Bad Credit, No Problem? Credit and Labor Market Consequences of Bad Credit Reports*

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Abstract

We study the effects of credit reports on financial and labor market outcomes. We use a difference-in-differences research design that compares changes in outcomes over time for Chapter 7 filers, whose personal bankruptcy flags are removed from credit reports after 10 years, to changes for Chapter 13 filers, whose personal bankruptcy flags are removed from credit reports three years earlier. Using credit bureau data, we show that the removal of the Chapter 7 bankruptcy flag leads to a large increase in credit scores, an economically significant increase in credit card utilization, and economically small increases in auto and mortgage borrowing. Using administrative tax records linked to personal bankruptcy records, we estimate a precise zero effect of improved credit reports on employment and wage outcomes. We conclude that credit reports are most important for lower stakes, unsecured borrowing, where lenders relay heavily on credit reports, and are less important for higher stakes, secured borrowing, where firms use other screening mechanisms, and for labor market outcomes, where employers rely on a much broader set of information.

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1 Introduction

The increasing availability and richness of credit report data is perhaps the most significant change to undergo consumer financial markets in the last 25 years. In the U.S., credit reports—and the associated credit scores—are used in nearly all consumer lending decisions, including credit cards, private student loans, auto loans, and home mortgages. And credit reports are widely used in non-lending decisions as well, such as rental decisions for apartments and hiring decisions in the labor market.[1]

Supporters of increased availability and richness of credit report data argue that this trend is a key factor behind the expansion of lending to high-risk segments of the population, including minority communities that have been historically shut out of the credit market. Critics recognize the importance of credit report data but are worried that the collection and dissemination of personal information may have been taken too far. They are concerned that credit reports might disproportionally punish individuals for mistakes made many years ago.

And critics have been particularly concerned about the use of credit reports in hiring decisions in the labor market. A series of prominent news-articles reported on how bad credit reports can be a major impediment to finding a job.[2] Talking to the New York Times, a lawyer at the National Consumer Law Center called the scenario a "a bizarre, Kafkaesque experience . . . Someone loses their job, so they can't pay their bills—and now they can't get a job because they couldn't pay their bills because they lost a job? It's this Catch-22 that makes no sense." Indeed, since 2007, eleven states have passed laws to restrict employer credit checks and many more are considering such legislation (Clifford and Shoag, 2016). Determining whether anecdotal evidence on the link between credit reports and employment represents a broad-based phenomenon is an important empirical question.

This paper estimates the causal effect of improved credit reports on credit and labor market outcomes. Our research design uses the sharp removal of personal bankruptcy "flags" from credit reports at statutorily determined time horizons. Under the Fair Credit Reporting Act (FCRA), credit bureaus are required to remove information on Chapter 7 bankruptcy at 10 years after filing and remove information on Chapter 13 bankruptcies after a period of 7 years. The removal of a bankruptcy flag leads to a sharp and persistent change in credit scores, allowing us to identify the causal effect of better credit on a broad range of outcomes.[3]

[1] The Society of Human Resource Management reported that 60% of employer conduct background checks for some of their candidates in 2010, up from 25% of employers in 1998. See CFPB (2012) for more on the uses of credit reports.

[2] See National Public Radio (2012) and New York Times (2013)

[3] Under FCRA, Chapter 13 flags are not mandated to be removed earlier, but credit bureaus do so voluntarily (we confirm

We apply this research design using two large, administrative datasets. We examine the effects on credit market outcomes—including credit scores and various measures of borrowing—using a dataset generated from the Federal Reserve Bank of New York Equifax Consumer Credit Panel. Equifax is one of the three main credit bureaus and their data provides us with panel information on the near-universe of credit products held by an individual over time. Our primary analysis sample, which focuses on individuals with a bankruptcy flag removal, covers fifty thousand individuals over a period of 16 years. We analyze the effects on labor market outcomes using data from individual bankruptcy filings merged to administrative tax records at the Social Security Administration (SSA).

While the sharp removal of bankruptcy flags allows us to estimate the "on impact" effect of an improvement in credit reports using an event study design, this would only be valid for comparing outcomes just before and just after bankruptcy flag removal. To estimate effects over longer time horizons, we need to estimate how outcomes would have evolved in the counterfactual scenario in which bankruptcy flags are not removed.

We estimate these longer run effects using a difference-in-differences research design that exploits the timing of the removal of Chapter 13 versus Chapter 7 bankruptcy flags for individuals who filed for bankruptcy in the same year. The identifying assumption for this difference-in-difference specifications is parallel trends—in the absence of the Chapter 7 bankruptcy flag removal, outcomes for treated individuals, who experience a flag removal, and control individuals, who do not, would have evolved in parallel. To provide support for this assumption, we show that the path of outcomes for treated and control individual are virtually identical in the pre-flag removal period.

We start our analysis by examining the effect on credit scores. Since credit score are used in the vast majority of lending decisions, improvements in credit scores directly translate into increased credit availability. We show that bankruptcy flag removal leads to a sharp and persistent 14 point credit score increase. The jump occurs precisely in the quarter of bankruptcy flag removal and is fairly stable over a horizon of 6 years.

We show that flag removal has as statistically and economically significant effect on credit card borrowing. Flag removal increases the number of credit card accounts by 0.37 in quarters 12-24, an 11.4 percent increase from the baseline mean of 3.2 cards. The amount of credit card debt increases by $639 over the same time period, a 14.8 percent increase

In contrast to our results on credit cards, we find muted effects on automobile and mortgage

this in the credit report data).

borrowing. Our point estimates are small and our standard errors allow us to rule out economically significant changes. These small effects are consistent with automobile and mortgage lenders relying on non-credit report mechanisms to screen potential borrowers, such as downpayments and debt-to-income requirements.

We estimate a precise zero effect of flag removal on labor market outcomes. Our standard errors allow us to rule out economically significant increases in employment and earnings. The zero average effects are consistent with employers using a broad range of mechanisms to screen potential employees so that the impact of an improved credit score does not have a measurable impact on the margin.

We conclude that credit reports are most important for lower stakes, unsecured borrowing, where lenders relay heavily on credit reports, and are less important for higher stakes, secured borrowing, where firms use other screening mechanisms. Credit reports are similarly less important for labor market outcomes, where employers rely on a much broader set of information.

Our paper builds on Musto (2004), who studies the impact of bankruptcy flag removal on credit scores and credit card borrowing using an event-study design. Musto (2004) finds that flag removal has a sharp short run effect on credit scores and credit card borrowing, but has adverse longer run consequences, with higher delinquency levels and lower credit scores at 18 months after flag removal. In contrast, our difference-in-differences research design, which is better suited to study longer run effects, does not show any evidence of adverse longer-run outcomes. We are also able to examine a much richer set of outcomes, including auto and mortgage loans and, of course, labor market outcomes.

Our paper is also related to a number of recent working papers on the link between employment and credit conducted in parallel to our study. Bos, Breza and Liberman (2016) study a policy that reduce the time information on default was listed on credit reports in Sweden. Their analysis focuses on individuals who took out a pawnshop loan, which make up approximately 1% of the Swedish population.[4] They find that the removal of default information leads to a 3 percentage point increase in employment. However, it is unclear whether these results generalize outside of Sweden or to a more nationally representative sample.

A recent working paper by Clifford and Shoag (2016) studies the impact of recent state-level restrictions on employer credit checks using difference-in-differences research design. Using employ-

[4]By comparison, approximately 15% of the United States has filed for bankruptcy according to our calculations using the FRBNY Consumer Credit Panel.

ment and credit score data aggregated to the Census tract level, the authors find that restrictions on employer credit checks increased employment by 2 percentage points in the lowest credit score tracks, while at the same time *decreasing* employment in Census tracts with moderate credit scores. These aggregated data do not map one-for-one to a single model of heterogeneous effects at the individual level, making it hard to interpret the results. In addition, despite the state-year identifying variation, the authors cluster their standard errors at the zip code level, raising concerns about inference (Bertrand, Duflo and Mullainathan, 2004), and potentially explaining the difference with our findings.

