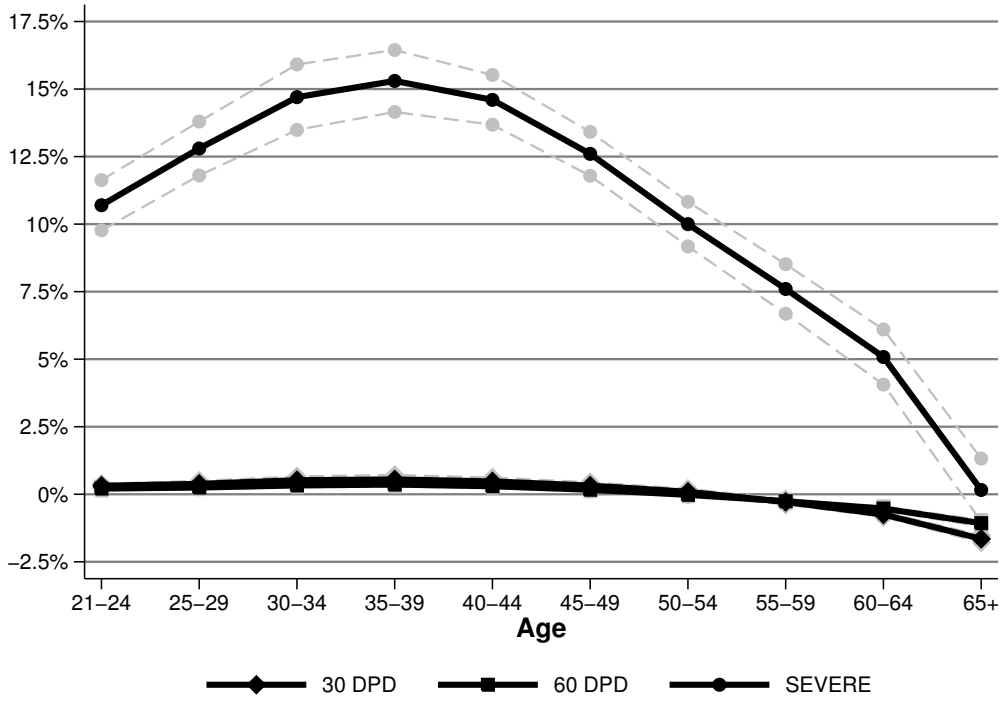


FIGURE 4. Default by Age, 18+ y.o. Individuals, 2001-2004
Notes: The figure presents the coefficients from an OLS regression of default on age (equation (5) of the text) estimated using data from 2001Q4 to 2004Q4. The gray dashed lines represent 95% confifidence intervals. The omitted category is age 18-20. Severe default is defined as a delinquency of 90 days or greater, a derogatory incident, or a bankruptcy.



Appendix A. Not-for-Publication: Summary of Sample Restrictions

Estimation	Ages Included	Years Included	Other Restriction(s)
Table 1	18-25	2005-2012	
Table 2	18-25	2005-2012	
Table 3	18-24	2008, 2010	Individual is in CCP sample at age 18
			Individual is in CCP sample in 2008Q4
Table 4	22, 25	2009, 2012	For 22-year-olds: got first card at age 21
			Can identify age of entry into credit card market
			No individuals with cosigned cards
Table 6	21	2002-2008	Child lives with 'parent' at age 18
			No individuals with more than two 'parents'
			No individuals with cosigned cards
Table 7	18-23	2005-2008	No individuals with cosigned cards
			Can identify age of entry into credit card market
Figure 1	18+	2005-2008	
Figure 2	18+	2005-2008	Individual is in CCP sample for at least 1 year
Figure 3	18+	2005-2008	
Figure 4	18+	2001-2004	
Table 8	18+	2005-2008	
Table 9	19-25	2005-2008	Can identify age of entry into credit card market
			No individuals with cosigned cards

Appendix B. Not-for-Publication: Anticipatory Effects of CARD Act

We 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 allows 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.

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 occurred between 2008Q4 and 2009Q4.

