Financial Consequences of Health Insurance: Evidence from the ACA’s Dependent Coverage Mandate

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Abstract
We study the financial effects of health insurance for young adults using the Affordable Care
Act’s dependent coverage mandate as a source of exogenous variation. Using nationally repre-
sentative, anonymized credit report and publicly available survey data on medical expenditures,
we exploit the mandate’s implementation in 2010 and its automatic disenrollment mechanism
at age 26. Our estimates show that increasing access to health insurance lowered young adults’
out-of-pocket medical expenditures, debt in third-party collections, and the probability of per-
sonal bankruptcy. However, most improvements in financial outcomes are transitory, as they
diminish after an individual ages out of the mandate at age 26.

Keywords: health insurance, consumer credit, financial outcomes, Affordable Care Act
JEL Codes: D14, I13, I18

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1 Introduction

Prior to the passage of the Affordable Care Act (ACA), young adults were exposed to high levels of medical expenditure risk because of low health-insurance coverage and high levels of indebtedness. From 2006 to 2009, data from the U.S. Census Bureau show that the uninsured rate of adults ages 19–25 was over 35 percent, approximately 75 percent higher than the rate of middle-age adults.\(^1\) Over this same period, young adults carried significant amounts of debt and may have had difficulties accessing additional sources of credit. Data from the Federal Reserve Board indicate that approximately 80 percent of young individuals ages 19–31 had some type of debt balance, and more than 40 percent reported being credit constrained (Dettling and Hsu, 2014).\(^2\) This lack of insurance coverage, combined with the limited ability to acquire additional credit, implies that even small medical shocks could have serious negative financial consequences for young individuals during this period. However, relatively little research has been done to assess if health-insurance coverage for young adults effectively mitigates this risk and reduces financial distress.

This paper addresses this gap in the literature by exploiting the ACA’s dependent coverage mandate (DCM) to assess the impact of health insurance on financial outcomes of young adults. One of the earliest parts of the ACA to take effect, the DCM required that all private health-insurance plans offering dependent coverage policies in the U.S. cover older children up to the age of 26. Within three years, the uninsured rate for young adults ages 19 to 26 fell by almost 10 percentage points (Collins, Gunja, and Beutel, 2016).

We take advantage of two aspects of the DCM to estimate the effect of insurance access on financial outcomes. First, to estimate the financial effect of gaining access to insurance, we utilize both the age eligibility criteria of the DCM and geographic variation of the uninsured young adult population to formulate an empirical strategy similar to Mazumder and Miller (2016) and estimate a triple-differences (DDD) model by combining data on the uninsured rate and the unemployment rate for young adults and form an ex-ante “exposure” indicator. We use this triple-differences framework and compare young adults born in either 1985 or 1986 (who were ages 24 or 25 at the

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\(^1\)The uninsured rate for adults ages 36–45 was 20.8 percent from 2006 to 2009. Both rates are based on the authors’ calculations from the Current Population Survey (CPS).

\(^2\)The average balance of this debt ranged from $13,000 to $20,000, depending on what kind of debt is measured (Dettling and Hsu, 2014; Brown, Grigsby, van der Klaauw, Wen, and Zafar, 2016).
passage of the mandate in 2010) with individuals born in 1982 or 1983 (who were 27 or 28 in 2010), living in counties with a high pre-mandate young adult uninsured rate and states with a high young adult unemployment rate (both rates above their 75 percentiles). To estimate the effects of losing insurance access under the DCM, we exploit the aspect of the mandate that limits insurance coverage to dependents up to their 26th birthday. Because of the introduction of a national age-based cutoff, we may expect to see differences in the age dynamics in financial outcomes before and after the implementation of the DCM. We take advantage of this age cutoff and specify a differences-in-differences empirical design and compare financial outcomes across ages before and after the ACA’s implementation.

Similar to other recent studies on the financial effects of health-insurance policy changes (Argys, Friedson, Pitts, and Tello-Trillo, 2019; Brevoort, Grodzicki, Hackmann, and Koulayev, 2019; Hu, Kaestner, Mazumder, Miller, and Wong, 2018; Mazumder and Miller, 2016),\(^3\) we use individual-level credit and debt information on a 5 percent random sample of U.S. adults with a credit report. These data provide a unique perspective for assessing financial distress as they contain detailed longitudinal records of these individuals’ financial information, allowing us to track their performance accurately over time. We also rely on data from the Medical Expenditure Panel Survey (MEPS) to assess the effect of access to health insurance on medical expenditures, out-of-pocket (OOP) expenditures, and the probability of incurring large OOP medical expenditures. The MEPS has been previous used by Chua and Sommers (2014) and Chen, Vargas-Bustamante, and Novak (2017) to assess the effect of the passage of the ACA’s DCM, showing that its implementation led to a 14 percent decrease in annual health-care expenditures and an 18–21 percent decrease in OOP expenditures.

Our results indicate that having access to insurance improves the financial outcomes of young individuals. In particular, we find that the introduction of the mandate reduced the probability of having debt in third-party collections (which include unpaid medical bills), the number of third-party collections, and the amount of debt in third-party collections. We also find that, in some specifications, the mandate lowered the probability that a young adult would file for personal bankruptcy while covered by the law. Using MEPS data, we confirm previous studies’ results that

\(^3\)Other studies focusing on the effect of health insurance on financial outcomes include Barcellos and Jacobson (2015) and Gross and Notowidigdo (2011).
have found that OOP medical expenditures declined for individuals covered by the mandate. We also find that these individuals also have a lower probability of incurring very large OOP medical expenditures, suggesting that health insurance limited medical expenditure risk.

We also examine if individuals with subprime Risk Scores prior to the mandate’s implementation, those most likely to be considered credit constrained and financially vulnerable, experienced relatively larger decreases in distress than those with prime Risk Scores. We find that young adults who were in the subprime category prior to the passage of the mandate experienced the largest declines in financial distress.

Along with estimating the effect of gaining health insurance through the DCM, we calculate the effects of the automatic disenrollment from the mandate when a young adult reaches age 26. Our estimates indicate that most improvements observed in the two years immediately after the mandate was implemented disappear after an individual ages out of the mandate’s coverage at age 26. This result is consistent with Dahlen (2015), who found a 15.4 percentage point increase in the share of young adults with worse health-insurance coverage after they aged out of the mandate. In particular, we find that the probability of having a third-party collection, amount in collections, and OOP medical expenses return to their pre-mandate levels. These findings may suggest that the quality of health insurance is important for financial outcomes as much as the coverage status.

In addition to examining the effects of providing health insurance to young individuals, this paper makes three contributions to the existing literature. First, we add to a growing body of literature that has analyzed the effects of the ACA’s dependent coverage mandate on a number of different margins, including employment (Bailey and Chorniy, 2016; Heim, Lurie, and Simon, 2018), self-employment (Bailey, 2017), and health and health-care utilization outcomes (Akosa Antwi, Moriya, and Simon, 2015; Barbaresco, Courtemanche, and Qi, 2015). Second, unlike previous studies of changes in health-insurance policies that have used credit report information and public health-insurance expansions, we analyze the effect of a government-mandated expansion in private insurance coverage on financial outcomes of intended beneficiaries, not public insurance programs such as Medicaid or the Massachusetts health-care reform. Given the policy uncertainty surrounding health care, we believe it is important to assess the effects of various health-insurance policies

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4 We define subprime as having a Risk Score below 620 in at least one quarter of 2008. The term Risk Score refers to Equifax Risk Score in this paper. This Risk Score is similar to other risk or credit scores used in the industry.
implemented in recent years on the financial outcomes of their target populations. Third, we estimate not only the effect of enrollment in health-insurance coverage but also the consequences of an automatic disenrollment from insurance coverage after young adults age out of the mandate at age 26.