Our paper is also related to a recent working paper by Herkenhoff, Phillips and Cohen-Cole (2016), which uses credit records from TransUnion merged with administrative employment records from the Census to study the impacts of bankruptcy flag removal on employment, earnings, and entrepreneurship. Using an event study research design, the authors find no net effect on self-employment or formal sector earnings, but a small positive effect on formal sector employment. Within the zero self-employment effect, they find that churn in and out of self-employment increases post-flag removal. Similarly, within the small formal sector employment result, they find that churn is increasing. They interpret these findings as evidence that (i) some formerly non-self employed people now have enough credit to start a business and (ii) some formerly self-employed people now have a clear credit record and can get a formal sector job.

The rest of our paper proceeds as follows. Section 2 presents background on credit reporting and describes our data. In Section 3, we presents our research design. Section 4 presents our results for the credit market and labor market outcomes. Section 5 concludes.

2 Background and Data

2.1 Credit Reporting

The history of credit bureaus in the U.S. can be traced back to the nineteenth century, when third parties sold lists of deadbeat borrowers to local merchants to help them manage the provision of store credit. The industry grew throughout the twentieth century but was highly fragmented, with 2,250 local and regional firms in 1970. Over the 1970s and 1980s, the rapid growth in national credit card lending fueled expansions and consolidation of the credit bureau industry. Today, there are three national credit reporting agencies—Equifax, TransUnion, and Experian—that provide most credit reports.

Along with basic information on name, address, and Social Security number, consumer credit

reports provide four main categories of information. The *trade line* segment provides information on contract characteristics, utilization, and adverse outcomes on a product level. For instance, for a given credit card, the trade line data includes information on the credit limit, account balance, and whether the consumer is currently in delinquency or default. The trade line data are provided to the credit bureaus by the the lenders, which are typically large national banks.

The *public records* segment includes information on bankruptcies and tax liens. Non-financially relevant public information, such as marriage records, are not included in the credit report. These data are obtained from the Public Access to Court Electronic Records (PACER) system and government offices. Credit reports also contain information on *collections*, reported by third-party collection agencies, and on credit *inquiries*. Consumer-initiated requests, known as "hard" inquiries, are provided in most credit reports. "Soft" inquires, which result for example from a bank-initiated pre-screening, are typically not reported.

The Fair Credit Reporting Act (1970) limits the time information can be maintained on credit reports. Chapter 7 bankruptcies may be listed for 10 years after the order for relief or date of adjudication. Information on Chapter 13 bankruptcies is removed after a period of 7 years. The FCRA also stimulates that information on late payments, delinquencies, and collection items be removed after 7 years.

Requestors of credit bureau information do not necessary receive the full set of credit bureau data. Potential employers, for instance, receive modified credit reports that do not contain information on the potential employee's date of birth and do not include credit scores. In addition to standard credit report information, lenders typically request consumer credit scores. These credit scores are sometimes developed by third parties, such as the Fair Isaac Corporation (FICO), and sometimes provided by the credit bureaus (e.g., VantageScore). There are dozens of types of credit scores based on different outcome variables and used for different types of lending decisions. The most common credit scores aim to predict the probability that a consumer will become 90 days delinquent on a new loan within two years. See CFPB (2012) for more background on the U.S. credit reporting system.

2.2 Data Sources and Sample Construction

We use two separate datasets to estimate the impact of removing a Chapter 7 bankruptcy flag on credit scores, financial outcomes, and formal sector employment and earnings. The first dataset uses information from the Federal Reserve Bank of New York's Equifax Consumer Credit Panel (CCP).

The second dataset uses information from individual bankruptcy filings merged to administrative tax records at the Social Security Administration (SSA).

The first dataset used in our analysis is constructed using records from the CCP, a 5 percent random sample all individuals in the U.S. with credit files.[5] The CCP data are derived from public records, collections agencies, and trade lines data from lending institutions. The data include a comprehensive set of consumer credit outcomes, including information on credit scores, unsecured credit lines, auto loans, and mortgages. The data also include geographic location at the ZIP code-level and year of birth. No other demographic information is available at the individual level. Importantly, the data also include information on bankruptcy chapter, the bankruptcy outcome, and the quarter that a bankruptcy flag is both placed and removed from the credit file.[6] The CCP data are available quarterly from 1999 to 2015. See Avery et al. (2003) and Lee and der Klaauw (2010) for additional details on the CCP data.

We make two sample restrictions to the CCP data. First, we restrict the sample to individuals who file for bankruptcy protection between 1992 and 2001. This restriction allows us to observe credit outcomes both before and after the flag removal. Second, we restrict our sample to individuals between 25 and 54 in the year of their bankruptcy filing to focus on working-age adults.

The second dataset constructed for this study consists of individual bankruptcy filings merged to administrative tax records at the SSA. Bankruptcy records are available from 1992 to 2009 for the 81 (out of 94) federal bankruptcy courts that allow full electronic access to their dockets.[7] We matched the individual-level bankruptcy records to administrative tax records from the SSA using last name and the last four digits of the filer's social security number. We were able to successfully match over 90 percent of the bankruptcy records, with nearly all of the unmatched records resulting from a shared name and last four digits of the social security number in the SSA data.[8] The SSA data include information on all formal sector earnings and employment from annual W-2s, and self-employment

[5]The CCP data is a representative sample of all individuals with a credit file, but does not include the roughly 11 percent of the U.S. population without credit files. As a result, the CCP data will be more representative for high income individuals than for low income individuals.

[6]We are not able to observe filing quarter for individuals filing before the first quarter of 1991. For these individuals, we infer the filing quarter based on when their bankruptcy flag is removed from their credit report. Specifically, we impute the filing quarter as being 7 years before the quarter of flag removal for Chapter 13 filers, and 10 years before the quarter of flag removal for Chapter 7 filers. In results available upon request, we find that the number of Chapter 7 and Chapter 13 filings in the CCP data closely track the number of filings observed in administrative bankruptcy records.

[7]We thank Tal Gross, Matthew Notowidigdo, and Jialan Wang for providing the bankruptcy data used in this analysis. See Gross, Notowidigdo and Wang (2014) for additional details on the PACER bankruptcy data.

[8]The SSA data include every individual who has ever acquired a SSN, including those who are institutionalized. However, illegal immigrants without a valid SSN are not included in the SSA data. The SSA data also does not include information on informal earnings or employment.

earnings from annual 1040s at the IRS. Individuals with no W-2 or self-employment earnings in any particular year are assumed to have had no earnings in that year. Individuals with zero earnings are included in all regressions throughout the paper. All dollar amounts are in terms of year 2014 dollars. The SSA data are available annually from 1978 to 2014.

Following our sample restrictions for the CCP data, we restrict the matched bankruptcy-SSA data to individuals who filed for bankruptcy protection between 1992 and 2001 who were between 25 and 54 in the year of their bankruptcy filing.

3 Research Design

We estimate the impact of bankruptcy flag removal using a difference-in-differences research design that compares outcomes for Chapter 7 filers (the "treatment" group), who have their flags removed at 10 years, to Chapter 13 filers (the "control" group), who have their flags removed at 7 years and are therefore unaffected at the 10 year time horizon.

We conduct our analysis using individual-level data collapsed to speed up the regression analysis. Specifically, we collapse the individual-level data to the full interaction of Chapter of filing, cohort of filing defined at the year-quarter level, time period defined at the year-quarter level, and 5-year age bins. In our regression specifications, we weight each of the resulting cells by the number of underlying individual observations so that our estimates are representative of the underlying individual-level data.

