

Cooper, Daniel; Gorbachev, Olga; Luengo-Prado, Maria José

**Working Paper**

## Consumption, credit, and the missing young

Working Papers, No. 19-10

**Provided in Cooperation with:**

Federal Reserve Bank of Boston

*Suggested Citation:* Cooper, Daniel; Gorbachev, Olga; Luengo-Prado, Maria José (2019) : Consumption, credit, and the missing young, Working Papers, No. 19-10, Federal Reserve Bank of Boston, Boston, MA, <https://doi.org/10.29412/res.wp.2019.10>

This Version is available at:

<https://hdl.handle.net/10419/227925>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



## Consumption, Credit, and the Missing Young

Daniel Cooper, Olga Gorbachev, and María José Luengo-Prado

### **Abstract:**

There are more young adults today with either no credit history or insufficient credit history to be scored by one of the major credit bureaus than there were before the Great Recession—a reality that is likely an unintended outcome of the CARD Act of 2009. In regressions that include a rich set of controls, this paper shows that measures of young adults missing from credit bureau data act as a drag on state-level consumption growth. This finding seems to be driven by young individuals from more disadvantaged backgrounds having less access to credit since the act went into effect.

**JEL Classifications:** E21, D12

**Keywords:** consumption, credit

---

Daniel Cooper is a senior economist and policy advisor in the research department at the Federal Reserve Bank of Boston; his email is [daniel.cooper@bos.frb.org](mailto:daniel.cooper@bos.frb.org). Olga Gorbachev is an associate professor of economics at the Lerner College of Business and Economics at the University of Delaware; her email is [olgag@udel.edu](mailto:olgag@udel.edu). María José Luengo-Prado, the corresponding author, is a senior economist and policy advisor in the Boston Fed's research department; her email is [maria.luengo-prado@bos.frb.org](mailto:maria.luengo-prado@bos.frb.org).

The authors thank Chloe Lee and Rachel Cummings for excellent research assistance.

This paper presents preliminary analysis and results intended to stimulate discussion and critical comment. The views expressed herein are those of the author and do not indicate concurrence by the Federal Reserve Bank of Boston, the principals of the Board of Governors, or the Federal Reserve System.

This paper, which may be revised, is available on the website of the Federal Reserve Bank of Boston at <http://www.bostonfed.org/economic/wp/index.htm>.

**This version:** October 2019

<https://doi.org/10.29412/res.wp.2019.10>

## 1 Introduction

Access to credit is an important driver of consumption growth. This paper documents that a higher percentage of young adults have been missing from credit bureau records since the implementation of the Credit Card Accountability Responsibility and Disclosure (CARD) Act of 2009, and that their numbers had only partially recovered by 2018. We call this phenomenon the “missing young” and demonstrate that indicators of missing young adults have predictive power for consumption growth at the state level, even after we control for a standard set of factors that help explain differences in consumption growth across states.

Having a complete record in credit bureau data, including a credit score, is important for obtaining credit. Brevoort, Grimm, and Kambara (2015) document that 11 percent of adults in the United States in 2010 had no credit history or had insufficient credit history to be scored by a credit bureau. Black and Hispanic individuals, along with individuals in low-income neighborhoods, were more likely to be missing from credit bureau data. Individuals without credit histories or with insufficient credit history to be scored in credit bureau data face significant challenges in accessing most credit markets and have trouble developing the additional credit history necessary to more easily obtain credit in the future. In the past, obtaining a credit card was an easy way to start building a credit history: Brevoort and Kambara (2017) show that credit cards triggered the creation of consumer credit records more frequently than any other product across all age groups and income levels. While the CARD Act is aimed at curtailing deceptive and abusive credit card practices and contains many provisions that are beneficial to consumers, it may have also had unintended consequences for young adults.

In general, fewer young individuals than older individuals have a record in credit bureau data, because the young are less likely to own a home or a car, or otherwise engage in purchases that involve credit.<sup>1</sup> Since 2009, when it went into effect, the CARD Act has likely further limited young individuals’ initial access to credit by making it more difficult

---

<sup>1</sup>A partially offsetting factor for differences in credit history across age groups in recent years has been the increase in student debt.

for someone turning 18 years old to obtain a credit card. More specifically, a provision in the CARD Act (Title 3) prohibits credit cards from being issued to consumers under the age of 21 unless they have a co-signer (who shares liability for the credit card debt), or they submit financial information that demonstrates they have the means to meet any debt obligations. The CARD Act also bans credit card issuers from sending young individuals pre-screened credit card offers, and it introduced rules that have made it harder for colleges and universities to collaborate with credit card issuers in offering cards to their student body.

Despite the good intent of these regulations, the limitations on credit card offers and availability have adversely impacted young adults' ability to access credit and build a credit history. For example, Debbaut, Ghent, and Kudlyak (2016) use credit bureau data to document that individuals under the age of 21 were 15 percent less likely to have a credit card following the passage of the act. They also find that conditional on having a credit card, these young individuals had fewer total cards and were 35 percent *more* likely to have a co-signed card. In addition, the authors argue that their estimates represent "a lower bound of the effect of the act because its passage also likely reduced the representation of youth in the credit bureau data."

Using data from the New York Fed Consumer Credit Panel (CCP) provided by Equifax, we document that there are indeed fewer young adults in credit bureau data since the implementation of the CARD Act. We further find a negative correlation between young individuals' more limited credit records (and credit access) and state-level consumption growth, suggesting that more limited credit availability for young adults may have contributed to the slower-than-anticipated recovery in consumption growth following the Great Recession. We also present evidence that is consistent with the observation of spending effects being driven at least in part by reduced credit supply to young individuals and not simply by reduced credit demand from this group. Specifically, young individuals are more likely to have access to credit cards since the enactment of the CARD Act if they are in socioeconomic groups deemed historically to be less of a credit risk, or if they have more affluent parents who can potentially co-sign a credit card for them.

The remainder of the paper proceeds as follows. Section 2 discusses our data and empirical specification, Section 3 presents and discusses our results, and Section 4 concludes.

## 2 Data and Empirical Specification

We generate our measures of the missing young (MY) using data from the CCP provided by Equifax. The CCP is a longitudinal, nationally representative 5 percent random sample of individuals with credit records in the United States. The data are available quarterly (starting in 1999) and include information on most aspects of an individual’s credit and debt holdings, including a credit score (Equifax Risk Score), the balance on credit cards, auto loans, student debt, and mortgages, as well as the person’s birth year and geographical location.