Using data from 2008Q4 and 2009Q4, we estimate the following specification for individuals born between 1987 and 1990

$$\begin{aligned} I^i_{i,t} &= \Phi(\alpha_0^{ANTIC} + \alpha_{20}^{ANTIC}\mathbf{1}_{\{2009Q4\}}\mathbf{1}_{\{age_{i.t}=19\}} \\ &\quad + \alpha_{21}^{ANTIC}\mathbf{1}_{\{2009Q4\}}\mathbf{1}_{\{age_{i.t}=20\}} + \delta^{ANTIC}\mathbf{1}_{\{2009Q4\}} \\ &\quad + \sum_{k=1}^{4}\beta_k^{ANTIC}\mathbf{1}_{\{age_{i,t}=18+k\}} + \gamma'^{ANTIC}\mathbf{X}_{i,t}), \end{aligned} \tag{8}$$

where the dependent variable $I^i_{i,t}$ is one of the three variables described after equation (1), and $\Phi(\cdot)$ is the function described after equation (1).

In equation (8), $1_{\{2009Q4\}}$ is an indicator that equals 1 if t is 2009Q4 and 0 otherwise, $1_{\{age_{i.t}=j\}}$ is an indicator that equals 1 if the individual is aged j at the end of year t, and $X_{i,t}$ is the vector of dummies for the individual's state of residence in period t. When estimating equation (8) 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 (8) 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 (8)

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 (8): 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 $B.1$ 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.

TABLE B.1. 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, occassionally, we are missing an observation for the number of cards.

	Probit		OLS		
	HASCARD	COSIGNCARD	HASCARD	NCARDS	COSIGNCARD
	(1)	(2)	(3)	(4)	(5)
d_age19	0.511***	-0.134***	0.195***	0.298***	-0.0192***
	(0.009)	(0.026)	(0.003)	(0.011)	(0.005)
d_age20	0.706***	-0.111***	0.270***	0.534***	-0.0165***
	(0.020)	(0.033)	(0.008)	(0.021)	(0.006)
d_age21	0.767***	0.0413	0.293***	0.692***	0.00566
	(0.029)	(0.033)	(0.011)	(0.029)	(0.005)
d_age22	0.817***	0.121***	0.312***	0.833***	0.0169***
	(0.037)	(0.040)	(0.014)	(0.036)	(0.005)
d_year2009	-0.116***	-0.125***	-0.0439***	-0.173***	-0.0185***
	(0.005)	(0.014)	(0.002)	(0.011)	(0.002)
d_year2009_age19	-0.159***	0.236***	-0.0630***	-0.0149***	0.0341***
	(0.010)	(0.025)	(0.004)	(0.005)	(0.005)
d_year2009_age20	-0.0613***	0.135***	-0.0245***	-0.0280***	0.0200***
	(0.007)	(0.019)	(0.003)	(0.006)	(0.003)
mean (depvar)	0.524	0.0772	0.524	1.545	0.0772
N	1,305,474	683,642	1,305,474	683,636	683,642

Appendix C. Not-for-Publication: Additional Tables and Sensitivity Analyses

Table C.1. Probit Estimation of 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). MTG takes a value of 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 2009 and 2012. 7) Only individuals aged 22 that got their first credit card at age 21 are included. All 25 year olds are included; the results are very similar with only 25 year olds that got their first credit card at age 21. 8) $\theta < 0$ in columns 1-3 indicates that young entrant types are less likely to have a delinquency / serious default than older entrant types. 9) $\theta < 0$ in column 4 indicates that young entrant types are less likely to have a mortgage than older entrant types.

	30DPD	60DPD	SERIOUS	MTG
	(1)	(2)	(3)	(4)
θ	0.148***	0.160***	-0.111***	0.0727***
	(0.022)	(0.029)	(0.022)	(0.027)
d_age25	0.0456**	0.0537**	0.0814***	0.769***
	(0.018)	(0.025)	(0.015)	(0.020)
d_year2012	-0.0751***	-0.151***	-0.117***	-0.191***
	(0.010)	(0.015)	(0.016)	(0.012)
mean (depvar)	0.0221	0.0137	0.154	0.0754
N	293,256	293,256	293,256	293,256

TABLE C.2. Default and Selection into Early Credit Card Use, Controlling for Quarters of 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) $\theta < 0$ indicates that young entrant types are less likely to default than older entrant types. 9) $qtrs\_exp$ is the number of quarters the individual has had a credit card for.