Let i index "filing groups," defined as individuals in the same 5-year age bin who filed for bankruptcy in the same Chapter and in the same year-quarter. Let t index time at the year-quarter level, and let r indicate quarters relative to the 10-year horizon when Chapter 7 filers have their bankruptcy flags removed. We define r using this 10-year horizon for both Chapter 7 and Chapter 13 filers even though Chapter 13 filers have their flags removed at an earlier date. For a given outcome, y_{it}, our regression specification takes the form:

$$y_{it} = \alpha_i + \alpha_t + \sum_{r \neq -1} \Big[\alpha_r + \beta_r \cdot \mathbf{1}(\text{Chapter 7}) \Big] + \varepsilon_{it} \tag{1}$$

where α_i are filing group fixed effects, α_t are year fixed effects, α_r are quarters relative to year 10 fixed effects, $\mathbf{1}(\text{Chapter 7})$ is an indicator for filing under Chapter 7, and β_r are coefficients on Chapter 7 that vary non-parametrically by quarter relative the 10-year horizon when Chapter 7 flags are removed.

We omit the quarter just prior to flag removal, $\beta_{r=-1}$, so that the other β_r's can be interpreted relative to this pre-removal baseline period. We also drop the base effect for the quarter prior to flag removal, $\alpha_{r=-1}$, as it is not separately identified from the other fixed effects in the specification. [9]

The primary advantage of estimating the non-parametric event study in Equation (1) is that it allows us to flexibly assess the pattern of outcomes before and after the flag removal. To gauge the magnitude and statistical significance of the results, we also estimates a specification that pools the effect across sets of consecutive quarters in the post flag removal period. In particular, we estimate a specification where replace the quarter-specific coefficients in the post flag removal period with three post-flag removal coefficients: β_1, which pools over quarters $r \in [0, 6]$, β_2, which pools over quarters $r \in [7, 12]$, and β_3, which pools over quarters $r \in [13, 24]$. Other than these pooled coefficients, the specification is identical to that in Equation (1).

In both specifications, the β coefficients can be interpreted as the differential change in y_{it} for Chapter 7 filers compared to Chapter 13 filers following the Chapter 7 bankruptcy flag removal. The identifying assumption is parallel trends: conditional on our controls, y_{it} would have followed a similar evolution for both groups of filers in the absence of the Chapter 7 flag removal. This identifying assumption would be violated if Chapter 7 and Chapter 13 filers have different trends in r. For example, our identifying assumption would be violated if Chapter 13 filers recover either faster or slower from a bankruptcy filing compared to Chapter 7 filers.

Our main approach to assess the validity of this assumption to examine outcomes for the treated and control filers in the pre-flag removal period. As discussed below, our plots of the raw data, and the non-parametric specifications, both show that outcomes for Chapter 7 and Chapter 13 filers move in close parallel during the pre-flag removal period for most outcomes. These results give us confidence that our control group is valid and provides us with an accurate counterfactual for what would have happened in the absence of flag removal.

4 Results

In this section, we examine the effects of the Chapter 7 flag removal using our difference-in-differences design. We first analyze the effects of flag removal on credit scores, before turning to its effects on unsecured borrowing, secured borrowing, and labor market outcomes.

[9] In this specification, we are only able to control for calendar year, rather than year-quarter, fixed effects due to collinearity. In our table results, we are able to control for year-quarter calender fixed effects since our post removal estimates are simplified to three post treatment coefficients.

4.1 Credit Scores

We begin with a descriptive analysis of how credit scores evolve for Chapter 7 and Chapter 13 bankruptcy filers just before and after flag removal. Since credit score are used in the vast majority of lending decisions, improvements in credit scores directly translate into increased credit availability.

Figure 1 plots average credit scores for Chapter 7 filers (the "treatment" group) and Chapter 13 filers (the "control" group) for each quarter relative to the Chapter 7 flag removal. In the pre-removal quarters, credit scores for Chapter 7 and Chapter 13 filers trend upwards together, confirming the parallel-trends identifying assumption. In the quarter that the Chapter 7 flag is removed, there is a clear jump of approximately 15 points in the credit scores of Chapter 7 filers relative to Chapter 13 filers. This initial 15 point increase in credit scores from a base of approximately 623 points corresponds to a jump from the 25.5 to 28.5 percentile of the credit score distribution of all credit users. Post-removal, the credit scores of both Chapter 7 and Chapter 13 filers continue their upward trend, with the relative "effect" of flag-removal narrowing over time. However, even 24 quarters post-removal, the credit scores of Chapter 7 filers remain approximately 7 to 8 points above those of Chapter 13 filers.

Figure 2 shows the corresponding difference-in-differences regressions for the effect of flag-removal on credit scores from our non-parametric specification in Equation (1). Table 2 shows results from our parametric specification that pools the effect across quarters 0-6, 7-12, and 13-24. In both specifications, we omit the quarter before flag removal, so that the effects can be interpreted relative to the pre-removal period. We also control for filing by cohort and calendar year effects in both specifications, and cluster standard errors at the demographic group by filing cohort level. The point estimates indicate that credit scores increase by 14.0 points in the first 6 quarters following flag removal, a 2.2 percent increase from the baseline mean of 623 points. Credit scores remain 11.7 points higher in quarters 7-12, and 10.6 points higher in quarters 12-24.

Consistent with the results from Figure 1, we also find that there is no systematic relationship between flag-removal and credit scores in the pre-removal quarters, with the estimated coefficients being economically and statistically insignificant. These pre-removal results are consistent with our identifying assumption of parallel trends for Chapter 7 and Chapter 13 filers.

4.2 Credit Card Debt

We examine four measures of credit card debt: (i) credit card balances aggregated across all cards, (ii) the number of credit card accounts, (iii) an indicator for at least one credit card account, (iv) the

amount of delinquent credit card debt. Figure 3 shows averages for Chapter 7 and Chapter 13 filers for each quarter relative to the Chapter 7 flag removal. Figure 4 shows the corresponding difference-in-differences regressions from our non-parametric specification in Equation (1). Table 3 shows results from our parametric specification that pools the effect across quarters 0-6, 7-12, and 13-24.

There is an economically and statistically significant impact of flag removal on credit card debt. The regression estimates in Table 3 show that flag removal increases the number of credit card accounts by 0.368 in quarters 12-24, an 11.4 percent increase from the baseline mean of 3.2 cards. The amount of credit card debt increases by $639 over the same time period, a 14.8 percent increase. Delinquent debt also modestly increases post-removal, but only the estimate from 6-12 quarters is statistically significant. In sum, these results suggest that the increase in credit scores documented above leads to a significant increase in credit card debt, most likely through an increase in credit supply or a decrease in credit costs.

Consistent with the credit score results, there is no pre-trend in credit card balance or delinquent balance pre-removal. There may be a modest pre-trend in the number of credit card accounts, although large standard errors make definitive conclusions impossible.

4.3 Automobile and Mortgage Debt

Our analysis of automobile and mortgage debt parallels our analysis of credit card borrowing conducted above. For automobiles and mortgages, we examine effects on (i) total balances, (ii) number of accounts, (iii) an indicator for at least one account, and (ii) the amount of delinquent debt. Figure 5 shows averages for Chapter 7 and Chapter 13 filers for each quarter relative to the Chapter 7 flag removal. Figure 6 shows the corresponding difference-in-differences regressions from our non-parametric specification in Equation (1). Table 4 shows results from our parametric specification that pools the effect across quarters 0-6, 7-12, and 13-24.

The impact of flag-removal on mortgage and automobile debt is far more modest than the unsecured debt results discussed above. The regression estimates in Panel A of Table 4 show that flag removal increases the number of auto loans by a statistically insignificant 0.004 loans in quarters 1-6, and only 0.027 loans in quarters 12-24. The latter estimate represents a 4.2 percent increase from the baseline mean of 0.6 loans. The amount of total auto debt also increases by only $152 in quarters 1-6 and $344 in quarters 12-24, 1.8 and 4.1 percent increases, respectively.