Our first measure of MY compares the count of individuals within a particular age group (for example, 18 to 24 years old) who have a credit score in the CCP with census counts of the same age group by state for each year.<sup>2</sup> The top-left panel of Figure 1 shows that from 2000 to 2007 on average roughly 42 (20) percent of adults aged 18 to 24 (18 to 34) had insufficient credit histories to have a credit score (unscored) or were missing altogether from the CCP data. Starting with the Great Recession and accelerating with the implementation of the CARD Act, the percentage of young individuals who were unscored or lacked any credit history increased. In addition, while the share of MY has declined somewhat after peaking in 2012, it remains elevated relative to the period before the CARD Act, suggesting that the act potentially has had some lasting effects on young individuals’ access to credit. An alternative measure of MY compares the share of individuals aged 18 to 24 (18 to 34) relative to individuals aged 18 to 65 in the CCP with the same share in census population data (by state and year) by taking the difference between the two ratios. This measure may better account for potential sampling issues in less populated states. The time trend for this “ratio” measure, depicted in the top-right panel of Figure 1, is similar to the one in the

---

<sup>2</sup>This “count” approach for determining the MY is our preferred measure, and we will refer to it interchangeably as “count” MY or “percentage” MY. Note that counts in the CCP are multiplied by 20, because the CCP is a 5 percent sample of individuals in the United States.

top-left panel. Importantly, our measures of MY exhibit substantial variation across states and over time, as shown in the bottom panel of Figure 1, which depicts the variation across states for one of our measures (percentage of missing young, 18 to 34 years old) before and after the enactment of the CARD Act. (The maps in Figure A.1 in the appendix also show the state-level variation in our measures.)

Our goal is to determine whether more limited access to credit for young consumers, as proxied by their absence from credit bureau data, may have played a role in the slow recovery in consumption following the Great Recession, all else being equal. We acknowledge that the variation in our missing-young measures may not be a completely exogenous indicator of credit availability for young adults over time, as these individuals' credit demand may fluctuate for various reasons. For example, if job prospects are grim, young individuals may postpone major purchases and credit applications by choice, which would delay their entrance into credit bureau records. While this caveat is relevant when interpreting our results, establishing a (good) credit history should be a priority for young individuals, because not having a credit history becomes problematic when a person wants or needs credit later in life. Our regressions also include time fixed effects, along with other controls, to try to account for changing credit demand over time.

For our analysis, we combine state-level consumption data from the Bureau of Economic Analysis (BEA) with our measures of MY from the CCP. (The variation of consumption growth across states is depicted in appendix Figure A.2.) Nominal state-level consumption data are available at an annual frequency from 1997 through 2018, and spending can be disaggregated based on major expenditure categories. We compute per capita expenditure growth using annual state-level population data, and nominal values are converted to real values using the CPI.

Our empirical specification is similar to the one in Demyanyk et al. (2019) and relates consumption growth to consumers' available resources as well as to measures of uncertainty and access to credit, in the vein of Carroll, Slacalek, and Sommer (2012). Both papers are based on the Carroll (1997) and Deaton (1991) buffer-stock model of saving, in which prudent

but impatient consumers, subject to uncertainty and credit constraints, target a certain level of wealth for precautionary reasons. In this model, available resources, uncertainty, and the tightening or easing of credit constraints affect the saving rate and consumption growth in three ways: (1) additional uncertainty increases the desired wealth target for precautionary reasons, and thus it increases the saving rate; (2) credit tightening also increases the desired wealth target and the saving rate; and (3) additional resources from, for example, a rise in asset prices increase consumption and lower saving—because the precautionary motive diminishes with wealth.

Our regressions take the following general form:

$$\begin{aligned}\Delta \log(c_{it}) = & \alpha_i + \mu_t + \beta_y \Delta \log(y_{it}) + \beta_h \Delta \log(h_{it}) \\ & + \beta_u \Delta u_{it} + \beta_{cf} \Delta \text{conf}_{rt} + \beta_{ca} \text{ca}_{it} + \varepsilon_{it},\end{aligned}$$

where  $\Delta$  captures the change in a variable between periods, the subscript  $i$  represents a given state, and the subscript  $t$  denotes a given year. All specifications include state fixed effects ( $\alpha_i$ ) and year fixed effects ( $\mu_t$ );  $c$  is real consumption per capita,  $y$  is real disposable income per capita (from the BEA), and  $h$  denotes housing prices (as measured by CoreLogic). The latter two variables are our proxies for consumer resources at the state level.<sup>3</sup> In addition,  $u$  (the unemployment rate from the Bureau of Labor Statistics) and “conf” (the Conference Board Consumer Confidence Index [CCI] available for nine census regions) are our proxies for economic (or consumer) uncertainty.<sup>4</sup> The variable “ca” stands for credit availability or access to credit, as captured by either of our MY indicators. An additional control related to credit access is the average (state-level) credit score.<sup>5</sup> Standard errors in our estimates are clustered at the state level, and all regressions are population weighted at the state level.

---

<sup>3</sup>Ideally, one would control for differences in financial resources in a consumption growth specification such as this one, but measures of financial-asset holdings at the state level are not available. However, any aggregate variation in financial resources over time will be picked up by the time fixed effect.

<sup>4</sup>We use the expectations component of the CCI, which incorporates expectations about business conditions, employment conditions, and family income six months ahead.

<sup>5</sup>The CCP contains a generic credit score, “Equifax Risk Score,” much like others that are available in the credit bureau marketplace. We use the terms “credit score” and “risk score” interchangeably.

Since the CCP data are available only from 1999 onward, and the BEA consumption data are annual, our primary analysis sample is annual and covers the period from 2000 through 2018.<sup>6</sup> Summary statistics and correlations for the variables included in our regressions are shown in appendix Tables A.1 and A.2.

### 3 Results and Discussion

Table 1 summarizes our main results. We estimate a marginal propensity to consume (MPC) for total spending out of (disposable) income of 16 cents to 17 cents, depending on the specification (see columns [1] and [2]). In addition, 10 percent higher house-price growth leads to 0.3 to 0.4 percent higher (total) spending growth, and an increase in the unemployment rate of 1 percentage point is associated with 0.26 to 0.27 percentage point lower consumption growth. We interpret the latter effect as the impact of additional uncertainty on consumption growth, because the income decline associated with job loss should already be captured by the income-growth variable. In terms of the more disaggregated spending categories, we find that the MPC out of income is higher for durables than nondurables and services (NDS), and higher house-price growth results in a larger durable-spending response (see columns [3] and [4]).<sup>7</sup> The uncertainty effect (as captured by the unemployment rate) is also larger for durables than NDS, because durables spending is easier to postpone. In addition, changes in the level of consumer confidence do not have a statistically significant effect on total consumption growth, as it seems that increases in confidence are associated with a shift from NDS spending toward spending on durables.<sup>8</sup> Also, consumption growth was faster in states with higher average credit scores over the sample period. In particular, a 10 percent higher average risk score is associated with 0.5 percent higher spending growth—an effect that appears to operate mainly through NDS spending. To the extent that credit scores proxy

---

<sup>6</sup>We exclude 1999 from our regressions due to minor sampling issues in the initial CCP year. Results are similar if we include this year.