	Probit			OLS		
	30DPD	60DPD	SERIOUS	30DPD	60DPD	SERIOUS
	(1)	(2)	(3)	(4)	(5)	(6)
θ	0.149***	0.160***	-0.0960***	0.00798***	0.00553***	-0.0172***
	(0.0226)	(0.0291)	(0.0228)	(0.00127)	(0.00109)	(0.00520)
d_age25	0.0334*	0.0487*	-0.0411**	0.00178*	0.00187*	-0.00786*
	(0.0180)	(0.0275)	(0.0184)	(0.000917)	(0.00100)	(0.00433)
d_year2012	-0.0757***	-0.151***	-0.128***	-0.00394***	-0.00520***	-0.0291***
	(0.00945)	(0.0148)	(0.0161)	(0.000520)	(0.000552)	(0.00384)
qtrs_exp	0.00123*	0.000511	0.0122***	0.0000647*	0.0000186	0.00278***
	(0.000728)	(0.000759)	(0.000738)	(0.0000379)	(0.0000258)	(0.000170)
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 C.3. Default and 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) $\theta < 0$ indicates that young entrant types are less likely to default than older entrant types.

	Probit			OLS		
	30DPD	60DPD	SERIOUS	30DPD	60DPD	SERIOUS
	(1)	(2)	(3)	(4)	(5)	(6)
θ	0.0925***	0.0810***	-0.165***	0.00482***	0.00221*	-0.0335***
	(0.0237)	(0.0285)	(0.0188)	(0.00149)	(0.00118)	(0.00421)
d_age25	-0.00159	-0.00888	-0.0976***	-0.000182	-0.000585	-0.0225***
	(0.0163)	(0.0192)	(0.0106)	(0.00110)	(0.000965)	(0.00267)
d_year2012	-0.165***	-0.235***	-0.175***	-0.00943***	-0.00890***	-0.0414***
	(0.00987)	(0.0139)	(0.0126)	(0.000578)	(0.000602)	(0.00321)
qtrs_exp	-0.000777	-0.00151***	0.0111***	-0.0000468	-0.0000608***	0.00262***
	(0.000564)	(0.000505)	(0.000566)	(0.0000328)	(0.0000198)	(0.000157)
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

TABLE C.4. Probit Regressions of 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. 7) *qtrs_exp* is the number of quarters the individual has had a credit card for.

	30DPD	60DPD	SERIOUS	30DPD	60DPD	SERIOUS
	(1)	(2)	(3)	(4)	(5)	(6)
d_age19	0.123***	0.167***	0.601***	0.126***	0.170***	0.558***
	(0.0144)	(0.0180)	(0.0104)	(0.0142)	(0.0175)	(0.0104)
d_age20	0.107***	0.144***	0.805***	0.112***	0.151***	0.708***
	(0.0170)	(0.0222)	(0.0162)	(0.0166)	(0.0213)	(0.0168)
d_age21	0.103***	0.134***	0.885***	0.111***	0.145***	0.731***
	(0.0204)	(0.0247)	(0.0190)	(0.0193)	(0.0228)	(0.0205)
d_age22	0.0907***	0.117***	0.931***	0.102***	0.133***	0.713***
	(0.0193)	(0.0261)	(0.0200)	(0.0181)	(0.0235)	(0.0226)
d_age23	0.0805***	0.0992***	0.989***	0.0961***	0.121***	0.698***
	(0.0189)	(0.0266)	(0.0193)	(0.0172)	(0.0231)	(0.0231)
d_year2006	0.00578	0.0313***	0.0367***	0.00537	0.0307***	0.0473***
	(0.00428)	(0.00678)	(0.00451)	(0.00424)	(0.00675)	(0.00395)
d_year2007	0.0637***	0.101***	0.110***	0.0632***	0.100***	0.124***
	(0.00519)	(0.00863)	(0.00553)	(0.00512)	(0.00858)	(0.00498)
d_year2008	-0.0244***	0.0148	0.114***	-0.0241***	0.0152	0.116***
	(0.00688)	(0.0119)	(0.00893)	(0.00688)	(0.0119)	(0.00800)
qtrs_exp				-0.00169***	-0.00235***	0.0302***
				(0.000565)	(0.000680)	(0.000991)
mean (depvar)	0.0315	0.0215	0.153	0.0315	0.0215	0.153
N	2,356,997	2,356,997	2,356,997	2,356,997	2,356,997	2,356,997

TABLE C.5. Default by Age, 19-to-23-Year-Old Individuals (Excludes 18-Year-Olds)