Panel B of Table 4 shows similar results for mortgage debt. Flag removal increases the number of

mortgage loans by 0.023 loans in quarters 12-24, a 3.7 percent increase, with similar results in earlier quarters. Mortgage debt increases by $1,410 in quarters 1-6, $2,774 in quarters 6-12, and a statistically insignificant $656 in quarters 12-24. These estimates represent a 0.9 to 3.9 percent increase from the baseline mean of $71,779.

Figure 6 shows no systematic evidence of different pre-trends in auto and mortgage debt outcomes. Similar to the unsecured debt outcomes, there may be modest pre-trends in the total balance measures, although the standard errors are again too large to draw firm conclusions.

We view the economically small effects for automobile and mortgage debt, relative to credit card debt, as consistent with two explanations. First, automobile and mortgage borrowing are less frequent occurrences, and so any change in the credit worthiness of borrowers may not be reflected over our 24 quarter time horizons. Second, automobile and mortgage lenders rely much more heavily on non-credit report mechanisms to screen potential borrowers, such as down payment requirements (Adams, Einav and Levin, 2009) and debt-to-income requirements.

4.4 Labor Market Outcomes

Our analysis of labor market outcomes follows a familiar pattern. We examine effects on (i) formal sector employment (ii) wage earnings, (iii) self-employment and (iv) self-employment earnings. Figure 7 shows averages for Chapter 7 and Chapter 13 filers for each quarter relative to the Chapter 7 flag removal. Figure 8 shows the corresponding difference-in-differences regressions from our non-parametric specification in Equation (1). Table 5 shows results from our parametric specification that pools the effect across quarters 0-6, 7-12, and 13-24.

In contrast to the financial outcomes, there is no evidence of economically significant effects of flag removal on labor market outcomes, at least for the average bankruptcy filer. Flag removal increases employment in quarters 12-24 by a statistically insignificant 1.2 percentage points, a 1.6 percent increase from the baseline mean of 74.9 percent. The 95 percent confidence intervals ruling out employment effects of larger than about 3.4 percentage points over this time period. Similarly, we find that flag removal increases wage earnings by a statistically insignificant $678 in quarters 12-24, a 2.1 percent increase from the baseline mean, with the 95 percent confidence intervals ruling out effects larger than $2,238.

Self employment also increases by only 0.1 percentage points, a 1.5 percent increase, and self employment earnings increase by only $3, a 0.4 percent increase. Estimates in earlier quarters are even

smaller than those in quarters 12-24, suggesting that flag removal is unlikely to have economically important effects on the labor market outcomes of most bankruptcy filers, at least as measured by administrative tax data. Consistent with our earlier results, there is also no evidence of different pre-trends for labor market outcomes. Thus, our identifying assumption appears to be valid in this setting.

The zero average effects do not rule out the existence of groups of individuals who are affected by flag removal. Instead, it suggests that these groups are relatively small or that the effects for these groups are not large enough to have a measurable impact on the average. The zero average effects are consistent with employer using a broad range of mechanisms to screen potential employees so that the impact of an improved credit score does not have a measurable impact on the margin.

5 Conclusion

This paper estimates the causal effect of improved credit reports on credit and labor market outcomes. We find that the removal of a bankruptcy flag leads to a large increase in credit scores, an economically significant increase in credit card utilization, and economically small increases in auto and mortgage borrowing. In sharp contrast, we find a precise zero effect of improved credit reports on employment and wage outcomes. We argue that these results are consistent with credit reports being most important for lower stakes, unsecured borrowing, where lenders relay heavily on credit reports, and less important for higher stakes, secured borrowing, where firms use other screening mechanisms, and labor market outcomes, where employers rely on a much broader set of information.

There are at least three caveats to our analysis. First, events such as mortgage borrowing and job transitions are infrequent occurrences, and so any effects of credit worthiness may not be reflected over the 24 quarter time horizons we currently examine. Future versions of this paper will therefore include estimates over a variety of longer time horizons. Second, the zero average effects we estimate for labor market outcomes do not rule out the existence of groups of individuals who are affected by flag removal. Thus, it will be important that we also examine how the effects of credit worthiness vary across observably different borrowers. Finally, the effects of other changes in the credit worthiness, such as the removal of a foreclosure flag or delinquent debt flag, may be different than the effects examined here. While beyond the scope of this paper, estimating the effects of other improvements in credit worthiness is an important area of future work.

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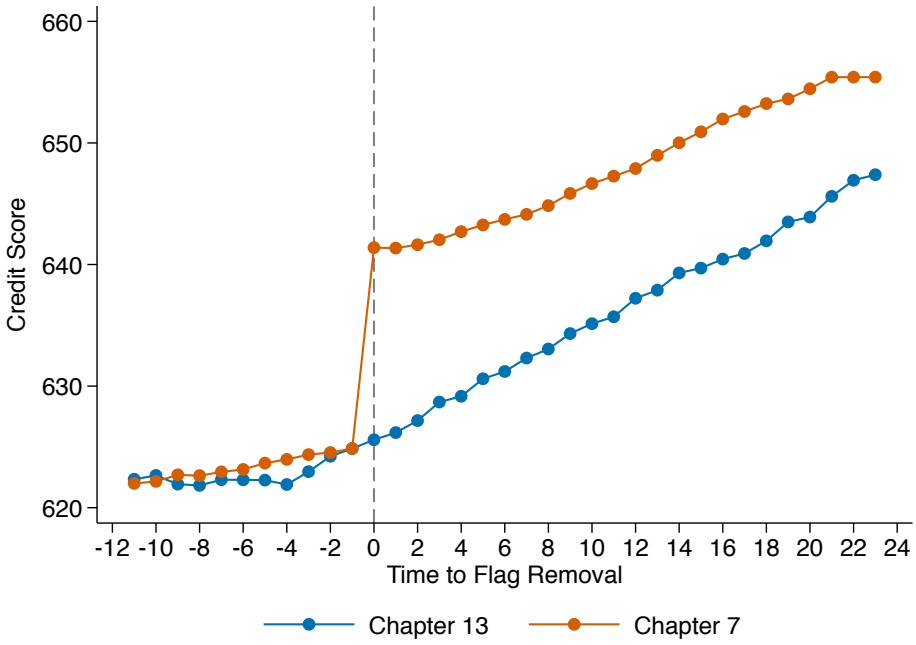
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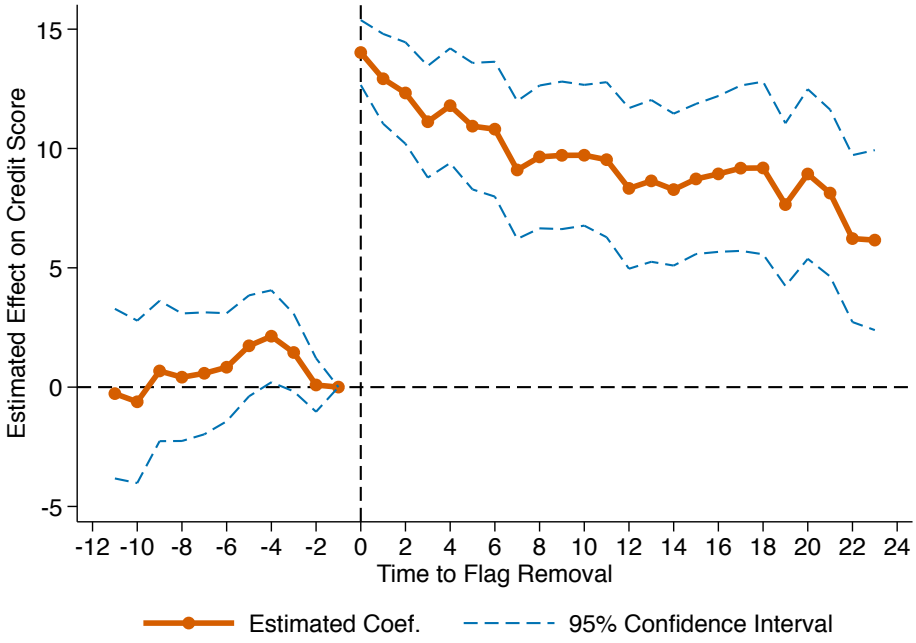
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Figure 1: Credit Score Trends