<sup>7</sup>The durables category includes vehicles, furnishings, household equipment, and other durables. Nondurables and services cover all other spending, including housing services.

<sup>8</sup>Keep in mind that our measure of consumer confidence has less variation than the other regressors, since it is available for only nine (census) regions and not at the state level.



for credit access, this result suggests that credit availability has independent predictive power for state-level consumption growth.

Turning to our variable of interest, MY, a state where fewer young individuals (aged 18 to 34) appear in credit bureau records has slower total consumption growth than a state with relatively more young adults appearing in those records. For our narrower definition of young adults, those aged 18 to 24, we do not find a statistically significant effect. This is to be expected, as access to credit should be more important for young adults' spending when they start living on their own, which happens later in life nowadays (see Cooper and Luengo-Prado 2018 for a discussion on changes in household formation patterns).<sup>9</sup> Much of the MY effect on consumption works through spending on NDS as opposed to durables. It is likely that the young buy relatively more NDS than durable goods. That MY matters relatively more for NDS spending is also consistent with young consumers using credit for house purchases, since the flow from housing services is included in the NDS category, and young individuals typically use credit in large part to buy houses.

It is important to recognize that our regressions do not necessarily identify a causal relationship between consumption and credit access. Our indicators of MY could be higher when consumption growth is lower simply because, in such a state, consumers and lenders alike expect lower or no income growth for young individuals, or consumers more generally, in the near future. With lower expected income growth, lenders will likely assume higher default probabilities, making them less willing to lend to consumers with limited credit histories (such as young adults). At the same time, consumers may reduce their demand for credit and otherwise decrease their consumption in response to their lower (actual or perceived) income growth. Still, our regressions include multiple state-level controls as well as time fixed effects to capture the aggregate state of the economy, and ameliorate some of these concerns.

Even though we identify correlations rather than causation, we can still use our estimated

---

<sup>9</sup>Not surprisingly, the MY effect for both age groups is larger and more precisely estimated when time fixed effects are not included in the regressions, as a lot of the variation in our MY measures is time based given the role of the CARD Act.

coefficients to quantify the relationship between credit access for young individuals and consumption growth, since our measures of MY have predictive power for spending growth, even with our robust set of controls. In particular, the number of young people missing in the CCP data was 10.9 percentage points greater in 2012 than in 2007, which implies a drag on state-level consumption growth of 0.54 percentage point based on our MY estimate in column (2) of Table 1. Using our alternative measure of missing young in column (6) yields an estimated drag on consumption growth of 0.48 percentage point. This effect is nontrivial given an average consumption growth across states of  $-1.6$  percent between 2007 and 2012. More recently, consumption growth would have been 0.21 (column [6]) to 0.36 (column [2]) percentage point higher in 2018 if the proportion of MY had not increased relative to 2007. (This effect is smaller than the 2012 effect, because the increase in the share of MY in the CCP data partially reversed.) Indeed, if more limited access to credit for young adults is the new normal, then our estimates imply that for some time, consumption growth may remain below the level suggested by standard models, which do not incorporate MY or credit access more generally.

### **Is access to credit for the young more limited now than in the past?**

Our indicators of MY do not allow us to determine whether young adults cannot get credit, are discouraged from applying for credit, or do not want credit. Credit may be available, but (young) people may not seek it out the way they did in the past for precautionary reasons or other factors. That is, we cannot easily separate credit demand from credit supply. Nevertheless, we present some additional evidence that is consistent with the CARD Act likely hindering younger individuals' access to credit.

First, since the CARD Act's introduction, the distribution (inter-quartile range) of credit scores for individuals likely affected by the act has become compressed, but that is not the case with the scores for other age groups. In particular, the distribution of credit scores for 20-year-olds shifts up and narrows after 2009. The average credit score among 20-year-olds jumped from 652 in 2006 to 670 in 2018, while the standard deviation of their credit scores

declined from 55 to 42. In contrast, the distributions of credit scores for individuals ages 30, 40, and 50 have remained relatively stable over time (see appendix Figure A.3). The compression of their credit scores suggests that younger individuals who appear in the credit bureau data since the enactment of CARD Act are likely more easily able to access credit, because they are the more appealing young borrowers for lenders (based on observables) and/or can more easily get credit through parental co-signing of credit cards or other means.

Additionally, we compare individuals ages 27 and 30 in 2018 with individuals in the same age groups in 2006. Twenty-seven-year-olds in 2018 were affected by the CARD Act (they are the oldest cohort impacted by the regulatory change), while 30-year-olds were not.<sup>10</sup> We find that a 27-year-old in 2018 opened his/her first credit account about 6.4 months later, on average, than a 27-year-old in 2006 (see Table 2, column [1]). This result is consistent with the CARD Act possibly delaying access to credit for affected young adults. Lower delinquency rates for 27-year-olds in 2018 relative to 2006 also point to a more qualified (likely more affluent) pool of young borrowers (column [2]). Both 27- and 30-year-olds in 2018 were less likely to hold a mortgage compared with individuals in those age groups in 2006, but the difference in mortgage holding between the two age groups narrows in 2018 relative to 2006 (column [3]). In addition, while the CCP risk scores of both age groups are higher in 2018 than in 2006, 27-year-olds in 2018 do not have lower credit scores than 27-year-olds in 2006, despite the former group’s relatively shorter credit histories. On the surface, this result suggests the CARD Act has had no negative impact on young adults’ credit scores. However, a more pessimistic interpretation would conclude that young individuals who would have had lower credit scores to begin with were excluded from traditional credit channels following the enactment of the CARD Act and do not appear in credit bureau records (a compositional change).<sup>11</sup>

We also document a decline in the share of young adults with credit cards during this

---

<sup>10</sup>We use 2006 as the pre-CARD Act comparison year to avoid any adverse effects of the Great Recession on individuals’ credit histories. Using individuals in these age groups from 2004, 2005, 2006, or the three years together as the comparison group yields similar results.

<sup>11</sup>Adding state fixed effects to these regressions or controlling for economic conditions via state-level unemployment rates or gross state product does not alter these findings.

period, which is consistent with less access to credit among young adults following the implementation of the CARD Act. We reach this finding using data on a sample of individuals whose mothers are members of the National Longitudinal Survey of Youth of 1979 (NLSY79). While these young adults are not necessarily representative of the US population (unlike their mothers), the data allow us to track access to credit cards and, more importantly, look at socioeconomic differences among individuals likely affected by the CARD Act—which we cannot do with credit bureau data, because, by law, they contain no demographic information other than age. The NLSY79 children are interviewed biennially, and the most recent data available are for 2014. We focus on persons who are 18 to 21 years old at the time of each interview.<sup>12</sup> We observe a decline in the share of these individuals with credit cards after the CARD Act took effect; the decline involves young adults in all of the socioeconomic groups, and some reversal of this trend begins in 2012, as shown in Figure 2.<sup>13</sup> In addition, we find that for these young adults, having a credit card can be based on their race as well as the socioeconomic status of their mothers (parents). Non-black, non-Hispanic young individuals; those from more affluent families; and females were more likely to have a credit card in 2014 than were other groups of 18- to 21-year-olds. Also, the recovery in the share of children with credit cards was slower for non-white (especially Hispanic) young adults and those with lower-income parents.<sup>14</sup> Overall, these patterns are consistent with credit availability being more limited for younger individuals in the years since the enactment of the CARD Act—especially for individuals who may be fairly or unfairly perceived as riskier borrowers.