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	60DPD	SERIOUS	30DPD	60DPD	SERIOUS
	(1)	(2)	(3)	(4)	(5)	(6)
d_age20	-0.0164**	-0.0234***	0.204***	-0.00123**	-0.00130***	0.0401***
	(0.00715)	(0.00760)	(0.00918)	(0.000530)	(0.000428)	(0.00235)
d_age21	-0.0207**	-0.0334***	0.284***	-0.00155**	-0.00184***	0.0585***
	(0.00966)	(0.00976)	(0.0129)	(0.000710)	(0.000555)	(0.00351)
d_age22	-0.0327***	-0.0501***	0.330***	-0.00241***	-0.00271***	0.0695***
	(0.00890)	(0.0117)	(0.0145)	(0.000658)	(0.000665)	(0.00415)
d_age23	-0.0430***	-0.0679***	0.388***	-0.00313***	-0.00361***	0.0842***
	(0.00884)	(0.0121)	(0.0140)	(0.000665)	(0.000695)	(0.00447)
d_year2006	0.00347	0.0293***	0.0367***	0.000247	0.00146***	0.00810***
	(0.00423)	(0.00661)	(0.00462)	(0.000296)	(0.000324)	(0.00101)
d_year2007	0.0573***	0.0961***	0.108***	0.00424***	0.00513***	0.0248***
	(0.00523)	(0.00859)	(0.00570)	(0.000419)	(0.000510)	(0.00140)
d_year2008	-0.0299***	0.0104	0.113***	-0.00201***	0.000518	0.0258***
	(0.00693)	(0.0118)	(0.00893)	(0.000456)	(0.000579)	(0.00225)
mean (depvar)	0.0317	0.0217	0.157	0.0317	0.0217	0.157
N	2,281,756	2,281,756	2,281,756	2,281,756	2,281,756	2,281,756