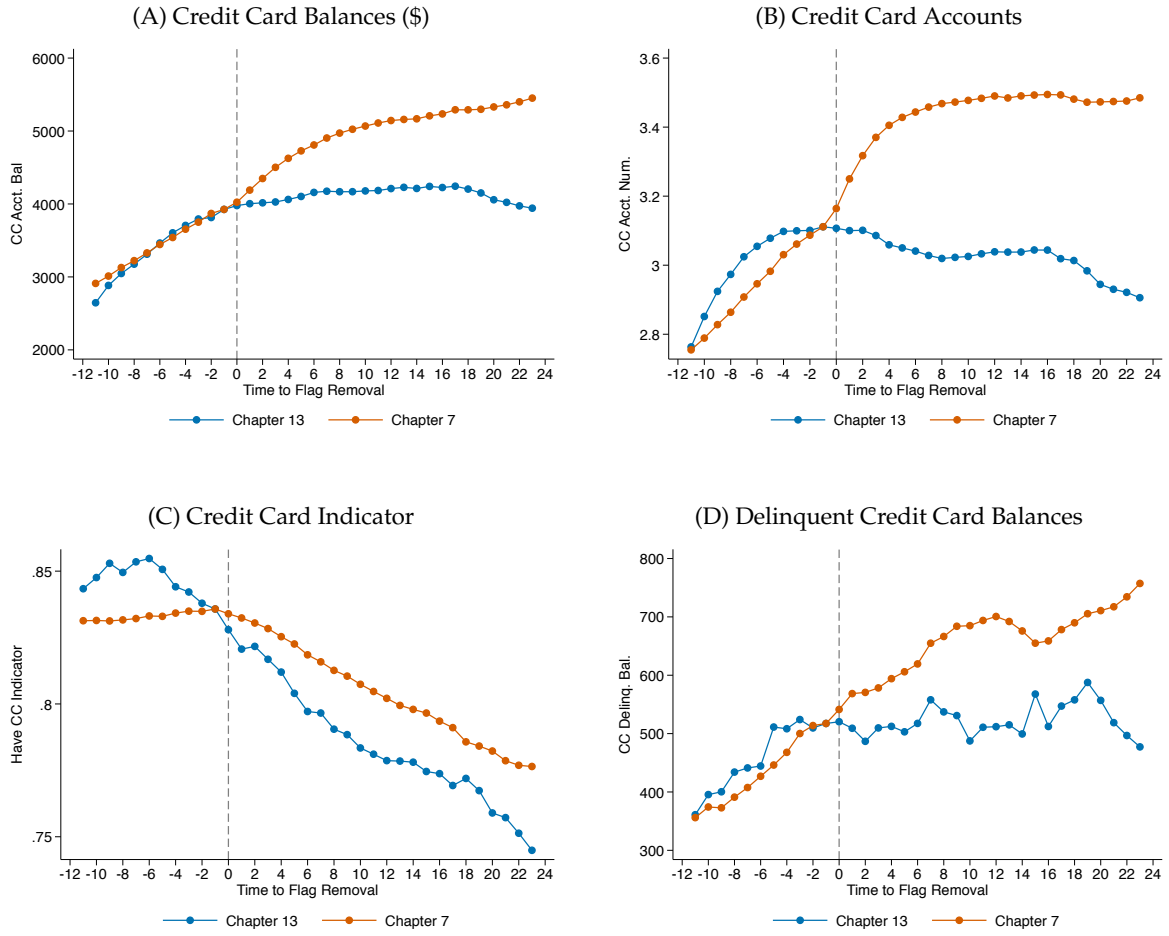
Notes: This figure plots the average credit score of bankruptcy filers to the event of bankruptcy flag removal. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Values are normalized to the average value of the outcome in the $t = -1$ period. The control group is Chapter 13 bankruptcy filers who filed in the same year, but whose flag was removed 12 quarters before. The x-axis denotes time with respect to the shock, normalized to period 0. See the text for additional details.

Figure 2: Effect of Chapter 7 Flag Removal on Credit Scores



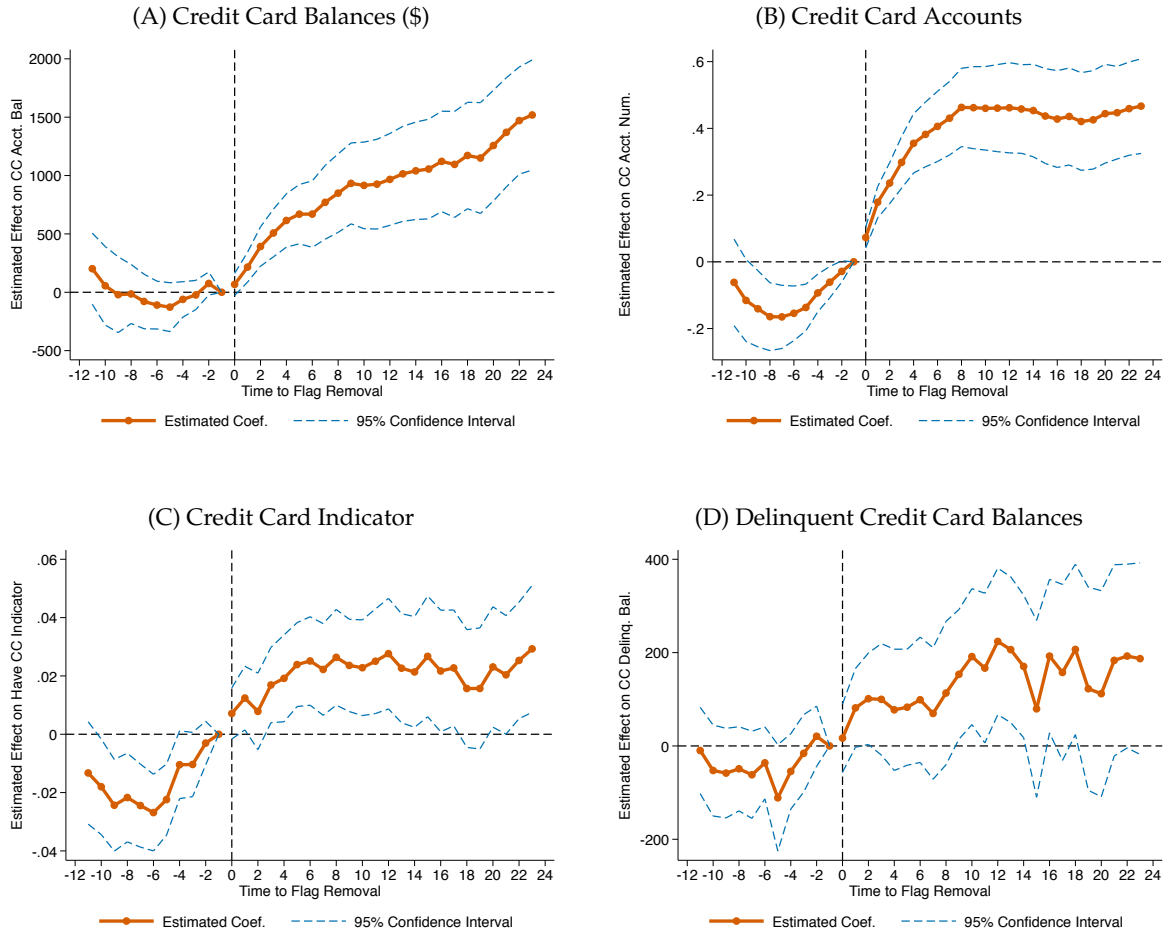
Notes: This figure plots the regression estimates of bankruptcy filers' credit score in response to the event of bankruptcy flag removal. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Values are normalized to the average value of the outcome in the $t = -1$ period. The x-axis denotes time with respect to the shock, normalized to period 0. See the text for additional details.