This paper also adds to the literature on the effect of public policies on the financial outcomes of young adults. While there are recent studies examining the effects of financial education mandates (Brown et al., 2016) and credit card restrictions (Debbaut, Ghent, and Kudlyak, 2016) on financial outcomes of young individuals, the financial response of this population group to health-insurance coverage is not well understood. However, given that young adults in the U.S. still experience high levels of uninsurance and are financially vulnerable because of low income and high unemployment, it is important to understand this response.

Overall, our results indicate that the expanding health insurance to young adults improves their financial well-being. This is consistent with other recent literature that has shown that assessments of welfare effects of health-care policy should account for the effect on individuals' personal finances as well as such factors as labor market outcomes. It is important to note that, because we observe only if young adults are eligible to be covered by the mandate, not if they actually gained health-insurance coverage, our estimates measure the intent-to-treat (ITT) effects of the DCM. This implies that our estimates of the effect of the mandate on treated individuals are more conservative than the treatment effects for individuals who actually received health insurance through the mandate. This is because we will be averaging effects across eligible individuals who actually received health insurance through their parents’ plans and those who did not.

2 Background and Framework

2.1 Young Adult Financial Health

Prior to the implementation of the ACA in 2010, the financial health of young adults could be characterized by three stylized facts. First, young adults were both asset and savings poor. Data from the 2010 Survey of Consumer Finances (SCF) show that the median bank deposits\(^5\) for young adults ages 19–25 was approximately $1,072, and the average amount of money in savings accounts

\(^5\)These include checking, savings, and money market mutual fund accounts.
was $3,000, with a median of $0. Median financial assets for this age group were approximately $1,558, while median total assets, including real estate, were only $11,163. Second, young adults during this time held fairly high levels of debt. Based on data from the Federal Reserve Bank of New York/Equifax Consumer Credit Panel (CCP), average debt balances in 2009 for 19- to 25-year-olds were approximately $13,470, with a median of $7,430. Individuals who were 25 years of age experienced even higher levels of indebtedness, with an average debt balance of $18,708. Third, young adults generally had low rates of financial literacy. Surveys conducted by the Jump$tart Coalition show that high school students consistently score poorly on a test of financial literacy, correctly answering only half of the test questions since 2000.\textsuperscript{6} College students who took the test in 2008 fared better than high school students, with an average score of 62.2 (Mandell, 2008).

Taking all of these facts into account, young adults in this time period were low on income, assets, and financial literacy, and had high debt levels.

One important implication of these resource constraints is how they affect an individual’s ability to smooth consumption and cover medical expenses. Although young adults are healthier on average than the rest of the population, they spend a relatively high amount of money for health care out of their own pockets. According to MEPS data, approximately 17.5 percent of all health-care expenditures in 2009 by young adults ages 19–25 were paid out of pocket. Approximately 48.7 percent of these individuals paid more than 50 percent of their total yearly medical expenses out of pocket, and 37.8 percent paid their entire yearly medical expenses out of pocket. Given that young adults have relatively little in savings and assets and hold higher amounts of debt, there is a higher probability that they would face financial hardship in the face of an expensive medical bill.\textsuperscript{7}

\textsuperscript{6}The Jump$tart Coalition administered biannual surveys from 1998 to 2008 to a nationally representative sample of high school seniors. In 2008, Jump$tart administered the financial literacy test to college students.

\textsuperscript{7}Statistics are based on the authors’ calculations using data from the MEPS. For more information on the MEPS, see www.meps.ahrq.gov.
2.2 Dependent Coverage Mandates and Health-Insurance Coverage of Young Adults

2.2.1 State-Level Dependent Coverage Mandates

Prior to the ACA’s dependent coverage mandate, laws requiring private health-insurance plans to cover young adults were passed at the state level. Starting with Utah in 1995, these laws become more popular over time, with 20 additional states passing some type of dependent coverage mandate by 2008 (Monheit, Cantor, DeLia, and Belloff, 2011). The passage of these laws was in part a response to the fact that, historically, young adults have been the most uninsured age demographic in the United States. While estimates vary based on the definition of health-insurance coverage, there is broad consensus that the rate was in excess of 30 percent, with some estimates as high as 37 percent. However, despite these state-level mandates, young adult uninsurance remained persistently high, raising questions regarding their efficacy (Cantor, Belloff, Monheit, and Koller 2012b; Levine, McKnight, and Heep, 2011; Monheit et al., 2011). Among the many reasons for this is that the state laws were fairly narrow in scope, with eligibility varying by student status, marriage status, and type of insurance plan. Prior research also suggested that availability and eligibility criteria were not always clear or readily available to consumers (Cantor, Belloff, Monheit, DeLia, and Koller, 2012a). Another reason why the uninsured rate remained high is that self-insured plans, which account for more than half of all private health-insurance plans, were typically not covered by these state-level dependent coverage mandates because the Employee Retirement Income and Security Act (ERISA) exempted them from these regulations.

2.2.2 The ACA’s Dependent Coverage Mandate

The ACA was enacted by Congress on March 21, 2010, and signed into law by President Barack Obama on March 23, 2010. While a majority of the law’s components did not take effect until 2014, the DCM was one of the first provisions to be implemented, taking effect in late September 2010. The mandate standardized dependent coverage across all states, requiring all family health-insurance plans to offer coverage for dependent children until they reached 26, regardless of student or marital status. Subsequent analysis on the coverage effects of the mandate using data from the Survey of Income and Program Participation (SIPP) and the Current Population Survey (CPS)
Figure 1: Probability of Being Covered by a Policyholder Outside of the Household

Notes: Based on authors’ calculations using data from the MEPS. Pre-ACA is defined as the years 2005-2009, while Post-ACA is defined as the years 2011-2015.

have shown that the uninsured rate for adult dependents dropped significantly, with 2 million to 3 million young adults receiving dependent coverage through parental insurance by the end of 2011 (Akosa Antwi et al., 2013; Cantor et al., 2012b; Sommers et al., 2013). Figure 1 shows the probability that a young adult is covered by a health-insurance policyholder living outside of the household by age before and after the DCM using data from the MEPS. Consistent with the previous literature, we see that for individuals eligible to be covered (younger than 26), there is a substantial increase in this probability in the post-ACA period, with young adults ages 24 and 25 after the DCM seeing an approximately 7 percentage point increase in having this kind of coverage, relative to young adults of the same age prior to the DCM.

However, this increase in young adult insurance coverage via parental employer-sponsored insurance (ESI) was not solely from the previously uninsured population. Akosa Antwi et al. (2013) estimate that there was 1.7 percent decline in own-name ESI for young adults as a result of the mandate. This implies that own-name ESI coverage was crowded out by parental ESI, an important
spillover effect from the mandate. Despite this crowd-out problem, the uninsured rate for young adults 19–25 has declined dramatically to 14.5 percent, more than a 50 percent decline from the pre-ACA levels (Collins, Gunja, and Beutel, 2016).

Importantly, there was significant heterogeneity in where these declines in the uninsured rate occurred. To demonstrate this, we show counties with the largest declines in young adult uninsurance in Figure 2.A and 2.B. As shown in Figure 2.A, there was significant variation in the uninsured rate across the U.S. prior to the passage of the DCM in 2009, with many parts of the Southwest and Southeast, as well as some counties in the Northwest, with uninsured rates in excess of 30 percent. These rates declined substantially after the mandate implementation, especially in the Southwest and Western states as shown in Figure 2.B. Similar to Mazumder and Miller (2016), we use this variation in the uninsured rate across U.S. counties in 2009 to examine if individuals in the regions most affected by the policy change experienced more pronounced changes in financial distress.