TABLE C.6. 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 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_age21_24	-0.0227***	-0.0376***	0.272***	-0.00161***	-0.00195***	0.0621***
	(0.00832)	(0.0105)	(0.0107)	(0.000592)	(0.000559)	(0.00328)
d_age25_29	-0.0362***	-0.0518***	0.354***	-0.00251***	-0.00261***	0.0844***
	(0.00715)	(0.00883)	(0.0127)	(0.000521)	(0.000488)	(0.00430)
d_age30_34	-0.0105	-0.0247***	0.383***	-0.000753	-0.00128***	0.0929***
	(0.00697)	(0.00679)	(0.0110)	(0.000492)	(0.000366)	(0.00449)
d_age35_39	-0.000696	-0.0214***	0.412***	-0.0000509	-0.00110***	0.101***
	(0.00819)	(0.00747)	(0.0113)	(0.000581)	(0.000400)	(0.00474)
d_age40_44	-0.0138*	-0.0356***	0.413***	-0.000975*	-0.00182***	0.102***
	(0.00758)	(0.00776)	(0.0113)	(0.000538)	(0.000427)	(0.00438)
d_age45_49	-0.0355***	-0.0712***	0.362***	-0.00242***	-0.00350***	0.0867***
	(0.00886)	(0.00910)	(0.0126)	(0.000639)	(0.000515)	(0.00396)
d_age50_54	-0.0814***	-0.116***	0.280***	-0.00537***	-0.00546***	0.0644***
	(0.00693)	(0.00873)	(0.0142)	(0.000521)	(0.000521)	(0.00375)
d_age55_59	-0.133***	-0.168***	0.198***	-0.00837***	-0.00749***	0.0436***
	(0.00708)	(0.00835)	(0.0164)	(0.000554)	(0.000537)	(0.00384)
d_age60_64	-0.201***	-0.234***	0.112***	-0.0119***	-0.00982***	0.0234***
	(0.00773)	(0.0113)	(0.0203)	(0.000624)	(0.000657)	(0.00429)
d_age65andabove	-0.363***	-0.392***	-0.0928***	-0.0185***	-0.0141***	-0.0177***
	(0.0110)	(0.0127)	(0.0287)	(0.000747)	(0.000720)	(0.00545)
d_year2006	0.0226***	0.0354***	0.0304***	0.00130***	0.00136***	0.00785***
	(0.00424)	(0.00355)	(0.00330)	(0.000252)	(0.000132)	(0.000855)
d_year2007	0.0778***	0.124***	-0.0585***	0.00475***	0.00527***	-0.0153***
	(0.00714)	(0.00940)	(0.00787)	(0.000446)	(0.000425)	(0.00233)
d_year2008	0.0513***	0.0916***	-0.113***	0.00303***	0.00374***	-0.0287***
	(0.0107)	(0.0154)	(0.0156)	(0.000643)	(0.000638)	(0.00437)
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 C.7. Probit Regressions of Subcategories of Serious Default by Age
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) 90DPD and 120DPD take the value 1 if the individual is 90 or 120 days delinquent on a credit card, respectively. DEROGATORY takes the value 1 if the individual has a card in derogatory incident status (includes chargeoffs). BANKRUPTCY takes the value 1 if the individual has a card in bankruptcy status. 5) We include a constant and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	90DPD	120DPD	DEROGATORY	BANKRUPTCY
	(1)	(2)	(3)	(4)
d_age21_24	-0.0415***	-0.0356***	0.380***	0.727***
	(0.0116)	(0.0110)	(0.0114)	(0.0160)
d_age25_29	-0.0547***	-0.0772***	0.476***	1.183***
	(0.00933)	(0.00882)	(0.0148)	(0.0155)
d_age30_34	-0.0225***	-0.0604***	0.492***	1.373***
	(0.00721)	(0.00767)	(0.0124)	(0.0171)
d_age35_39	-0.0214***	-0.0666***	0.519***	1.463***
	(0.00746)	(0.00801)	(0.0128)	(0.0184)
d_age40_44	-0.0364***	-0.0840***	0.520***	1.517***
	(0.00728)	(0.00876)	(0.0138)	(0.0180)
d_age45_49	-0.0728***	-0.128***	0.470***	1.532***
	(0.00863)	(0.0100)	(0.0153)	(0.0187)
d_age50_54	-0.120***	-0.187***	0.388***	1.531***
	(0.00892)	(0.0105)	(0.0168)	(0.0190)
d_age55_59	-0.175***	-0.246***	0.308***	1.528***
	(0.00806)	(0.0111)	(0.0187)	(0.0209)
d_age60_64	-0.239***	-0.317***	0.226***	1.507***
	(0.0117)	(0.0141)	(0.0212)	(0.0240)
d_age65andabove	-0.399***	-0.459***	0.0428	1.309***
	(0.0140)	(0.0181)	(0.0274)	(0.0347)
d_year2006	0.0435***	0.0646***	-0.00297	0.131***
	(0.00325)	(0.00417)	(0.00390)	(0.0151)
d_year2007	0.136***	0.183***	-0.0893***	-0.233***
	(0.00902)	(0.00974)	(0.00876)	(0.00555)
d_year2008	0.113***	0.116***	-0.135***	-0.246***
	(0.0167)	(0.0181)	(0.0148)	(0.00984)
mean (depvar)	0.0137	0.0256	0.142	0.0129
N	54,269,650	54,269,650	54,269,650	54,269,650

TABLE C.8. 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 and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2005-2008.

	Probit	OLS
	(1)	(2)
d_age21_24	0.0186	0.00349
	(0.0130)	(0.00252)
d_age25_29	0.0143	0.00261
	(0.0119)	(0.00229)
d_age30_34	0.0649***	0.0131***
	(0.00830)	(0.00161)
d_age35_39	0.0738***	0.0150***
	(0.00835)	(0.00159)
d_age40_44	0.0616***	0.0124***
	(0.00836)	(0.00147)
d_age45_49	0.0116	0.00217
	(0.00996)	(0.00191)
d_age50_54	-0.0573***	-0.0110***
	(0.0114)	(0.00240)
d_age55_59	-0.132***	-0.0242***
	(0.0130)	(0.00288)
d_age60_64	-0.211***	-0.0369***
	(0.0177)	(0.00379)
d_age65andabove	-0.401***	-0.0620***
	(0.0242)	(0.00480)
d_year2006	0.0414***	0.00733***
	(0.00625)	(0.00111)
d_year2007	0.00695	0.00145
	(0.00756)	(0.00136)
d_year2008	0.0615***	0.0113***
	(0.0148)	(0.00268)
mean (depvar)	0.109	0.109
N	51,391,150	51,391,150

TABLE C.9. Default by Age, 18+ Year Old Individuals, 2001-2004
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 and state fixed effects (coefficients not shown). 6) All data are from the fourth quarter, years 2001-2004.