Some of our MY measures are also highly correlated with state-level poverty rates, and the correlation has strengthened since the CARD Act went into effect. The raw correlation of the count MY (18 to 34) and the poverty rate from 2000 through 2008 is 0.36, while the

---

<sup>12</sup>The number of individuals in the data in this age range declines over time as their mothers get older; see the top-left panel of Figure 2.

<sup>13</sup>The partial reversal could be due to young individuals and their parents learning over time how to obtain credit cards under the new regulation, as well as to the economic recovery.

<sup>14</sup>Some of the relationship between parental income and young adults' credit card access may be due to lower-income parents being less able to co-sign for their child's credit card.

correlation after 2008 is 0.45. When we regress count MY on the poverty rate, allowing for a differential effect after 2008 in regressions that also include state and time fixed effects, we obtain a significant coefficient for the post-2008 period (see Table 3). This finding suggests that the CARD Act likely has had a disproportionate effect on credit access for young individuals of less privileged backgrounds.

Separately, we also find that the degree of exposure to financial education across states and over time correlates with our MY measures. This result comes from first measuring financial education exposure using data on the various financial education mandates that are part of high school graduation requirements across states, as captured by Urban and Schmeiser (2015). We classify an individual in a given state as (likely) exposed if a financial education requirement for high school graduation was in place when that individual was 15 years old.<sup>15</sup> A higher share of young adults who were exposed to a personal finance curriculum is associated with a lower share of MY after the CARD Act took effect (see Table 3). Quantitatively, having a one-standard-deviation higher share of young adults who were exposed to financial education is associated with a 0.76 to 0.82 percentage point lower share of MY. This result suggests that financial education has been important in helping young adults navigate the new environment that followed the implementation of the CARD Act and obtain credit—consistent with the idea that accessing credit has become more difficult for young adults.

## 4 Concluding Remarks

Consumers with limited credit histories face challenges accessing credit markets. In the past, credit cards triggered the creation of consumer credit records more frequently than any other product. The introduction of the Credit Card Accountability Responsibility and Disclosure (CARD) Act in 2009, which made it harder for individuals younger than 21 to obtain credit cards, likely has had some long-lasting effects on young adults' access to credit.

---

<sup>15</sup>Using a similar approach, Stoddard and Urban (Forthcoming) find that financial education graduation requirements shifted college students from high-cost to low-cost college financing—a result that demonstrates the potential power of personal finance education at a young age.

We document that there are more young adults lacking sufficient credit histories to appear in credit bureau data today than there were before the Great Recession, and we show that young individuals’ reduced access to credit acts as a drag on state-level consumption growth, even after we control for typical drivers of consumer spending. With the measures of young adults missing from credit bureau records (the “missing young” or MY) remaining elevated, the drag on consumption could continue. We further provide suggestive evidence that the MY level is due, at least in part, to credit supply effects and not necessarily to reduced credit demand by young adults. In particular, since the enactment of the CARD Act there appears to be less credit among the more socioeconomically disadvantaged young adults and among young adults who are less financially literate.

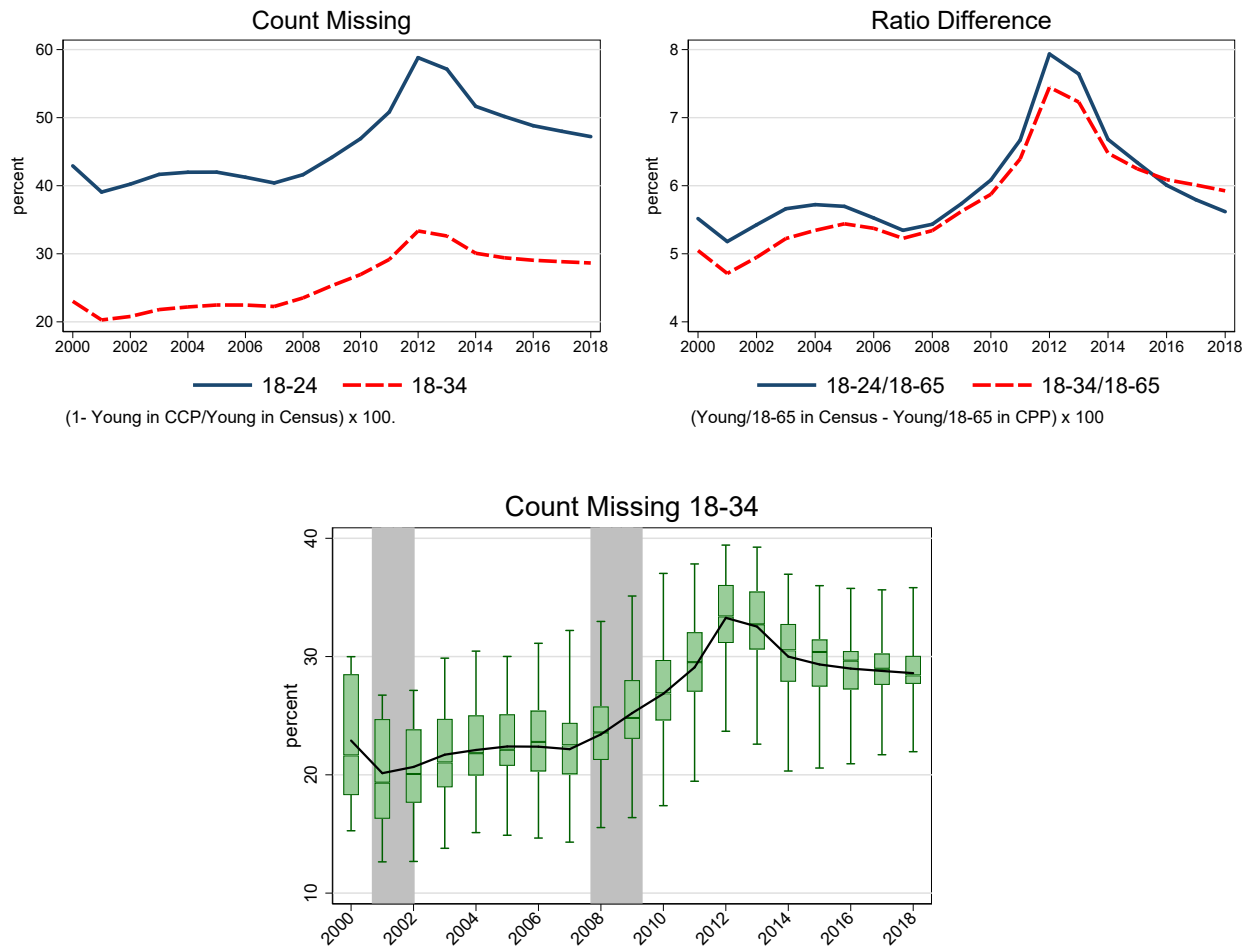
Our research highlights the need to continue to find ways for young adults to more easily signal credit worthiness. In the meantime, more financial education is important for helping these consumers build credit histories early in their adult lives, before their need for credit (to buy a house or other large-ticket items) increases substantially. Indeed, the more limited credit (or slower development of credit histories) for young adults that followed the implementation of the CARD Act has important implications for wealth accumulation to the extent that these credit limitations force young people to wait longer to purchase their first home.