2.3 Conceptual Framework

2.3.1 Gaining Insurance

The fundamental purpose of health insurance is to reduce the financial risk of health-care spending. For young adults, who typically are healthier and have a lower incidence of chronic illnesses, we would expect that insurance does not function as a means for financing regular medical spending. Instead, we argue that it acts more in accordance to the standard model of insurance, mitigating financial uncertainty in the future. This feature is in contrast to older adults, who are relatively less healthy than young adults and suffer from chronic illnesses at a higher rate; for them, health-care costs can be very high and are regularly incurred. Because of these persistent and high costs, older adults frequently use health insurance as a tool to finance the use of regular and predictable medical spending, regardless of being in either a healthy or sick state. Using health insurance in this way is a deviation from the standard model, in which insurance is meant to smooth income across different states of health. This distinction in the use of health insurance between the two age groups is important, as it suggests that we should find differential financial effects from policies that expand insurance coverage to younger individuals compared with older individuals.

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8 Sixty percent of adults aged 50-64 have at least one chronic condition (Pew, 2013).
Figure 2.A: 2009 U.S. Uninsurance Rates for Young Adults, by County

Figure 2.B: 2013 U.S. Uninsurance Rates for Young Adults, by County

Note: Authors’ calculations using data from the U.S. Census Bureau’s Small Area Health Insurance Estimates Program.
Acquiring health insurance improves financial outcomes through two primary mechanisms: a risk effect and an income effect. The risk effect improves financial outcomes by lowering expected medical expenditures in the case of adverse health shocks. This reduction in risk may allow for investing (Goldman and Maestas, 2013; Ayyagari and He, 2016) or reduce the need to hold precautionary savings (Kotlikoff, 1989; Gruber and Yelowitz, 1999; Lee, 2016). Because of the differences in the incidences of chronic disease and other adverse health issues between older and younger adults, the transition from being uninsured to having health insurance should lower medical expenditure risk less for younger adults, all else equal. In addition, young adults have significantly less income and assets, which implies that the level of medical expenditures that would trigger default is lower, leaving them vulnerable to smaller shocks. However, the overall effect of this risk reduction on financial outcomes depends on a number of additional factors, including health-risk status and individual preferences for insurance (Cutler, Finkelstien, and McGarry, 2008).

For those individuals who were uninsured before the passage of the mandate, receiving coverage likely results in an income effect that improves financial standing. Because access to health insurance directly lowers total OOP medical expenses through co-pays and co-insurance, insured individuals will have increased availability of financial resources, via higher real incomes or increased credit availability. Having additional financial resources may also allow individuals to pay down existing delinquent debt or prevent future delinquencies. Delinquent and/or unpaid medical bills can lead to substantial financial problems (Brevoort et al., 2019); therefore, increasing insurance coverage should directly lead to a lower incidence of these events and, in turn, reduce financial distress. The presence of moral hazard will reduce the magnitude of the income effect, as any increased health care utilization after receiving coverage would increase OOP expenses. For young adults receiving coverage through parental ESI, the magnitude of the income effect would depend on the distribution of the premium and the cost-sharing between the parents and the dependents.

2.3.2 Parental ESI

A potential caveat when thinking about how insurance improves financial health for young adults is that the DCM induced crowd-out, leading some dependents to switch from own-name ESI plans to their parents plans (Akosa Antwi et al., 2013). For these individuals, the decision to switch to a parent’s plan is likely driven by differences in OOP expenditures and/or plan generosity. If we
assume young adults derive utility from insurance coverage and there are nonzero switching costs for shifting to parental ESI from an own-name plan, then individuals must receive higher utility either through increased plan generosity or through lower OOP costs to incentivize a switch to parental ESI. Similar to the uninsured, individuals who switch insurance plans because of lower OOP costs also experience an income effect through this OOP reduction. Overall, we expect the income effect for these individuals who switched from own-name to parental ESI to be less than that of the uninsured group, since the switching group includes individuals who switched because of net utility gains through increased benefits and because they incurred lower OOP costs.

### 2.3.3 Losing Health Insurance

While understanding how the expansion of insurance coverage can lead to improved financial outcomes, the financial effects of losing insurance are more ambiguous. While many individuals may be able to regain access through alternative means upon losing DCM eligibility (e.g., COBRA, the ACA marketplaces), some will experience an uninsured spell. Loss of insurance will likely lower medical care access and utilization (Anderson, Dobkin, and Gross, 2012, 2014; Ghosh and Simon, 2015; Tello-Trillo, 2016), leading to lower OOP expenditures while increasing medical expenditure risk. This, in turn, may lead to worse financial outcomes (Argys et al., 2019). If individuals’ physical health worsens as a result of losing health insurance, this could also lead to worse financial outcomes. Uninsured (or underinsured) individuals may have to seek care at an emergency room, which is expensive relative to primary care and can lead to serious negative financial consequences (Dobkin et al., 2018). Once again, because of the health of younger adults and their patterns of utilization of care, we expect that the medical expenditure risk is lower for younger adults than older adults when losing health insurance.

In summary, we form the following hypotheses regarding the effects of the ACA’s DCM:

1. For young adults who gain access to health insurance, we expect financial distress to decrease. While the magnitude of the decline is ambiguous, given that younger adults are healthier, we expect the effect to be mostly because of the insurance value of health coverage, not subsidizing predictable health-care expenditures (which may be the case for other groups.

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9 Tello-Trillo (2016) discusses how an individual that utilized health care prior to disenrollment, and gained health capital (such as information on a chronic illness), would not lose this health capital when becoming uninsured.
such as older adults).

2. If young adults are able to reinsure at the same generosity level after the automatic disenrollment at age 26, we would expect no change in financial distress after age 26.

3. For young adults who lose health insurance via the aging-out mechanism, we expect financial distress to increase. The magnitude of the increase is ambiguous.

4. For young adults who are able to reinsure, but with lower generosity plans, we expect financial distress to increase. While the magnitude of the increase is ambiguous, we expect it would be smaller than for young adults who become uninsured after the auto disenrollment.

5. We expect the effects of losing health insurance access because of the aging-out mechanism of the DCM to be asymmetric with the effects of gaining access to health insurance, if young adults are able to reinsure.

3 Data

3.1 Medical Expenditure Panel Survey Data

To examine how the ACA’s DCM affected the health-care expenditures of young adults, we use data from the 2005-2015 waves of the Household Component of the MEPS. The MEPS is a yearly nationally representative survey of approximately 40,000 individuals and families. Participants in the MEPS are surveyed five times over two years about their households’ use of health services, insurance status, and health-care expenditures. The survey also collects detailed information on characteristics of all members in the household, including demographic information, income, and employment.

We limit our sample to individuals ages 21 to 29 because we are primarily interested in examining the age dynamics of medical expenses before and after the implementation of the DCM. Table 1 provides summary statistics for our sample of young adults.