	Probit			OLS		
	30DPD	60DPD	SERIOUS	30DPD	60DPD	SERIOUS
	(1)	(2)	(3)	(4)	(5)	(6)
d_age21_24	0.0444***	0.0437***	0.456***	0.00315***	0.00211***	0.107***
	(0.00564)	(0.00783)	(0.00793)	(0.000370)	(0.000351)	(0.00475)
d_age25_29	0.0536***	0.0508***	0.530***	0.00386***	0.00249***	0.128***
	(0.00802)	(0.00671)	(0.00833)	(0.000557)	(0.000294)	(0.00509)
d_age30_34	0.0705***	0.0651***	0.589***	0.00520***	0.00327***	0.147***
	(0.00986)	(0.00702)	(0.0119)	(0.000718)	(0.000339)	(0.00618)
d_age35_39	0.0743***	0.0710***	0.607***	0.00550***	0.00359***	0.153***
	(0.0112)	(0.00753)	(0.0112)	(0.000835)	(0.000381)	(0.00585)
d_age40_44	0.0653***	0.0597***	0.587***	0.00477***	0.00297***	0.146***
	(0.00988)	(0.00699)	(0.0106)	(0.000719)	(0.000336)	(0.00470)
d_age45_49	0.0451***	0.0349***	0.522***	0.00322***	0.00167***	0.126***
	(0.00873)	(0.00633)	(0.0126)	(0.000623)	(0.000295)	(0.00415)
d_age50_54	0.0136*	-0.00334	0.433***	0.000917	-0.000200	0.100***
	(0.00804)	(0.00581)	(0.0163)	(0.000563)	(0.000279)	(0.00422)
d_age55_59	-0.0421***	-0.0570***	0.345***	-0.00284***	-0.00258***	0.0760***
	(0.00687)	(0.00597)	(0.0216)	(0.000481)	(0.000307)	(0.00467)
d_age60_64	-0.121***	-0.126***	0.246***	-0.00748***	-0.00530***	0.0508***
	(0.00629)	(0.00761)	(0.0261)	(0.000467)	(0.000415)	(0.00521)
d_age65andabove	-0.315***	-0.303***	0.0116	-0.0165***	-0.0107***	0.00159
	(0.00925)	(0.0117)	(0.0317)	(0.000655)	(0.000579)	(0.00593)
d_year2002	-0.0507***	-0.0528***	0.0778***	-0.00386***	-0.00274***	0.0209***
	(0.00141)	(0.00188)	(0.00240)	(0.000151)	(0.000123)	(0.000644)
d_year2003	-0.134***	-0.124***	0.0766***	-0.00951***	-0.00605***	0.0207***
	(0.00302)	(0.00293)	(0.00589)	(0.000352)	(0.000237)	(0.00179)
d_year2004	-0.184***	-0.181***	0.0927***	-0.0125***	-0.00835***	0.0252***
	(0.00448)	(0.00444)	(0.00889)	(0.000471)	(0.000324)	(0.00267)
mean (depvar)	0.0301	0.0190	0.204	0.0301	0.0190	0.204
N	49,519,256	49,519,256	49,519,256	49,519,256	49,519,256	49,519,256

TABLE C.10. Probit Regressions of Default Later in Life on Entry Age
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.

	30DPD	60DPD	SERIOUS
	(1)	(2)	(3)
d_entry18	-0.0460***	-0.0218*	-0.269***
	(0.0115)	(0.0118)	(0.0121)
d_entry19	-0.00836	-0.0182*	-0.187***
	(0.0113)	(0.0108)	(0.00963)
d_entry20	-0.00316	-0.00462	-0.134***
	(0.0105)	(0.0119)	(0.0105)
d_entry21	-0.0112	-0.0203*	-0.167***
	(0.00862)	(0.0113)	(0.00974)
d_entry22	-0.0349***	-0.0351***	-0.145***
	(0.00901)	(0.00997)	(0.00870)
d_entry23	-0.0242***	-0.0312***	-0.0852***
	(0.00773)	(0.0115)	(0.00700)
qtrs_exp	-0.00361**	-0.00658***	0.0584***
	(0.00147)	(0.00235)	(0.00135)
qtrs_exp_sqd	0.0000475	0.000120	-0.00146***
	(0.0000522)	(0.0000813)	(0.0000495)
d_year2006	0.00892**	0.0192***	0.0149***
	(0.00347)	(0.00693)	(0.00539)
d_year2007	0.0516***	0.0922***	0.0194***
	(0.00549)	(0.00782)	(0.00752)
d_year2008	-0.0177***	0.0170*	-0.0366***
	(0.00655)	(0.00985)	(0.0129)
mean (depvar)	0.0308	0.0206	0.186
N	2,594,077	2,594,077	2,594,077