Figure 3: Unsecured Credit Trends



Notes: These figures plot the average balance of credit card and retail accounts, average number of credit card and retail accounts, average of an indicator for any credit card or retail account, and the average delinquent credit card and retail balance of bankruptcy filers to the event of bankruptcy flag removal. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Values are normalized to the average value of the outcome in the $t = -1$ period. The control group is Chapter 13 bankruptcy filers who filed in the same year, but whose flag was removed 12 quarters before. The x-axis denotes time with respect to the shock, normalized to period 0. See the text for additional details.

Figure 4: Effect of Chapter 7 Flag Removal on Unsecured Credit



Notes: This figure plots the regression estimates of bankruptcy filers' credit card and retail balances, average number of credit card and retail accounts, average of an indicator for any credit card or retail account, and the average delinquent credit card and retail balance in response to the event of bankruptcy flag removal. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Values are normalized to the average value of the outcome in the $t = -1$ period. The x-axis denotes time with respect to the shock, normalized to period 0. See the text for additional details.

Figure 5: Auto and Mortgage Borrowing Trends

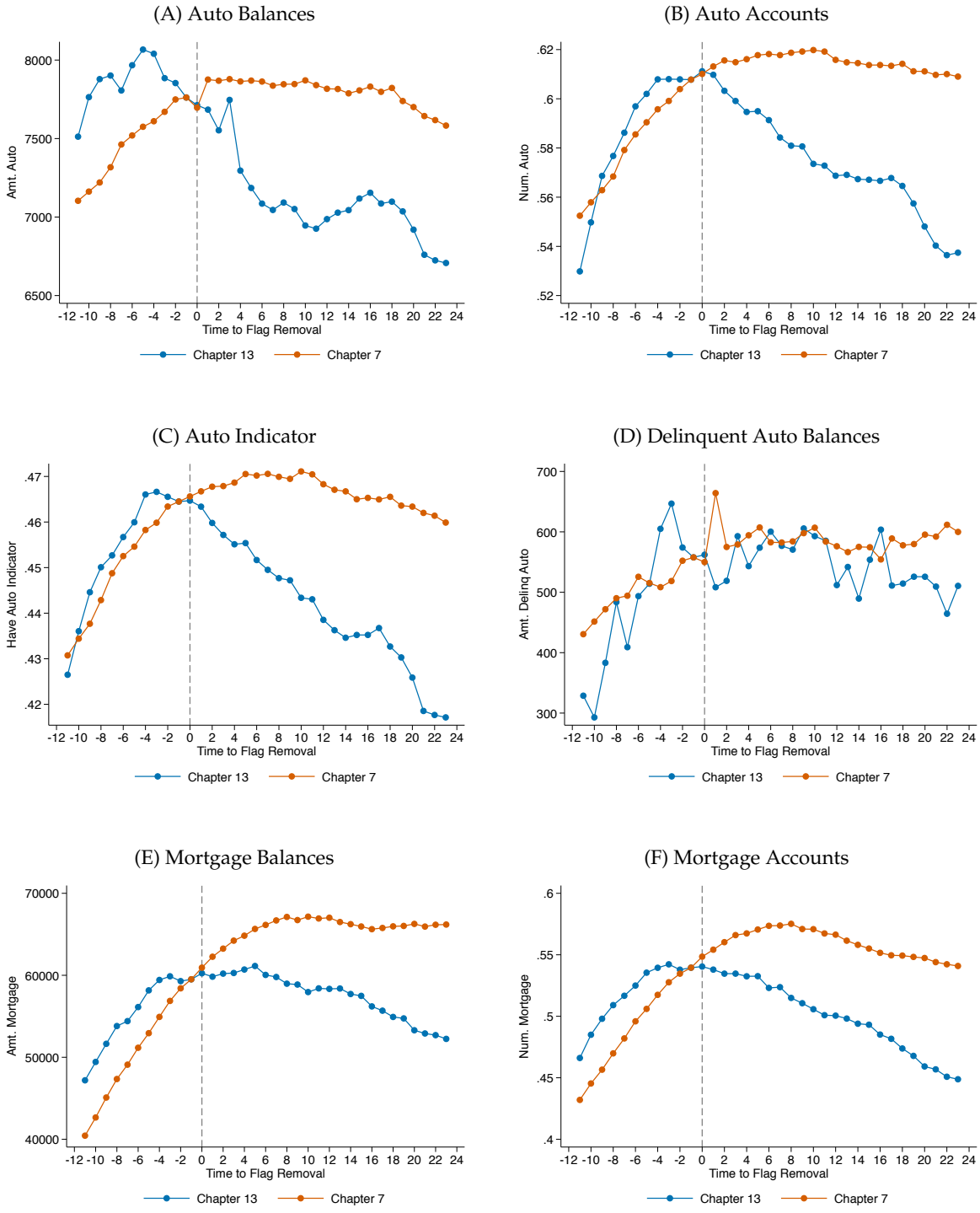
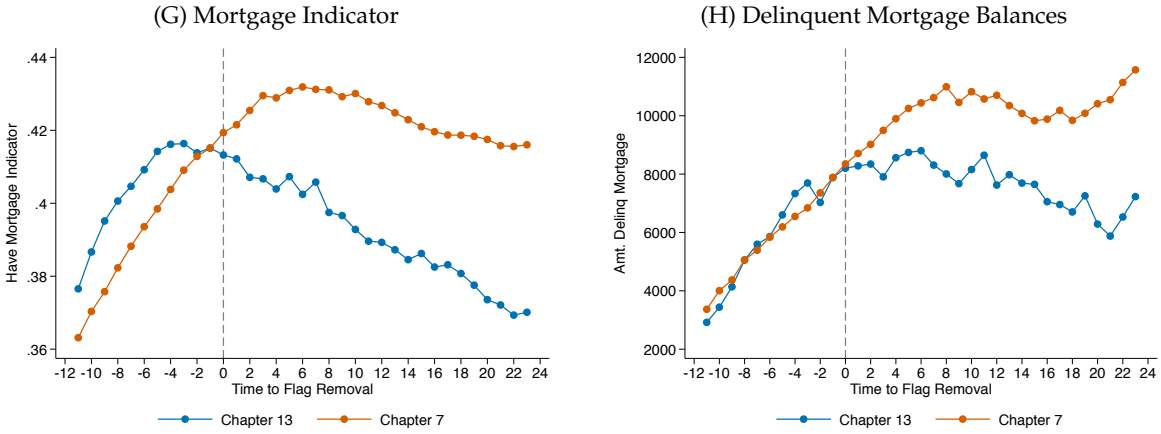