Young adults average approximately $1,883 in total medical expenditures per year, and $323 in out-of-pocket expenses. In comparison, individuals ages 30 to 64 averaged $4,314 in total medical
Table 1: MEPS Summary Statistics, 2005-2015

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Pre-ACA</th>
<th>Post-ACA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total OOP Medical Spending</td>
<td>323.94</td>
<td>329.06</td>
<td>322.03</td>
</tr>
<tr>
<td></td>
<td>(990.48)</td>
<td>(949.23)</td>
<td>(1,015.77)</td>
</tr>
<tr>
<td>Total Medical Spending</td>
<td>1,883.39</td>
<td>1,627.50</td>
<td>2,168.51</td>
</tr>
<tr>
<td></td>
<td>(6,732.46)</td>
<td>(5228.80)</td>
<td>(8,185.22)</td>
</tr>
<tr>
<td>% of total medical spending paid OOP†</td>
<td>0.361</td>
<td>0.396</td>
<td>0.326</td>
</tr>
<tr>
<td></td>
<td>(0.350)</td>
<td>(0.356)</td>
<td>(0.341)</td>
</tr>
<tr>
<td>N</td>
<td>42,384</td>
<td>17,831</td>
<td>20,993</td>
</tr>
<tr>
<td>Fraction with OOP medical expenses</td>
<td>0.588</td>
<td>0.665</td>
<td>0.500</td>
</tr>
</tbody>
</table>

Notes: Authors’ calculations using data from the Medical Expenditure Panel Survey (MEPS) from 2005-2015. Sample is limited to individuals ages 21 to 29. Standard deviations reported in parentheses. All calculations made with sample weights. Expenditure variables deflated to 2010 dollars. †: conditional on having any out-of-pocket expenses

While total medical expenditures for young adults have increased over time, the percent of those expenditures that have been paid OOP have decreased in the post-ACA period. We also observe a decrease in the percent of individuals who have any OOP medical expenditures at all. These trends are consistent with the decrease in the uninsured rate for this population and the increase in insurance generosity due to the passage of the ACA’s dependent coverage mandate.

3.2 Consumer Credit Data

The consumer credit data used in the analysis come from the Federal Reserve Bank of New York/Equifax Consumer Credit Panel (CCP). The CCP data set is an anonymized, nationally representative 5 percent random sample of individuals with credit bureau records from 1999 to the present. Consumers must have at least one public record or credit account and a Social Security number (SSN) to be included in the CCP. Individuals are followed at a quarterly frequency until they die, change their SSN, or drop off because of an extended period of credit market inactivity. While the CCP contains extensive information regarding credit data, it does not contain any demographic information besides year of birth and census geography. In a given quarter, the CCP contains data on approximately 12 million different consumers.11

One concern with our data is that not all individuals, especially young adults, have a credit

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10 For a closer comparison, individuals ages 30-39 average $2,649 in total medical expenditures.

11 For a more comprehensive overview of the CCP, see Lee and van der Klaauw (2010).
bureau file. Works by Lee and van der Klaauw (2010) and Brown et al. (2016) compare the CCP with data from the SCF and the American Community Survey (ACS), and they provide strong evidence that the young adult population covered in the CCP is representative of other measures of this age population. Analysis by Brevoort, Grimm, and Kambara (2016) show that, while approximately 62 percent of consumers ages 18–19 do not have a credit bureau file, this number drops to nearly 10 percent for consumers ages 25–29.

We use these credit bureau data for two types of analysis. First, we use them to measure the effect of the ACA’s DCM’s implementation in 2010. This analysis allows us to provide event-type study estimates and triple-differences estimates based on treatment and control groups affected by the policy change. Second, we rely on credit bureau data of a broader set of young adults to estimate the effect of disenrollment from the DCM at age 26. We describe the age-out CCP sample in more detail in Section 6.2, while the CCP sample used to analyze the DCM’s implementation is discussed below.

When constructing our CCP sample for the analysis of the implementation of the DCM in 2010, there are two important considerations to make. First, because the mandate’s effects are determined by age, we restrict the data to include the credit files of individuals born in the years 1982–1983 and 1985–1986. The individuals born in 1985 and 1986 serve as a treatment group since they would have been 24 and 25, respectively, when the mandate took effect in 2010. Individuals born in 1982 and 1983 are never treated by the mandate since they would have been 27 or 28 when it was implemented and therefore serve as the control group.

We use data of all consumers from the four birth-year cohorts from Q1:2008 to Q4:2013 and drop any consumers who have fewer than four total observations across the sample period. We do not observe all individuals in each time period because many young adults typically have “thin” credit files and therefore do not have continuously present credit bureau files. Because of this,

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12 Because the CCP only contains information on birth year, the possible age range of individuals in the treated group could be from 23–25. We exclude individuals born in 1984 because it is possible they would have turned 26 prior to the passage of the mandate.

13 Our approach also addresses the issue raised by Slusky (2017) regarding previous research that used difference-in-differences strategies to study the dependent coverage mandate. He found that previous studies often failed placebo tests because the age bandwidth for treatment groups was too wide and argued that future studies should reduce the age bandwidth to control for the age-structure of health insurance markets.

14 Credit bureau records with only one or two trades, or accounts, are considered “thin.”

15 Young people have thin credit files typically because they have little need or opportunity for credit activity (Lee
we do not restrict the sample to consist of balanced panels because this would introduce a sampling bias into our analysis by arbitrarily omitting individuals with either fewer observations over time or without a continuous credit report over the sample period. Instead, we allow for unbalanced panels to avoid this bias. Our final sample includes 866,781 individuals and 18 million observations.

To analyze financial distress, we use a number of different measures as outcome variables. Similar to Dobkin et al. (2018), we focus on third-party collections as a measure of financial health. In most cases, unpaid medical bills are sent to third-party collections, and they do not go through a cycle of being reported as 30, 60, 90, etc. days late in consumer credit reports. To capture different margins of adjustment in third-party collections, we use the number of accounts in third-party collections, the probability of having an account in third-party collections, and the amount of debt in third-party collections. The probability of having a third-party collection can be considered as a measure of the extensive margin (going from zero to a positive number), while the number of accounts and the amount in third-party collections are intensive margin measures showing by how much the number of unpaid medical bills and the amount unpaid change with the policy implementation. In addition to third-party collections, we use a binary indicator variable for personal bankruptcy in the last 24 months as an outcome variable. Prior studies argue that personal bankruptcy is one of the last resort options used by individuals to deal with unpaid medical bills (e.g., Gross and Notowidigdo, 2011). Thus, this variable is a good measure of extreme financial distress induced by medical expenditures. Table 2 presents summary statistics for these variables in the treatment and control groups.

3.3 Control Variables Data

To control for local labor market conditions, we use yearly data from the ACS. We use state-level unemployment data for two different age groups: 20- to 24-year-olds, and the total unemployment rate for the state. Although we cannot observe or control for individual- or household-level insurance status, in our triple-differences models (described in the next section), we use data on county-level differences in insurance status prior to the passage of the mandate. These data come from the

---

16 An account is sent to third-party collections when the party that the debt is initially owed to is unable to collect it from the debtor and contracts an outside party to collect the debt.
Table 2: Financial Distress Summary Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Probability of debt in third-party collections</td>
<td>0.238</td>
<td>0.426</td>
</tr>
<tr>
<td>Number of accounts in third-party collections</td>
<td>0.501</td>
<td>1.374</td>
</tr>
<tr>
<td>Amount in third-party collections (in $)</td>
<td>739.34</td>
<td>2,554.82</td>
</tr>
<tr>
<td>Bankruptcy filing in the last 24 months</td>
<td>0.006</td>
<td>0.078</td>
</tr>
<tr>
<td>Number of individuals</td>
<td>866,781</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Authors’ calculations using data from the Federal Reserve Bank of New York/Equifax Consumer Credit Panel. Data are for full sample period, Q1:2008–Q4:2013.