## References

- Brevoort, Kenneth P., Philipp Grimm, and Michelle Kambara. 2015. “CFPB Data Point: Credit Invisibles.” Working paper. The CFPB Office of Research.
- Brevoort, Kenneth P., and Michelle Kambara. 2017. “CFPB Data Point: Becoming Credit Visibles.” Working paper. The CFPB Office of Research.
- Carroll, Christopher D. 1997. “Buffer-Stock Saving and the Life Cycle/Permanent Income Hypothesis.” *The Quarterly Journal of Economics* 112(1): 1–55.
- Carroll, Christopher D., Jiri Slacalek, and Martin Sommer. 2012. “Dissecting Saving Dynamics: Measuring Wealth, Precautionary, and Credit Effects.” Technical Report.

- Cooper, Daniel, and Maria Jose Luengo-Prado. 2018. “Household Formation over Time: Evidence from Two Cohorts of Young Adults.” *Journal of Housing Economics* 41(September): 106–123.
- Deaton, Angus. 1991. “Saving and Liquidity Constraints.” *Econometrica* 59(5): 1221–1248.
- Debbaut, Peter, Andra Ghent, and Marianna Kudlyak. 2016. “The CARD Act and Young Borrowers: The Effects and the Affected.” *Journal of Money, Credit and Banking* 48(7): 1495–1513.
- Demyanyk, Yuliya, Dmytro Hryshko, Maria Jose Luengo-Prado, and Bent E. Sorensen. 2019. “The Rise and Fall of Consumption in the 2000s: A Tangled Tale.” *Economica* 86(343): 495–531.
- Stoddard, Christiana, and Carly Urban. Forthcoming. “The Effects of State-Mandated Financial Education on College Financing Behaviors.” *Journal of Money, Credit and Banking*.
- Urban, Carly, and Maximilian Schmeiser. 2015. “State-Mandated Financial Education: A National Database of Graduation Requirements, 1970-2014.” Insights: Financial Capability. FINRA Investor Education Foundation.

**Figure 1. Missing Young Indicators**

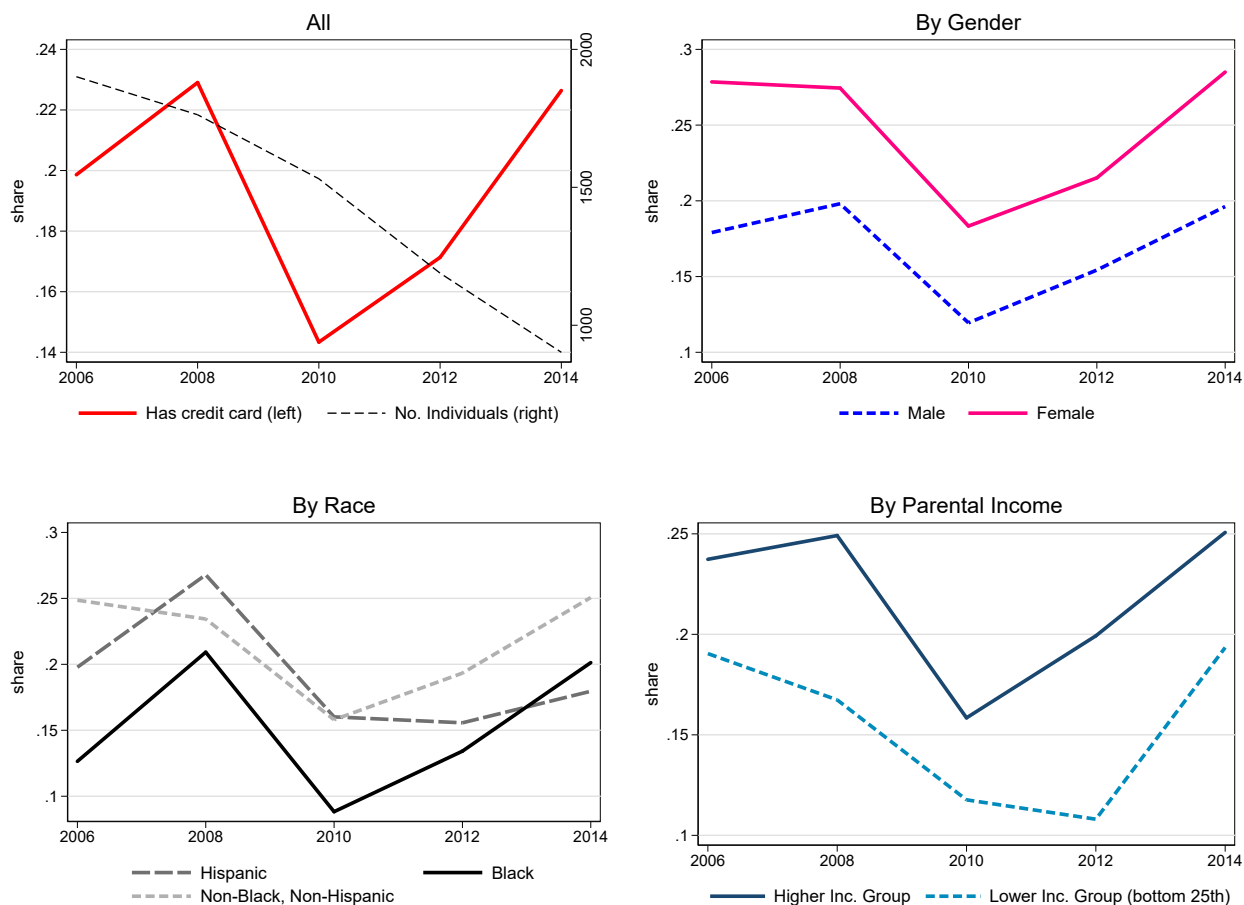


*Source:* Authors' calculations using the NY Fed CCP provided by Equifax and data from Census/Haver Analytics.