Figure 5 Continued: Auto and Mortgage Borrowing Trends

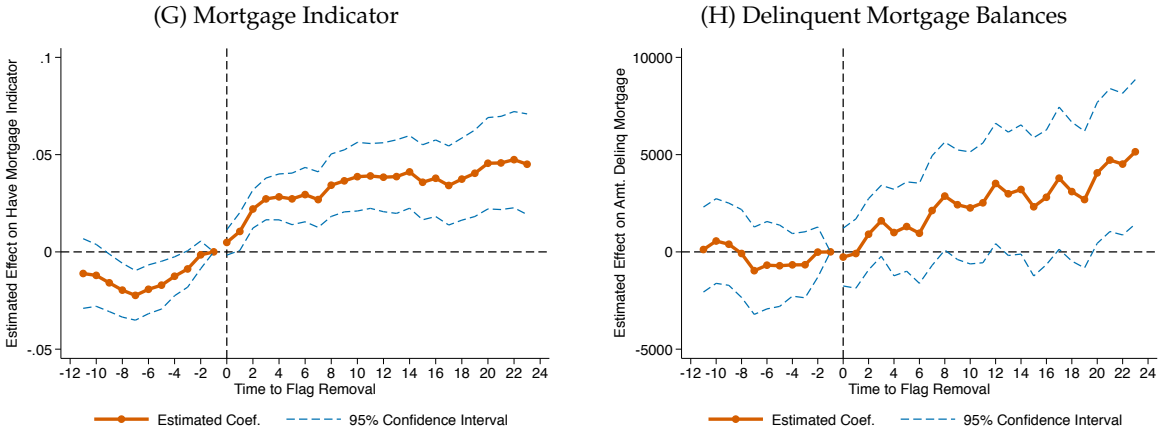


Notes: This figure plots the average auto loan balance, average number of auto loan accounts, average of an indicator for any auto loan, average delinquent auto balance, average mortgage loan balance, average number of mortgage loan accounts, average of an indicator for any mortgage loan, and average delinquent mortgage balance of bankruptcy filers to the event of bankruptcy flag removal. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Values are normalized to the average value of the outcome in the $t = -1$ period. The control group is Chapter 13 bankruptcy filers who filed in the same year, but whose flag was removed 12 quarters before. The x-axis denotes time with respect to the shock, normalized to period 0. See the text for additional details.

Figure 6: Effect of Chapter 7 Flag Removal on Auto and Mortgage Borrowing

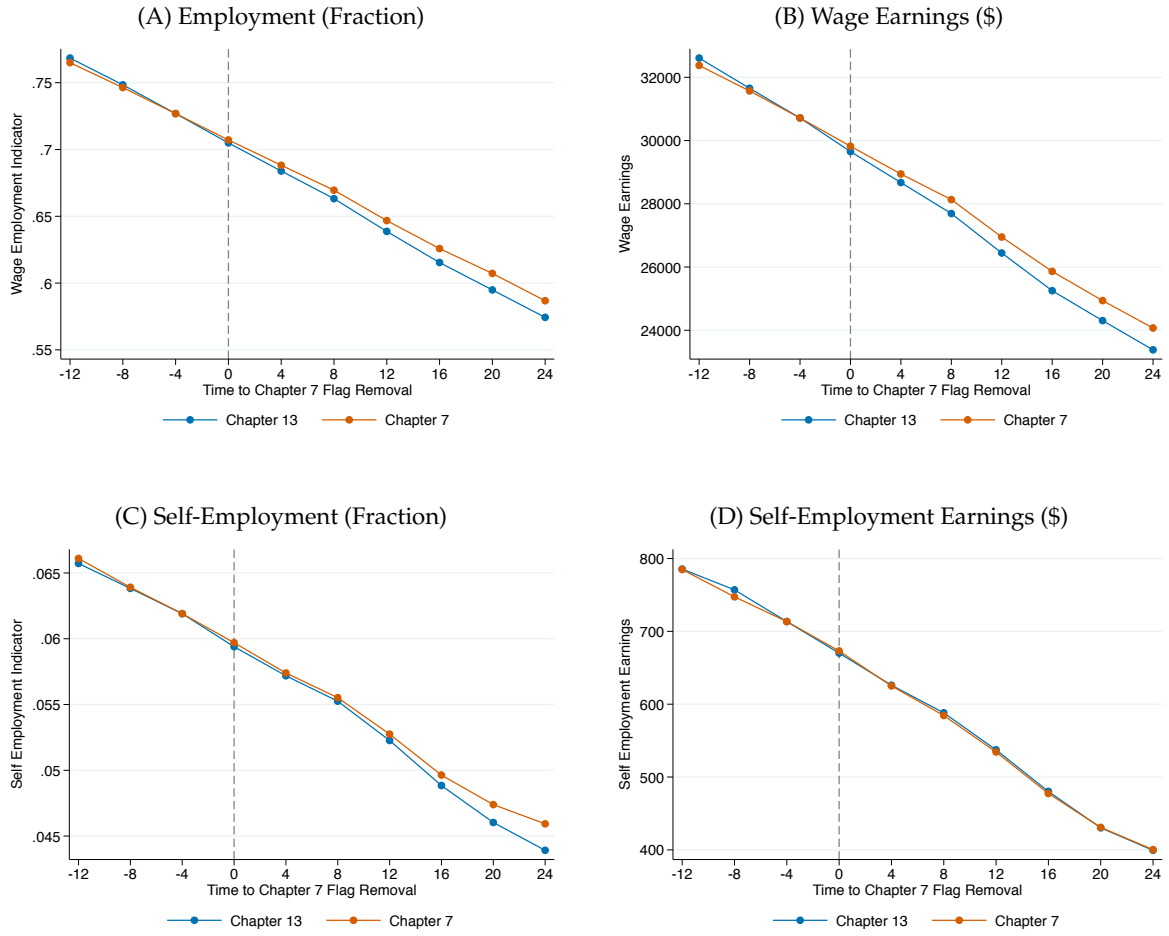


Figure 6 Continued: Effect of Chapter 7 Flag Removal on Auto and Mortgage Borrowing



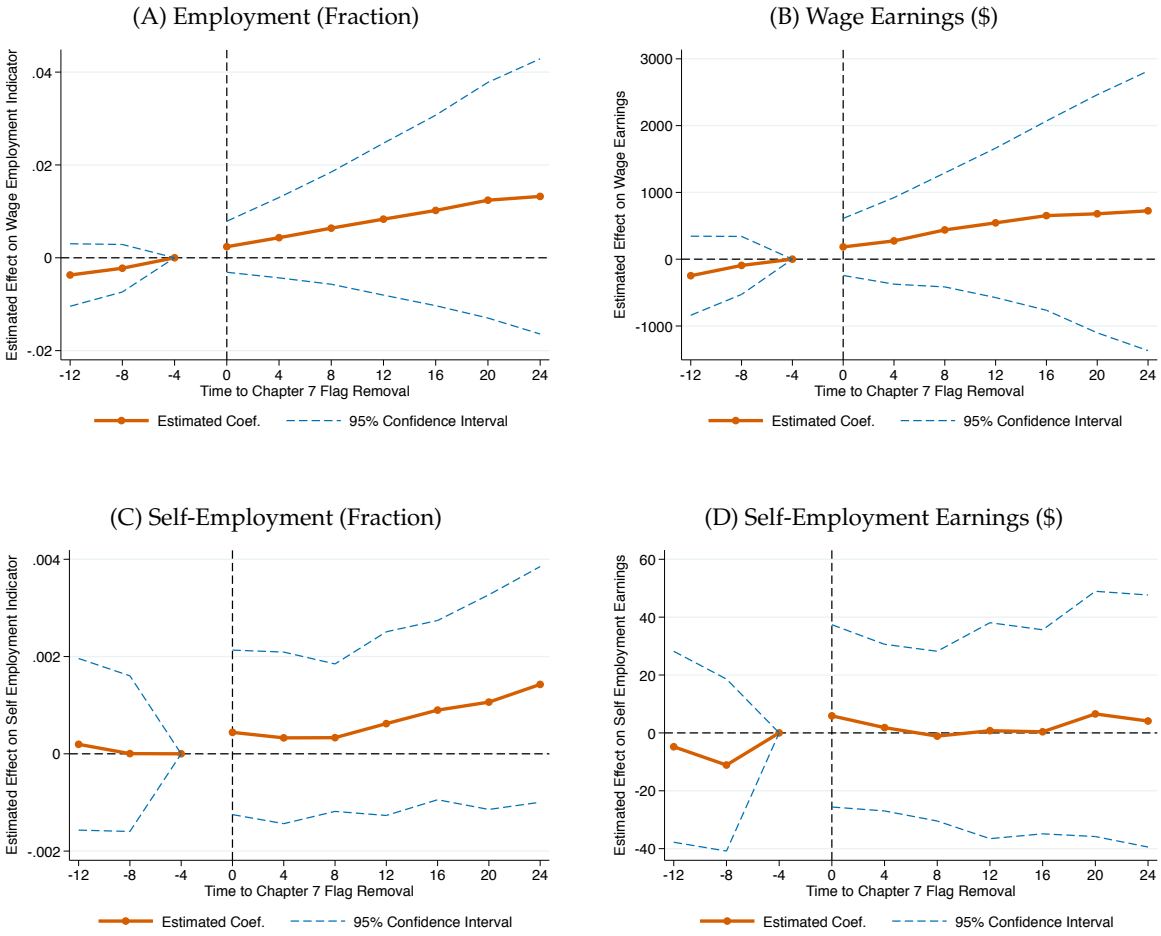
Notes: This figure plots the regression estimates of bankruptcy filers' auto loan balance, number of auto loan accounts, indicator for any auto loan, delinquent auto balance, mortgage loan balance, number of mortgage loan accounts, indicator for any mortgage loan, and delinquent mortgage balance in response to the event of bankruptcy flag removal. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Values are normalized to the average value of the outcome in the $t = -1$ period. The x-axis denotes time with respect to the shock, normalized to period 0. See the text for additional details.