Small Area Health Insurance Estimates (SAHIE) from the U.S. Census Bureau. The SAHIE data are produced by a hierarchical Bayesian model that estimates health-insurance coverage for every county in the United States. This model combines data from multiple sources, including the ACS, the CPS, and data from the Medicaid and SNAP programs. Following Mazumder and Miller (2016), we use uninsured rates for 18- to 39-year-olds in our models.

4 The Effect of the Dependent Coverage Mandate on Out-of-Pocket Expenses

To examine if the implementation of the ACA’s DCM reduced financial distress for young adults, we first establish that the mandate was successful in reducing medical expenditures and medical expenditure risk. To do this, we utilize the MEPS data and estimate an event-study model using

17 For more information on the SAHIE data, see www.census.gov/did/www/sahie/index.html.
18 While the ACS has more disaggregated data on uninsured rate by geography and age, the 2010 ACS only has county-level uninsured information for less than a quarter of all counties due to sampling. The SAHIE, while having less disaggregated data, has complete geographic coverage. We therefore choose to utilize the SAHIE data as our uninsured data source when forming the exposure variable.
a standard differences-in-differences strategy and compare young adults eligible to be affected by the law (under the age of 26) to young adults unaffected by the law (older than age 26). We restrict our MEPS sample to the years 2007 to 2013 to focus on the three years before and after its implementation. Our DID estimating equation is then:

\[ y_{it} = \beta_0 + \lambda Treatment_i \times T_t + \beta_1 Treatment_i + \sigma T_t + X_{it}\Omega + \epsilon_{it}, \]  

where \( T_t \) is a vector of year dummy variables. We define \( Treatment = 1 \) for young adults between the ages of 23 and 25 (treatment group), and \( Treatment = 0 \) for young adults ages 27 to 29 (control group). The vector \( X \) includes a rich set of demographic control variables, including race, income, level of education, family size, marital status, student status, census region, and age.

Our dependent variables of interest include a number of different measures of medically related financial outcomes: total medical expenditures, total OOP medical expenditures, the percent of total medical expenditures paid OOP, and the probability that an individual has a high amount of OOP expenses. Results from the event study model are presented in Figure 3.

Panel A of Figure 3 shows that OOP medical expenditures for young adults decreased in the years after the implementation of the ACA’s DCM. After the implementation of the DCM, total OOP expenditures decreased by $140-$165, or 40-50% relative to the pre-ACA mean. In Panel B, we find that the probability that a young adult would have a large amount of OOP expenses declines after the ACA by 5 percentage points. This result is consistent with DCM lowering medical expenditure risk for young adults. Part of this reduction may be related to the decline in total medical expenditures, shown in Panel C, but we only observe one year in the post-ACA DCM period where we find statistically significant declines in total medical expenditures. However, Panel D shows that the share of total medical expenditures paid OOP also goes down in the post-ACA DCM period. This indicates that although both OOP and total medical expenditures are declining, OOP expenditures are declining at a faster rate. Overall, the results in Figure 3 demonstrate a broad pattern of reduction in medical expenditure risk for young adults after the implementation of the ACA’s dependent coverage mandate.
5 The Effect of the Dependent Coverage Mandate on Financial Distress

5.1 Empirical Strategy

To identify the effect of the DCM on financial distress of young adults, we use a triple-difference empirical framework similar to Mazumder and Miller (2016) and Brevoort et al. (2019). Because we cannot observe the individual insurance status before or after the mandate's implementation, our estimates are intent-to-treat (ITT) only. Thus, they likely understate the actual effects on individuals who received health insurance. To more directly test how the DCM affected eligible
individuals, we exploit the geographic variation in the uninsured rate and unemployment rate for young adults and combine them in implementing a triple-differences empirical framework. We do this by combining county- and state-level information on uninsured and unemployment rates for young adults during the pre-mandate period to create a measure of ex-ante exposure to the law. Using data from the ACS and SAHIE, we create an indicator variable equal to one if an individual was living in a county that was at or above the 75th percentile of the uninsured rate and a state that was at or above the 75th percentile of the unemployment rate for young adults in 2009.\footnote{According to the SAHIE data, the weighted county-level young adult uninsured rate at the 75th percentile from 2008–2009 was 30.5 percent. The 75th percentile of the young adult unemployment rate in 2009 was 16 percent.} We label this indicator variable $Exposure_{c}$, where subscript $c$ denotes county-level variation we exploit.

To estimate the causal effect of the passage of the mandate on financial distress for young adults, in principle, we would estimate the following triple-differences (DDD) model:

$$ y_{it} = \alpha_0 + \alpha_1 Exposure_{c} \times Treated_i \times Post_t + \alpha_2 Exposure_{c} \times Treated_i + \alpha_3 Exposure_{c} \times Post_t + \alpha_4 Treated_i \times Post_t + \alpha_5 Treated_i + \alpha_6 Post_t + \alpha_7 Exposure_c + X_{it} \beta + \mu_i + T_t + \epsilon_{it}, \quad (2) $$

where $Treated_i$ is a dummy variable equal to one if an individual was born in 1985 or 1986, and $X_{it}$ is a vector of control variables that includes state fixed effects, state fixed effects interacted with time fixed effects, state-level unemployment rates for the 19- to 25-year-old age group and the total unemployment rate for the state, and age fixed effects. We also include in this equation time fixed effects $T_t$ and individual fixed effects $\mu_i$. $Post_t$ is a dummy variable equal to one for observations starting in the fourth quarter of 2010, the first quarter that the mandate was officially in place, to the end of the sample period in 2013. However, several health insurers announced their intention to implement the mandate prior to the required implementation date in September 2010 (Akosa Antwi et al., 2013; Federal Register, 2010).

To address the staggered nature of the implementation of the mandate, we follow the approach widely used in the previous literature and create a number of time-period dummy variables to allow for differential effects of the mandate across different points in the timeline of the implementation. $Enact_t$ is a dummy variable equal to one for observations that span the enactment period of the mandate, from the second to third quarters of 2010 (March 2010–September 2010). To analyze
the effects of being covered by the mandate and aging out of the coverage on financial distress, we divide the post-implementation period into two separate intervals. In particular, we define the implementation or covered stage to span the fourth quarter of 2010 to the fourth quarter of 2012 and specify the aging-out period to run from the first quarter of 2013 to the fourth quarter of 2013. Thus, the model to be estimated is now:

\[
y_{itc} = \lambda_0 + (Exposure_c \times Treated_i \times (Enact_t + Implement_t + AgeOut_t))\Phi + \\
+ Exposure_c \times (Enact_t + Implement_t + AgeOut_t)\Psi \\
+ Treated_i \times (Enact_t + Implement_t + AgeOut_t)\Omega \\
+ \lambda_1 Exposure_c \times Treated_i + \lambda_2 Exposure_c + \lambda_3 Treated_i + \lambda_4 Enact_t \\
+ \lambda_5 Implement_t + \lambda_6 AgeOut_t + X_{it}\beta + \mu_i + T_t + \epsilon_{it}, \tag{3}
\]

where all control variables are as defined previously. The interaction terms of \(Exposure_c \times (Enact_t + Implement_t + AgeOut_t)\) control for any trends in high uninsured areas that are common between the treatment and control groups after the mandate was passed. The terms in \(Treated_i \times (Enact_t + Implement_t + AgeOut_t)\) control for any trends in the treatment group that are common across all geographic areas in the post-mandate periods. The coefficients of interest are in the vector \(\Phi\), which are the triple interactions of \(Exposure_c\), \(Treated_i\), and each of the time periods defined. We can interpret these coefficients as the effect of the ACA’s dependent coverage mandate on financial distress for young adults within geographic areas that experienced high levels of uninsurance for each time period.