*Notes:* The top-left panel is a percent missing indicator based on population counts of young adults in both the census and the CCP ( $\times 20$  in this case since the CCP is a 5 percent sample of the US population). The top-right panel depicts the difference between the ratio of young adults (in the age group indicated by the series label) relative to the number of 18- to 65-year-olds in the census and the CCP. The bottom panel shows state-level variation in the count-based measure for 18- to 34-year-olds, the dashed series in the top-left panel. The box and whiskers show the interquartile range, median, minimum, and maximum percent missing young across states, and the line depicts the (population-weighted) average across all states.



**Figure 2.** Share of Young Adults 18 to 21 with Credit Cards: NLSY79 Children



*Source:* Authors' calculations using data from young adults who are children of women belonging to the National Longitudinal Survey of Youth 1979 cohort (NLSY79).

*Notes:* The data are biennial, and 2014 is the latest year available. This sample of young adults, unlike their mothers, is not necessarily representative of the US population.

**Table 1.** The Missing Young and Consumption Growth

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	Missing Young Count		Missing Young Ratio Diff.		Missing Young Count		Missing Young Ratio Diff.		Missing Young Count		Missing Young Ratio Diff.		Missing Young Count		Missing Young Ratio Diff.	
	18 to 24	18 to 34	18 to 24	18 to 34	18 to 24	18 to 34	18 to 24	18 to 34	18 to 24	18 to 34	18 to 24	18 to 34	18 to 24	18 to 34	18 to 24	18 to 34
	Total	Total	Total	Nondurables + Services	Durables	Total	Total	Nondurables + Services	Durables	Total	Total	Nondurables + Services	Durables	Total	Total	Nondurables + Services
Income Growth	0.17*** (6.50)	0.16*** (6.33)	0.14*** (5.89)	0.28*** (5.57)	0.17*** (6.67)	0.16*** (6.67)	0.15*** (6.31)	0.28*** (5.35)	0.17*** (6.67)	0.16*** (6.67)	0.15*** (6.31)	0.28*** (5.35)	0.17*** (6.67)	0.16*** (6.67)	0.15*** (6.31)	0.28*** (5.35)
House-Price Growth	0.03*** (3.71)	0.04*** (4.00)	0.01 (1.35)	0.20*** (7.85)	0.03*** (3.47)	0.04*** (4.29)	0.01 (1.39)	0.20*** (8.15)	0.03*** (3.47)	0.04*** (4.29)	0.01 (1.39)	0.20*** (8.15)	0.03*** (3.47)	0.04*** (4.29)	0.01 (1.39)	0.20*** (8.15)
Change in Unemployment	-0.27*** (-2.88)	-0.26*** (-2.87)	-0.18** (-2.20)	-0.85*** (-3.84)	-0.27*** (-2.94)	-0.26*** (-2.77)	-0.18** (-2.08)	-0.84*** (-3.76)	-0.27*** (-2.94)	-0.26*** (-2.77)	-0.18** (-2.08)	-0.84*** (-3.76)	-0.27*** (-2.94)	-0.26*** (-2.77)	-0.18** (-2.08)	-0.84*** (-3.76)
Change in Confidence	-0.00 (-0.16)	0.00 (0.03)	-0.01 (-1.61)	0.04* (1.78)	-0.00 (-0.18)	-0.00 (-0.02)	-0.01 (-1.67)	0.04* (1.86)	-0.00 (-0.18)	-0.00 (-0.02)	-0.01 (-1.67)	0.04* (1.86)	-0.00 (-0.18)	-0.00 (-0.02)	-0.01 (-1.67)	0.04* (1.86)
Avg. Credit Score	0.05*** (3.55)	0.05*** (4.09)	0.06*** (5.09)	-0.01 (-0.40)	0.05*** (3.29)	0.05*** (3.86)	0.06*** (4.87)	-0.01 (-0.36)	0.05*** (3.29)	0.05*** (3.86)	0.06*** (4.87)	-0.01 (-0.36)	0.05*** (3.29)	0.05*** (3.86)	0.06*** (4.87)	-0.01 (-0.36)
Missing Young	-0.03 (-1.07)	-0.05** (-2.05)	-0.06** (-2.42)	0.01 (0.11)	-0.10 (-0.70)	-0.22** (-2.24)	-0.25** (-2.47)	-0.10 (-0.49)	-0.10 (-0.70)	-0.22** (-2.24)	-0.25** (-2.47)	-0.10 (-0.49)	-0.10 (-0.70)	-0.22** (-2.24)	-0.25** (-2.47)	-0.10 (-0.49)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.83	0.84	0.79	0.87	0.83	0.84	0.79	0.87	0.83	0.84	0.79	0.87	0.83	0.84	0.79	0.87
Observations	969	969	969	969	969	969	969	969	969	969	969	969	969	969	969	969

*Notes:* Regression:  $\Delta \log(c_{it}) = \alpha_i + \mu_t + \beta_y \Delta \log(y_{it}) + \beta_h \Delta \log(h_{it}) + \beta_u \Delta u_{it} + \beta_{ca} \Delta \text{conf}_{it} + \beta_{it} \varepsilon_{it}$ .  $i$ ,  $t$ , and  $r$  denote a state, a year, and a census region, respectively.  $c$  and  $y$  are real consumption per capita and disposable income per capita, respectively, from the BEA,  $h$  is a house-price index from CoreLogic,  $u$  is the unemployment rate from the BLS, “conf” is consumer sentiment from the Conference Board, and “ca” indicates a measure relating to credit access as listed in the table row and computed by the authors using NY Fed CCP data provided by Equifax.  $\alpha_i$  and  $\mu_t$  denote state and time fixed effects, respectively. All regressions are population weighted. Standard errors clustered by state. \*\*\* (\*\*) [\*] significant at the 1 (5) [10] percent level. Sample period: 2000–2017.

**Table 2.** 27-year-olds compared with 30-year-olds in 2006 vs. 2018. Difference in Difference Regressions

	(1) Age Oldest Acct	(2) 90-day Delinquency	(3) Has Mortgage	(4) Credit Score
Age=27	−21.71*** (−50.01)	0.11 (1.29)	−10.31*** (−36.65)	−10.30*** (−19.44)
Year=2018	1.26*** (3.13)	−0.24* (−1.91)	−11.20*** (−22.50)	18.24*** (16.60)
Year=2018 × Age=27	−7.66*** (−20.87)	−0.42*** (−4.23)	1.60*** (5.22)	0.14 (0.20)
Constant	105.03*** (115.50)	5.52*** (31.72)	33.52*** (21.62)	641.11*** (171.54)
Observations	758295	758295	758295	758295

*Notes:* Regression:  $y = \alpha + \beta_a \text{Age}_{27} + \beta_y \text{Year}_{2018} + \beta_{ay} \text{Age}_{27} \times \text{Year}_{2018} + \varepsilon$ . Regressions use NY Fed CCP data provided by Equifax: 2006 and 2018 only. Only individuals ages 27 and 30 are included in these regressions. The credit score is Equifax Risk Score. Standard errors clustered by state. \*\*\* (\*\*) [\*] significant at the 1 (5) [10] percent level.