TABLE C.11. 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 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_entry18	-0.0488***	-0.00885	-0.255***	-0.00325***	-0.000478	-0.0650***
	(0.0113)	(0.0116)	(0.0125)	(0.000760)	(0.000586)	(0.00381)
d_entry19	-0.00686	0.00114	-0.155***	-0.000521	-0.00000760	-0.0369***
	(0.0113)	(0.0106)	(0.00986)	(0.000817)	(0.000565)	(0.00248)
d_entry20	-0.000428	0.0114	-0.118***	-0.0000835	0.000510	-0.0266***
	(0.0105)	(0.0121)	(0.0110)	(0.000765)	(0.000665)	(0.00269)
d_entry21	-0.0111	-0.0115	-0.140***	-0.000824	-0.000634	-0.0319***
	(0.00857)	(0.0116)	(0.0101)	(0.000630)	(0.000628)	(0.00269)
d_entry22	-0.0354***	-0.0282***	-0.128***	-0.00253***	-0.00147***	-0.0294***
	(0.00872)	(0.00989)	(0.00845)	(0.000619)	(0.000529)	(0.00209)
d_entry23	-0.0243***	-0.0272**	-0.0835***	-0.00178***	-0.00144**	-0.0191***
	(0.00760)	(0.0114)	(0.00693)	(0.000559)	(0.000605)	(0.00189)
d_years_exp1	-0.0151*	-0.0340***	0.323***	-0.00112*	-0.00183***	0.0741***
	(0.00807)	(0.0115)	(0.00620)	(0.000583)	(0.000633)	(0.00237)
d_years_exp2	-0.0256***	-0.0658***	0.393***	-0.00184***	-0.00341***	0.0923***
	(0.00725)	(0.0107)	(0.00868)	(0.000527)	(0.000586)	(0.00367)
d_years_exp3	-0.0335***	-0.0858***	0.409***	-0.00241***	-0.00439***	0.0967***
	(0.00969)	(0.0142)	(0.00954)	(0.000696)	(0.000767)	(0.00366)
d_years_exp4	-0.0497***	-0.0942***	0.466***	-0.00353***	-0.00480***	0.113***
	(0.00908)	(0.0159)	(0.0107)	(0.000667)	(0.000851)	(0.00422)
d_years_exp5	-0.0664***	-0.0999***	0.535***	-0.00463***	-0.00506***	0.133***
	(0.0112)	(0.0131)	(0.0125)	(0.000814)	(0.000722)	(0.00553)
d_years_exp6	-0.0461***	-0.0986***	0.555***	-0.00331***	-0.00501***	0.139***
	(0.0115)	(0.0116)	(0.0145)	(0.000829)	(0.000636)	(0.00604)
d_years_exp7	-0.0222	-0.0560**	0.586***	-0.00180	-0.00299**	0.146***
	(0.0181)	(0.0229)	(0.0181)	(0.00122)	(0.00117)	(0.00627)
d_year2006	0.00799**	0.0186***	0.00798	0.000543**	0.000877**	0.00192
	(0.00353)	(0.00708)	(0.00535)	(0.000240)	(0.000331)	(0.00141)
d_year2007	0.0502***	0.0915***	0.0141*	0.00359***	0.00470***	0.00269
	(0.00550)	(0.00790)	(0.00749)	(0.000417)	(0.000462)	(0.00201)
d_year2008	-0.0190***	0.0169*	-0.0423***	-0.00126***	0.000809*	-0.0118***
	(0.00646)	(0.00992)	(0.0129)	(0.000423)	(0.000478)	(0.00351)
mean (depvar)	0.0308	0.0206	0.186	0.0308	0.0206	0.186
N	2,594,077	2,594,077	2,594,077	2,594,077	2,594,077	2,594,077