The coefficients of interest are \(\Phi\), which capture the immediate \((Enact_t)\), short-run \((Implement_t)\), and long-run \((AgeOut_t)\) effects of the mandate on financial distress for treated individuals. If access to health insurance only improves financial outcomes while young adults are covered, then we would expect the coefficient on \(Exposure_c \times Treated_i \times Implement_t\) to be statistically significant. If enough health-insurance companies began implementation of the mandate before it went into effect, the coefficient on \(Exposure_c \times Treated_i \times Enact_t\) may also be negative and significant. The sign and significance of the coefficient on \(Exposure_c \times Treated_i \times AgeOut_t\) is ex-ante ambiguous because there are many potential mechanisms that could drive certain effects after individuals have
aged out of the mandate. For example, if young adults age out of the mandate and do not regain health-insurance coverage, we may expect financial distress to increase again, or any improvements made while being insured may be reversed. Although we include $Treated_i$ in Equations (2) and (3), its coefficient is not estimated because this variable is collinear with the individual fixed effects $\mu_i$. In these regressions, standard errors are clustered at the county level.

5.2 Event Study Results

The DDD framework outlined in the previous section relies on the assumption that the trends in the financial variables would be the same for the treatment and control groups in the absence of the mandate. While we cannot test if the treatment and control groups would have trended similarly in the post-mandate period in the absence of the mandate, we can evaluate if the two groups had similar trends in the pre-mandate period. To assess if the trends in our financial variables are comparable across the treated and control groups, we estimate the following event study model based on our triple-difference specification:

$$y_{ite} = \gamma_0 + \sum_{e=Q1:2009}^{Q4:2013} \gamma_{ep} T_e \times Exposure_c \times Treated_i + \cdots + X_{it} \beta + \mu_i + T_t + \epsilon_{it}, \quad (4)$$

where $T_e$ is a vector of dummy variables for each calendar quarter from Q1:2009 to Q4:2013 and the control variables in $X_{it}$ are the same as in the previous equations. We also include in this equation, but do not spell out, all double interactions and single terms of $Exposure_c$, $Treated_i$, and $T_e$. The coefficients of interest in Equation (4) are the $\gamma_{ep}$’s on the interaction of the calendar time dummy variables, exposure dummy, and the treatment dummy variable. These coefficients show the differences in financial outcomes in the treatment and control groups for quarters prior to and after the mandate implementation. These coefficients are estimated relative to the excluded period - all quarters in 2008. We cluster standard errors at the county level.

Figure 4 plots the estimated effects of the DCM on financial distress of young adults over the course of our sample. The four panels of Figure 4 show effects for the probability of having debt in third-party collections, the number of accounts in third-party collections, the amount in third-party collections, and the indicator of a bankruptcy declaration in the last 24 months. For all these variables, the trends in the treatment and control groups appear parallel prior to the law’s
**Figure 4:** Effect of Dependent Coverage Mandate on Financial Distress

Panel A: Probability of a third-party collection

Panel B: Number of third-party collections

Panel C: Amount in third-party collections

Panel D: Bankruptcy declaration in the last 24 months

Note: Authors’ calculations using data from Federal Reserve Bank of New York/Equifax Consumer Credit Panel.

The results in this figure also suggest that the probability of third-party collections, number of collections, and amount in collections declined in the treatment group compared with the control group after the law was enacted and implemented. There is also a decline in personal bankruptcy filings, which becomes statistically significant in the second half of 2012, when treated individuals are covered by the mandate. After 2012, all cohorts of treated individuals age out of the mandate. In this period, the event study graphs indicate that the improvements in financial outcomes start to diminish and they become statistically insignificant. These preliminary results are suggestive of
a potential reduction in some measures of financial distress as a result of the dependent coverage mandate and a potential reversal of these improvements after the automatic disenrollment at age 26.

5.3 Triple-Differences Results

Results from the triple-differences specification in Equation (3) are presented in Table 3. The estimates in Table 3 show that three of our measures of financial distress declined as a result of the dependent coverage mandate. In the implementation period, eligible young adults experienced a 0.5 percent point reduction in the probability of debt in third-party collections, which is a 2 percent decline relative to the average in the treatment group. The number of accounts in third-party collections decreased by 0.015, which is a 3 percent reduction. The amount in collections dropped by $39, or 5 percent of the mean. Finally, the effect of the mandate on the bankruptcy indicator is negative, but not statistically significant at the conventional levels.

We use these estimates of the ITT effects of the mandate to calculate the implied treatment-on-the-treated effects. To do this, we divide the ITT effects by the change in the uninsured rate that resulted from the passage of the DCM, which was approximately 3.5%. Using this rate, we estimate that treated individuals saw a reduction in accounts in collections of \( \frac{0.015}{0.035} = 0.429 \) and a reduction in the amount of debt in collections of \( \frac{39.16}{0.035} = 1,118.86 \) during the implementation period. While these implied effects are large, they are in-line with estimates from previous studies. Hu et al. (2018) estimated that the passage of the ACA’s medicaid expansion reduced debt in collections by $1,140, while Brevoort et al. (2019) find that medical debt in collections declined by $1,231, implying that decline in overall collections would be even larger.

The third row of Table 3 shows the age-out effects of the mandate for the treated group. In this period, the effect of the mandate on the probability of having debt in third-party collections decreases in magnitude and becomes statistically insignificant. Similarly, the effect on the amount in third-party collections declines in absolute value and becomes insignificant. While the number of accounts in third-party collections still shows a statistically significant effect; overall, the improvements in financial outcomes from the mandate seem to diminish after an individual ages out of the mandate. This result is consistent with the findings of Dahlen (2015), who finds that young adults who age out of the mandate at age 26 report a 15.4 percentage point increase in the probability of
Table 3: The Effect of the Dependent Coverage Mandate on Financial Distress:

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Probability of Accounts in Third-Party Collections</th>
<th>Number of Third-Party Collections</th>
<th>Amount in Third-Party Collections</th>
<th>Bankruptcy in the Last 24 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treated × Exposure × Enactment (Q2:2010–Q3:2010)</td>
<td>-0.002815* (0.002)</td>
<td>-0.006854 (0.007)</td>
<td>-30.926* (17.927)</td>
<td>0.00008722 (0.001)</td>
</tr>
<tr>
<td>Treated × Exposure × Implementation (Q4:2010–Q4:2012)</td>
<td>-0.005066*** (0.002)</td>
<td>-0.01525** (0.006)</td>
<td>-39.157** (18.687)</td>
<td>-0.0008241 (0.001)</td>
</tr>
<tr>
<td>Treated × Exposure × Age-Out (Q1:2013–Q4:2013)</td>
<td>-0.002133 (0.002)</td>
<td>-0.01669** (0.008)</td>
<td>-29.096 (23.288)</td>
<td>-0.001310* (0.001)</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.4794</td>
<td>0.4893</td>
<td>0.2869</td>
<td>0.3366</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>17,905,532</td>
<td>17,905,532</td>
<td>8,241,707</td>
<td>17,941,047</td>
</tr>
</tbody>
</table>

Notes: Standard errors are clustered at the county level. All regressions include individual, time, and state fixed effects. ***, **, * - denote significance at the 1%, 5%, and 10% level, respectively. Authors’ calculations using data from the Federal Reserve Bank of New York/Equifax Consumer Credit Panel.

Importantly, this decrease in quality occurred even though uninsured rates did not significantly increase at age 26, with both the offer of ESI coverage (7.9 percent) and the purchase of non-ESI coverage (5.1 percent) increasing after an individual’s 26th birthday. Since non-ESI coverage is typically more expensive and provides less generous benefits than ESI coverage, it is unsurprising that our estimated improvements in financial distress diminish but do not revert to pre-mandate levels completely, as young adults age out of the mandate.