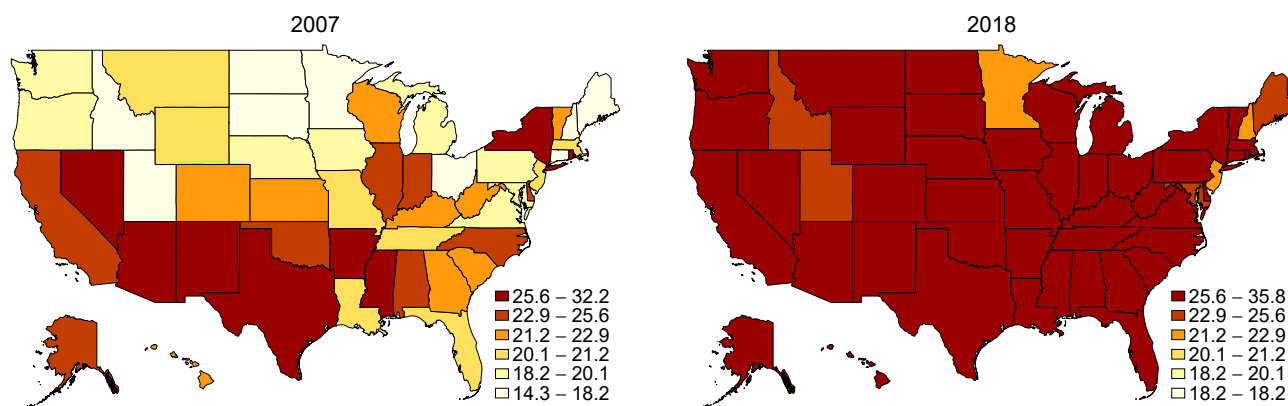
**Table 3.** The Missing Young, Poverty, and Financial Education

	(1)	(2)	(3)	(4)	(5)	(6)
	Missing Young Count 18 to 34			Missing Young Ratio Diff. 18 to 34		
Poverty rate	0.03 (0.22)		-0.05 (-0.36)	0.01 (0.46)		0.01 (0.20)
Year $\geq$ 2009 $\times$ Poverty rate	0.20* (1.95)		0.23* (1.89)	0.02 (0.91)		0.02 (0.77)
Financial education req.		0.43 (1.00)	0.24 (0.50)		0.10 (1.02)	0.08 (0.75)
Year $\geq$ 2009 $\times$ Financial educ. req.		-0.82*** (-6.72)	-0.76*** (-6.36)		-0.12*** (-3.46)	-0.11*** (-3.16)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.90	0.91	0.91	0.89	0.89	0.90
Observations	969	969	969	969	969	969

*Notes:* State-level regressions using census data (poverty rate), New York Fed CCP data provided by Equifax (missing young), and data from Urban and Schmeiser (2015) (financial education). The financial education requirement measure represents the share of individuals 18 to 34 years old in a given state each year who were potentially exposed to personal finance education in high school due to state-mandated graduation requirements in place when those individuals were 15 years old as collected in Urban and Schmeiser (2015). This variable has been standardized for easier interpretation. Standard errors clustered by state. \*\*\* (\*\*) [\*] significant at the 1 (5) [10] percent level.

## A Appendix Figures and Tables

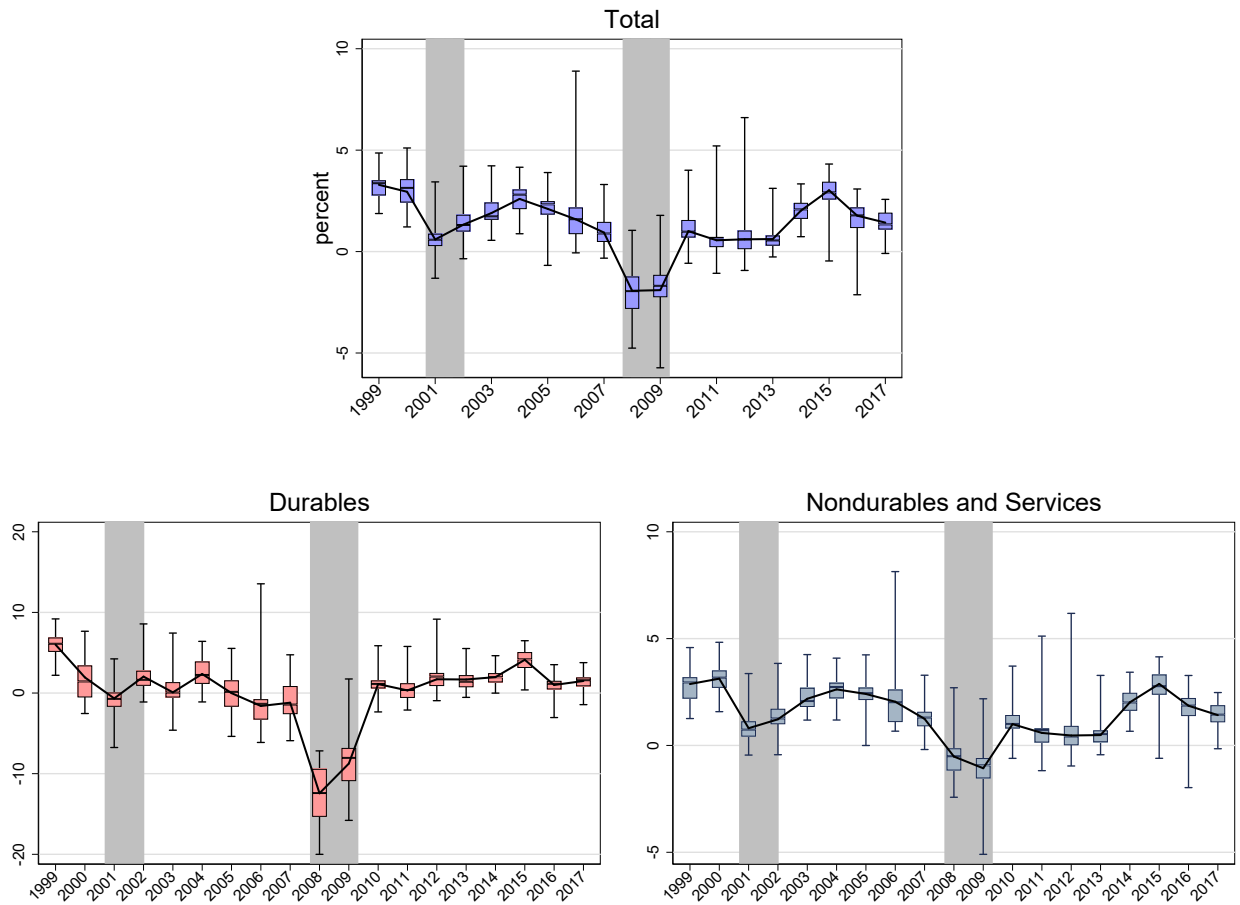
**Figure A.1.** Count Missing Young, Aged 18 to 34: State-Level Variation



*Source:* Authors' calculations using the NY Fed CCP data provided by Equifax and Census Bureau data.