Figure 7: Labor Market Trends



Notes: This figure plots the average of an employment indicator, wage earnings, a self-employment indicator, and self-employment earnings in response to the event of bankruptcy flag removal. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Values are normalized to the average value of the outcome in the $t = -4$ period. The control group is Chapter 13 bankruptcy filers who filed in the same year. The x-axis denotes time with respect to the shock, normalized to period 0. See the text for additional details.

Figure 7: Effect of Chapter 7 Flag Removal on Labor Market Outcomes



Notes: This figure plots the regression estimates of bankruptcy filers' employment status, wage earnings, self-employment status, and self-employment earnings in response to the event of bankruptcy flag removal. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Values are normalized to the average value of the outcome in the $t = -4$ period. The x-axis denotes time with respect to the shock, normalized to period 0. See the text for additional details.

Table 2: Effect of Chapter 7 Flag Removal on Credit Scores

	Mean at	Difference-in-Difference Estimates		
	$t = -1$	6 Quarters	12 Quarters	24 Quarters
	(1)	(2)	(3)	(4)
Credit Score	623.202	14.053***	11.720***	10.620***
	(16.167)	(0.624)	(0.891)	(1.051)

Notes: This table reports the difference-in-difference estimates of bankruptcy filers' credit score in response to the event of bankruptcy flag removal. The regressions include 1,832,614 observations for 53,978 individuals. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Column 1 reports the dependent variable mean and standard deviation for the treatment group in the quarter prior to flag removal. For columns 2 through 4, the control group is those individuals who filed for Chapter 13 and whose flag is removed 12 quarters earlier than the treatment group. See the text for additional details.

Table 3: Effect of Chapter 7 Flag Removal on Unsecured Outcomes

	Mean at	Difference-in-Difference Estimates		
	$t = -1$	6 Quarters	12 Quarters	24 Quarters
	(1)	(2)	(3)	(4)
CC Acct. Num.	3.218	0.184***	0.333***	0.368***
	(0.445)	(0.017)	(0.029)	(0.035)
CC Acct. Bal	4,319.116	236.614***	509.452***	639.786***
	(765.309)	(53.308)	(90.329)	(105.843)
CC Indicator	0.859	0.008**	0.014***	0.011**
	(0.052)	(0.003)	(0.005)	(0.005)
CC Delinq. Bal.	645.213	53.198	83.332*	57.564
	(254.968)	(32.872)	(44.364)	(48.168)

Notes: This table reports the difference-in-difference estimates of bankruptcy filers' credit card and retail accounts in response to the event of bankruptcy flag removal. The regressions include 1,832,614 observations for 53,978 individuals. Row 1 is the number of outstanding credit card accounts. Row 2 is the current balance of the accounts. Row 3 is an indicator for whether the individual has any credit card accounts at all. Row 4 is the outstanding 30 days or more delinquent balance. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Column 1 reports the dependent variable mean and standard deviation for the treatment group in the quarter prior to flag removal. For columns 2 through 4, the control group is those individuals who filed for Chapter 13 and whose flag is removed 12 quarters earlier than the treatment group. See the text for additional details.

Table 4: Effect of Chapter 7 Flag Removal on Secured Outcomes

	Mean at	Difference-in-Difference Estimates		
	$t = -1$	6 Quarters	12 Quarters	24 Quarters
	(1)	(2)	(3)	(4)
Panel A: Auto Outcomes				
Num. Auto	0.641	0.004	0.019**	0.027**
	(0.084)	(0.005)	(0.009)	(0.011)
Amt. Auto	8,322.626	152.830	419.391**	344.025
	(1,714.891)	(123.710)	(196.752)	(223.457)
Auto Indicator	0.484	0.004	0.012**	0.018***
	(0.054)	(0.004)	(0.006)	(0.006)
Amt. Delinq Auto	591.916	16.270	−30.641	−11.115
	(385.594)	(39.662)	(49.976)	(55.135)
Panel B: Mortgage Outcomes				
Num. Mortgage	0.609	0.016***	0.030***	0.023***
	(0.106)	(0.005)	(0.007)	(0.008)
Amt. Mortgage	71,779.802	1,410.878*	2,774.154**	656.731
	(19,287.460)	(770.350)	(1,306.561)	(1,436.477)
Mortgage Indicator	0.449	0.013***	0.020***	0.017***
	(0.054)	(0.003)	(0.004)	(0.005)
Amt. Delinq Mortgage	9,985.581	1,021.463*	1,701.129**	1,235.388
	(6,454.174)	(533.370)	(745.264)	(828.821)

Notes: This table reports the difference-in-difference estimates of bankruptcy filers' secured credit accounts in response to the event of bankruptcy flag removal. The regressions include 1,832,614 observations for 53,978 individuals. Row 1 is the number of auto accounts the consumer has open. Row 2 is the current outstanding auto loan balance. Row 3 is an indicator for whether the individual has any oustanding auto loans. Row 4 is the current outstanding 30 days or more delinquent balance for auto loans. Row 5 is the number of mortgage accounts the consumer has open. Row 6 is the current outstanding mortgage balance. Row 7 is an indicator for any outstanding mortgage loan. Row 8 is the current outstanding 30 days or more delinquent balance for mortgage loans. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Column 1 reports the dependent variable mean and standard deviation for the treatment group in the quarter prior to flag removal. For columns 2 through 4, the control group is those individuals who filed for Chapter 13 and whose flag is removed 12 quarters earlier than the treatment group. See the text for additional details.

Table 5: Effect of Chapter 7 Flag Removal on Labor Market Outcomes

	Mean at	Difference-in-Difference Estimates		
	$t = -4$	8 Quarters	12 Quarters	24 Quarters
	(1)	(2)	(3)	(4)
Wage Employment Indicator	0.749	0.004	0.008	0.012
	(0.092)	(0.004)	(0.008)	(0.011)
Wage Earnings	32,300.962	298.565	543.874	678.961
	(5,195.526)	(294.926)	(558.100)	(796.805)
Self Employment Indicator	0.064	0.000	0.001	0.001
	(0.009)	(0.001)	(0.001)	(0.001)
Self Employment Earnings	758.061	2.197	0.763	3.336
	(154.412)	(12.348)	(18.617)	(18.347)

Notes: This table reports the difference-in-difference estimates of bankruptcy filers' employment outcomes in response to the event of bankruptcy flag removal. The regressions include 32,531,232 observations for 4,582,107 individuals. The treatment sample includes individuals who were age 25 to 55 when they filed for bankruptcy, and had their bankruptcy flag removed sometime between 2001 to 2011. Column 1 reports the dependent variable mean and standard deviation for the treatment group in the year prior to flag removal. For columns 2 through 4, the control group is those individuals who filed for Chapter 13 and whose flag is removed 12 quarters earlier than the treatment group. See the text for additional details.