5.4 Heterogeneity Analysis: Prime vs. Subprime Consumers

Because health insurance may benefit individuals who are credit constrained and cannot borrow as much as they need to cover their unexpected expenses, we compare the effects of the DCM for individuals who had high Risk Scores prior to the mandate’s implementation with individuals who had low Risk Scores. We employ the same empirical strategy as in the previous section and divide the sample based on the individual’s subprime status in at least one quarter of 2008, using a Risk
Table 4: The Effect of the Dependent Coverage Mandate on Financial Distress: Heterogeneous Effects by Subprime/Prime Status (Q1:2008–Q4:2013)

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Probability of Accounts in Third-Party Collections</th>
<th>Number of Third-Party Collections</th>
<th>Amount in Third-Party Collections</th>
<th>Bankruptcy in the Last 24 Months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subprime</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated × Exposure × Enactment (Q2:2010–Q3:2010)</td>
<td>-0.006307**</td>
<td>-0.02255**</td>
<td>-38.670*</td>
<td>0.0003947</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.011)</td>
<td>(21.494)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Treated × Exposure × Implementation (Q4:2010–Q4:2012)</td>
<td>-0.008489***</td>
<td>-0.02659***</td>
<td>-50.474***</td>
<td>-0.001444</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.010)</td>
<td>(19.348)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Treated × Exposure × Age-Out (Q1:2013–Q4:2013)</td>
<td>-0.002896</td>
<td>-0.01683</td>
<td>-34.765</td>
<td>-0.002346**</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.013)</td>
<td>(24.973)</td>
<td>(0.001)</td>
</tr>
<tr>
<td><strong>Prime</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated × Exposure × Enactment (Q2:2010–Q3:2010)</td>
<td>-0.001673</td>
<td>-0.006114</td>
<td>-37.853</td>
<td>-0.0005344</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.004)</td>
<td>(43.714)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Treated × Exposure × Implementation (Q4:2010–Q4:2012)</td>
<td>-0.0003781</td>
<td>-0.005606</td>
<td>36.009</td>
<td>-0.001216*</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.004)</td>
<td>(57.294)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Treated × Exposure × Age-Out (Q1:2013–Q4:2013)</td>
<td>0.001830</td>
<td>0.001339</td>
<td>90.376</td>
<td>-0.001706**</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.005)</td>
<td>(75.875)</td>
<td>(0.001)</td>
</tr>
<tr>
<td><strong>R²</strong></td>
<td>0.3759</td>
<td>0.4458</td>
<td>0.2581</td>
<td>0.3360</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>8,563,977</td>
<td>8,563,977</td>
<td>6,302,418</td>
<td>8,566,996</td>
</tr>
</tbody>
</table>

Notes: Standard errors are clustered at the county level. All regressions include individual, time, and state fixed effects. ***, **, * - denote significance at the 1%, 5%, and 10% level, respectively. Authors’ calculations using data from the Federal Reserve Bank of New York/Equifax Consumer Credit Panel.

Score of 620 as the prime Risk Score cutoff. The Risk Score used is the Equifax Risk Score. We exclude individuals with a missing Risk Score in all quarters of 2008.

We use this distinction because lenders are more likely to decline applications for credit from individuals with subprime Risk Scores and these individuals have lower credit card limits and higher credit card utilization rates than prime individuals.

Results for the regressions on the subprime and prime samples are presented in Table 4, with
subprime individuals in the top panel and prime individuals in the bottom panel. Table 4 shows that the mandate had the largest effects among subprime individuals, who are most likely to be credit constrained. In particular, this population experienced reductions in the probability and the number of accounts in third-party collections as well as the amount in collections. We also observe a decline in the bankruptcy indicator, which is statistically significant in the age-out period. The results for prime individuals in Table 4 indicate that the mandate did not affect third-party collection outcomes of individuals who were less likely to be credit constrained. There is a statistically significant effect on bankruptcy declarations for prime borrowers, but it is smaller in size than the effect for subprime consumers.

6 The Effect of Losing Insurance: Aging-Out Analysis

As we saw in the previous section, improvements in financial health dissipate for young adults after they turn 26, which is the age cutoff for private insurance plans to offer dependent coverage under the ACA. These results suggest that young adults do not receive the same amount of financial protection after “aging out” of the dependent coverage mandate and transitioning to their own health insurance plans.

Figure 6: Percent of Individuals Having Insurance by Age; Pre/Post-ACA

Notes: Based on authors’ calculations using MEPS data. Pre-ACA is defined as the years before the ACA was passed in 2010.
As mentioned in Section 2.3, there are multiple mechanisms that may explain why this is the case. Dahlen (2015) finds that young adults receive less generous coverage when transitioning off of parental coverage. Using an RD design, Yoruk (2018) also finds evidence that uninsured rates for young adults increase immediately after turning 26. To shed more light on this question, we plot the percent of young adults who are insured by age before and after the ACA in Figure 6. In the years prior to the implementation of the DCM, we do not observe any reductions in the probability of being insured as young adults turn age 26. However, in the years after the DCM was implemented, we observe a strong dip in the insured rate as young adults age out of the mandate, declining from 73.3 percent at age 25, to 69.1 percent by age 27. Because young adults become uninsured or receive less generous insurance coverage after aging out of the mandate, this likely results in higher OOP medical expenses, which in turn may lead to the reversal of the improvements in financial outcomes we document for individuals receiving coverage.

6.1 MEPS Age-Out Analysis

To examine how young adults’ financial health are affected by the aging-out mechanism of the DCM, we first use the MEPS data to verify that young adults pay higher OOP expenses upon turning 26. Figure 7 shows the trend by age. As can be clearly seen, there is a large and immediate spike in average OOP medical spending at age 26 for individuals in the years after the ACA’s implementation. This spike suggests that changes to young adult health-insurance coverage resulted in higher OOP medical expenses.

However, it is possible that this relationship existed prior to the introduction of the ACA’s DCM. To examine if these age-out effects are unique to the period after the ACA, we interact each age dummy variable with a dummy variable equal to one for each year after the passage of the ACA in 2010. Because the medical expenditure variables in the MEPS are for the entire year, we exclude the year 2010 because we are not able to distinguish what fraction of the medical expenditures were incurred prior to the enactment and/or implementation of the ACA’s DCM, and which were incurred afterward. Our estimating equation is:
We can interpret each coefficient $\alpha_{age}$ as the difference in being of a certain age before the ACA went into effect and being of this age after the ACA was in effect. The omitted age is 22; therefore, we interpret our coefficients to be relative to a young adult who is covered (would have been covered) by the ACA’s dependent coverage mandate. Positive coefficients would indicate that young adults of a specific age in the post-ACA period have higher OOP medical spending than a young adult of the same age in the pre-ACA period.

As can be seen in Figure 8, we observe a jump in both OOP medical expenditures and in the percentage of total medical expenditures that are paid OOP for individuals age 26 and older in the post-ACA DCM period. Panel A shows that young adults who turn age 26 in the post-ACA DCM period have approximately $140 more in OOP medical expenditures than individuals who turn age 26 in the pre-ACA DCM period. For the percent of total medical expenses that are paid OOP, we observe that young adults age 26 and older in the post-ACA DCM period pay approximately 7 percentage points more out-of-pocket than young adults age 26 and older in the pre-ACA DCM period.

\[
y_{it} = \beta_0 + \sum_{age=22}^{29} \alpha_{age} D_{age} \times PostACA + \sum_{age=22}^{29} \nu_{age} D_{age} + \beta_1 PostACA + X_{it} \Lambda + \epsilon_{it}. \tag{5}
\]
Notes: Based on authors’ calculations using MEPS data. Includes years 2005-2009 and 2011-2015. Age 22 is the omitted category.

period. These results imply that this effect at age 26 is unique to the post-ACA DCM period and is not indicative of a persistent discontinuity in the age distribution of medical expenditures.