*Notes:* "Count Missing Young" is based on population counts of young adults in both the census and the CPP ( $\times 20$  since the CPP is a 5 percent sample of US population).

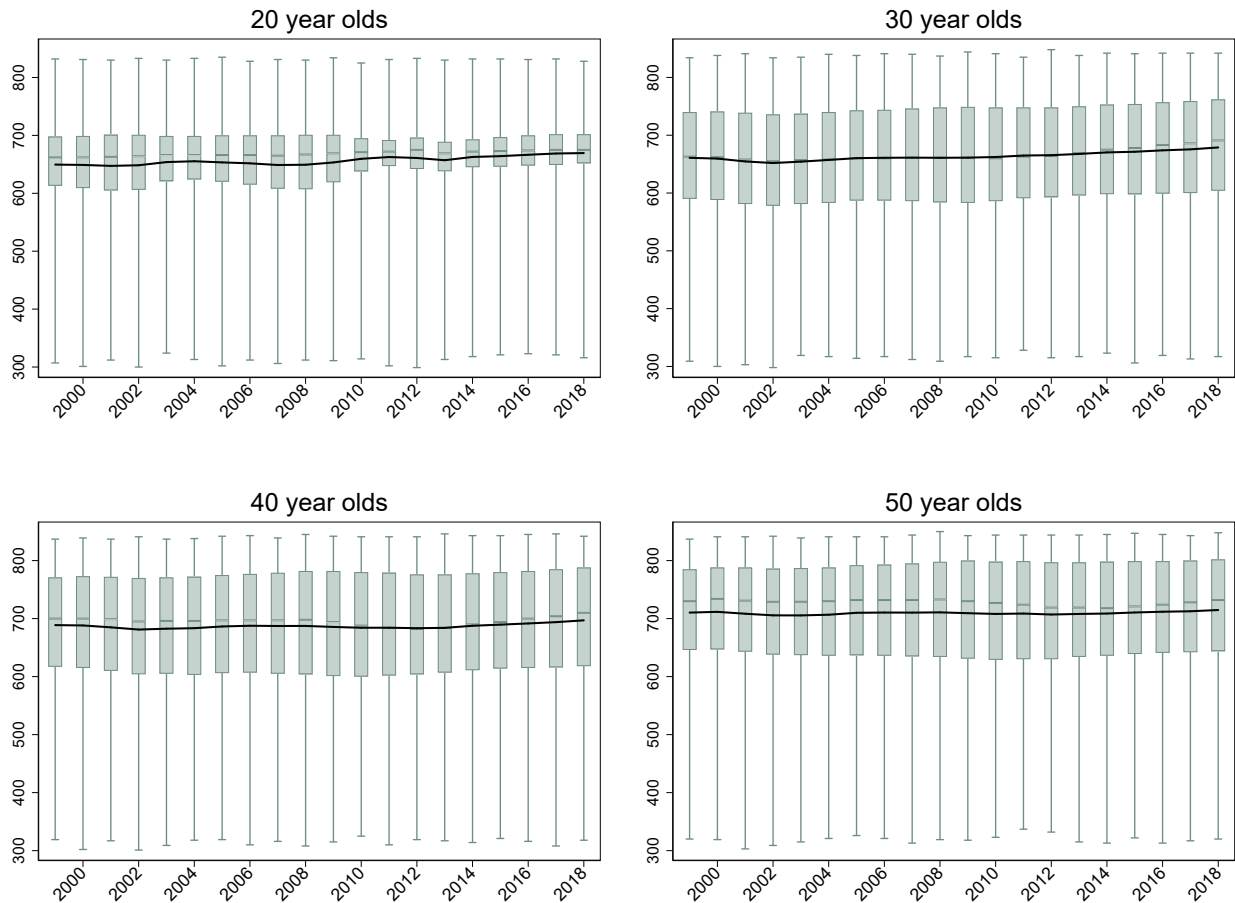
**Figure A.2.** State-Level Variation in Consumption Growth



*Source:* Authors' calculations using BEA data.

*Notes:* The box and whiskers show the interquartile range, median, minimum, and maximum growth in the plotted series across states. The line depicts the (population-weighted) average across states.

**Figure A.3.** Distribution of Credit Scores by Age over Time



*Source:* Authors' calculations using the NY Fed CCP provided by Equifax.

*Notes:* The CCP contains a generic credit score much like others available in the credit bureau marketplace, Equifax Risk Score. The box and whiskers show the interquartile range, median, minimum, and maximum. The line depicts the average.

**Table A.1.** Summary Statistics for Regressions

Variable	Mean	Std. Dev.	Min.	Max.	N
Consumption Growth	1.22	1.5	-5.73	8.9	969
Income Growth	1.35	1.98	-6.66	11.99	969
House-Price Growth	3.42	6.18	-25.69	27.27	969
Change in Unemployment	-0.03	1.13	-2.7	5.57	969
Change in Confidence	0.07	13.66	-46.22	28.65	969
Avg. Credit Score	676.49	18.75	619.31	716.31	969
Missing Young Count 18-24	46.15	6.72	28.14	72.23	969
Missing Young Count 18-34	25.97	5.16	12.64	39.42	969
Missing Young Ratio Diff. 18-24	6.02	1	3.74	11.13	969
Missing Young Ratio Diff. 18-34	5.8	1.08	2.32	9.81	969

*Notes:* Statistics weighted by state population.

**Table A.2.** Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Consumption Growth	1.00									
(2) Income Growth	0.54	1.00								
(3) House-Price Growth	0.65	0.30	1.00							
(4) Change in Unemployment	-0.55	-0.31	-0.42	1.00						
(5) Change in Confidence	0.28	0.21	0.10	-0.16	1.00					
(6) Avg. Credit Score	0.07	0.05	-0.00	-0.10	0.07	1.00				
(7) Missing Young Count 18-24	-0.07	-0.08	-0.08	-0.32	0.23	-0.07	1.00			
(8) Missing Young Count 18-34	-0.10	-0.08	-0.12	-0.28	0.24	0.01	0.94	1.00		
(9) Missing Young Ratio Diff. 18-24	-0.05	-0.07	-0.05	-0.25	0.16	-0.14	0.87	0.73	1.00	
(10) Missing Young Ratio Diff. 18-34	-0.10	-0.09	-0.06	-0.26	0.19	-0.07	0.93	0.92	0.85	1.00