6.2 CCP Age-Out Analysis

Next, we investigate if the reversal of improvements in financial outcomes we observe from our triple-differences models in the previous section are specific to being age 26 and older, or are only present in the post-ACA period. In order to estimate the age effects of our variables of interest, we make two important adjustments to our CCP sample: (1) we extend the sample frame to include data from 2003 to 2017, and (2) we include individuals born from 1978 to 1992. We extend the sample in these ways to ensure that there are enough birth year cohorts that turn each age before and after the ACA goes into effect.\footnote{For example, to estimate the age 26 dummy in the pre-ACA period of 2003-2009, we need to include individuals born in 1983 (26 in 2009), 1982 (26 in 2008), 1981 (26 in 2007), and 1980 (26 in 2006).} Also, because we only observe birth year, and not the exact birth day, we only include the 4th quarter of data for each year. This ensures that for each individual in each calendar year, the age variable is measured without error.\footnote{If we were to include the other quarters of data in this sample, we would introduce measurement error in the age variable, since we don’t know which quarter of the year an individual actually turns that age. The average over the four quarters would include information on the age of interest, plus either the age before or after, depending on the individual’s birthday. We only observe birth year, and not the exact birth day, in the CCP.} Using this updated sample, we
estimate a model similar to the one specified in the previous section by interacting a vector of age dummy variables with a dummy variable for the years that are in the post-ACA period:

\[ y_{it} = \beta_0 + \sum_{age=22}^{29} \alpha_{age} D_{age} \times PostACA + \sum_{age=22}^{29} \nu_{age} D_{age} + \beta_1 PostACA + \mu_i + \gamma_{ic} + \epsilon_{it}. \]  

(6)

Similar to the previous CCP analysis in Section 5, we include both individual and county fixed effects in our model. We also include a third-order polynomial in time. Also, as in Equation (5) for the previous MEPS analysis, our coefficients of interest are the \( \alpha_{age} \)'s, which indicate if individuals of a specific age in the post-ACA DCM period have more debt in collections than young adults of the same age in the pre-ACA DCM period. Because we extend our sample to include additional years from 2003 to 2006, we omit analysis of our bankruptcy variable, as a major change in bankruptcy code was implemented in 2005 through the Bankruptcy Abuse Prevention and Consumer Protection Act. Our results for debt in collections are displayed in Figure 9.

**Figure 9:** Differences in Debt in Collections by Age; Pre/Post-ACA

Panel A: Accounts in third-party collections  
Panel B: Amount of debt in third-party collections

Notes: Authors’ calculations using data from Federal Reserve Bank of New York/Equifax Consumer Credit Panel.

As can be seen in Figure 9, the pre/post-ACA age-dynamics we observed in the MEPS results in the previous subsection are also present in the CCP analysis: We also observe a strong spike in debt in third-party collections as individuals age out of the mandate. For those at age 26, we see that debt in collections, shown in Panel B, increase by $20 and by age 27, it increases to over
$50 dollars. To calculate the implied treatment-on-the-treated effects for this analysis, we use the fact that young adults reported a 15.4 percentage point increase in having lower quality health-insurance plans after aging out and that there is a 5.8 percentage point increase in the number of young adults reporting being uninsured after aging out.\textsuperscript{23} Using these two rates combined implies that aging-out leads to a $\frac{50}{0.212} = $235 increase in debt in third-party collections. We also note that, unlike the results from the MEPS analysis, we observe strong persistence in the amount of debt owed to third-party debt collectors. This is unsurprising, as debt in collections tends to persist over time, with the average age of an account in collections being approximately two years.

7 Discussion and Conclusion

The results from this analysis contribute to the growing body of studies that leverage consumer credit and medical expenditure data sets to analyze the effects of health-insurance policy on financial outcomes. Using the implementation of the ACA’s DCM in 2010 and its automatic disenrollment mechanism at age 26 to identify the effects of health insurance on young adults, we find that the increased access to health insurance improved financial outcomes for adult dependents. In particular, we observe reductions in financial distress in the the two years after the law was implemented, from the fourth quarter of 2010 to the fourth quarter of 2012. We find that third-party collections (most of which include unpaid medical bills) declined along the extensive margin (the probability of having debt in collections) and intensive margins (the number of and amount in collections). We also find that health insurance reduced the probability of personal bankruptcy, the amount of out-of-pocket medical expenses, and the probability of very large medical expenditures.

Our regression results also suggest that once individuals age out of the mandate after age 26, many improvements in financial outcomes disappeared, indicating that young adults (1) receive material financial protections from health insurance, despite the fact they are relatively healthy and utilize health-care services at lower rates and (2) did not receive the same amount of financial protection when transitioning from the DCM to either their own individual health-insurance plans or losing their coverage entirely. Given that many young adults transitioned to worse quality

\textsuperscript{23}The 5.8 percentage point increase in the uninsured rate is derived from the difference in the Pre/Post-ACA insured rates in Figure 6 at age 25.
health-insurance plans after they aged out of the mandate (Dahlen, 2015), these findings may suggest that the quality of health insurance plays an important role in the financial protection of covered individuals.

We also find that individuals with subprime Risk Scores prior to the enactment of the mandate experienced greater improvements in financial distress than persons who had prime Risk Scores. These results suggest that the mandate was effective among populations that had the highest likelihood of being affected. Most important, the results as a whole strongly indicate that providing health insurance to the young can improve their financial outcomes.

Our estimates can provide context when evaluating the welfare aspects of the ACA’s DCM. Specifically, we are able to evaluate the effect of a private health-insurance expansion on financial distress, which represents an important departure from the existing literature, as a majority of other studies that have examined the effect of health-insurance policy on financial distress have focused on public health-insurance expansions. This distinction has direct implications on the welfare effects of this law, as the efficiency of the mandate, as opposed to public finance considerations, will dictate the incidence of its cost. Depew and Bailey (2015) show that while family plan premiums increased by 2.5–2.7 percent after the DCM was implemented, employee contributions did not experience a statistically significant increase. This implies that while employers saw increased costs, they did not pass the cost of the coverage on to workers. Since employee contributions did not change, it is possible then that employers passed on the costs through wage reductions instead of increased insurance contributions.

While young adults may not bear the entire cost of the mandate, the benefits from reducing their financial distress can be significant. Brevoort et al. (2019) provide a theoretical framework that shows how reductions in delinquent medical debt can improve consumer welfare. Reductions in financial distress for young adults may also reduce the financial burden of parents who provide financial support to their children. Because these individuals are at the beginning stages of the life cycle, reducing financial burdens or decreasing the probability of incurring large amounts of medical debt may have significant long-run implications, especially if the shocks persist over time. Our results provide an important first step in understanding these dynamics by empirically identifying these effects.

The results of the analysis have important policy implications. We contribute to the growing
body of evidence that the provision of health insurance may generate important, welfare-enhancing benefits beyond providing access to health care or reducing out-of-pocket costs. If policymakers are to properly assess the expansion or contraction of health insurance, they need to consider the effect of providing or removing health insurance on the financial outcomes of individuals, not just measures of physical health and access to health care.
References


