

# Insolvency After the 2005 Bankruptcy Reform\*

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## Abstract

The 2005 Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) is the most important reform of personal bankruptcy in the United States in recent years. This legislation overhauled eligibility requirements and increased monetary costs of filing for bankruptcy. Using administrative credit file data from a nationally representative panel, we quantify the effects of the reform on bankruptcy and insolvency. Exploiting geographical variation in the change in filing fees associated with the reform, we show that Chapter 7 bankruptcies strongly declined in response of the rise in filing fees, while there is no such evidence for Chapter 13, and argue that this pattern is consistent with binding liquidity constraints driving the response to the reform. We show that the missing Chapter 7 bankruptcies lead to a rise in persistent insolvency and also a return to being current for financially distressed borrowers. Finally, we show that persistent insolvency is associated with worse outcomes than filing for bankruptcy for financially distressed borrowers, in terms of access to credit and credit scores, suggesting that BAPCPA may have removed an important form of relief for these borrowers.

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# 1 Introduction

Personal bankruptcy is a form of social insurance offering relief to individuals who are unable to repay previously contracted debt.<sup>1</sup> As most forms of social insurance, the debt discharge offered under bankruptcy may generate moral hazard, raising important positive and normative questions on the effects of personal bankruptcy on household indebtedness and delinquency behavior, as well as on the optimal design of the institution of personal bankruptcy.

This paper seeks to contribute to our understanding of personal bankruptcy by examining the effect of the 2005 Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA), the most comprehensive reform of personal bankruptcy regulation since the Bankruptcy Reform Act of 1978. The 2005 law restricted filing requirements, including introducing an income test for Chapter 7 bankruptcy, and substantially increased the monetary cost of filing for bankruptcy. We assess the impact of changes in eligibility requirements and filing costs on bankruptcy and related outcomes. Importantly, while previous work only considers the impact of the law on bankruptcies, we also consider other outcomes, and are able to account for how the reduction in bankruptcy filing affects financially distressed borrowers.

Our analysis is based on anonymous administrative credit report data from a nationally representative panel of U.S. individuals from 1999 to 2013. These data allow us to observe bankruptcy filings by chapter and the changing characteristics of filers, as well as the behavior of financially distressed individuals who post-2005 decide not to file. We aggregate the data at the U.S. bankruptcy court district level, which allows us to use a rich set of local economic indicators in order to control for the impact of local economic conditions, including the 2007-2009 Great Recession. We focus on borrowers experiencing a new spell of financial distress, and we examine the transition rates into various credit outcomes such as bankruptcy, persistent insolvency, foreclosure or resolution of insolvency.

BAPCPA's main provision was to introduce an income test for Chapter 7 bankruptcy, effectively removing the ability of most filers to choose their chapter.<sup>2</sup> Additionally, it introduced a number of new provisions that increased the burden of filing for bankruptcy and overall made bankruptcy a less attractive option. In particular, the new law increased

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<sup>1</sup>Some of the common circumstances leading to bankruptcy include loss of income due to unemployment or illness, medical bills, divorce, unplanned children. See Chakravarty and Rhee (1999) and Livshits, MacGee, and Tertilt (2007) for more detail.

<sup>2</sup>Chapter 7 filers are required to have income below their state's median, limiting the possibility of choosing the filing chapter. It mandated a fixed 5 year repayment plan for most Chapter 13 filers and increased re-filing restrictions for both chapters. For a discussion of the impact of the income test, see Lawless et al. (2008), who argue that it did not significantly affect household decisions.

the monetary cost of filing in a variety of ways. It raised court filing fees and mandated that filers attend compulsory credit counseling classes at their own expense. It also increased reporting requirements in bankruptcy petitions and made bankruptcy attorneys personally liable for inaccuracies in information reported to the court in the bankruptcy petition. These changes led to a sizable rise in attorney fees for bankruptcy cases. The mean rise in attorney fees was 35% for Chapter 7 filers, from a mean value of \$697 dollars pre-reform to \$975 post-reform. For Chapter 13 filers, the mean rise in attorney fees was 29%, from a mean value of \$1,910 pre-reform to \$2,531 post reform.<sup>3</sup> We use the variation of the change in costs across court districts to capture the effect of monetary costs on filing decisions. Given previous evidence suggesting that liquidity constraints play a sizable role in the decision to file for bankruptcy, such increases can constrain individuals' options in terms of seeking relief for financial distress.<sup>4</sup> Overall, the aggregate evolution of Chapter 7 and 13 filings shows a clear pattern post-reform. After a brief but sizable anticipation effect in 2004, both chapter filing rates drop and then rise again temporarily during the Great Recession, never reaching their pre-reform levels. The permanent decline in Chapter 7 filing rates is even more pronounced after controlling for local economic conditions. Specifically, Chapter 7 bankruptcy filings drop by more than 60 log points, while there is no statistically significant change in Chapter 13 filings. The drop in Chapter 7 filings is also concentrated at the bottom of income distribution, suggesting that the income test for Chapter 7 bankruptcy is not the main driver of this response. We explore a mechanism behind the response and the difference between chapters using the cross-district variation of the increase in filing costs.

To proxy for the change in the monetary cost of filing for bankruptcy, we exploit the geographical variation in the change in attorney fees post-reform, as reported by Lupica (2012), separately for Chapter 7 and Chapter 13.<sup>5</sup> We find that larger increases in attorney fees are strongly negatively related to Chapter 7 bankruptcy filings, but not to Chapter 13 filings. Our estimates imply that moving from the 25th to the 75th percentile of the

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<sup>3</sup>These values come from Lupica (2012). See also Government Accountability Office (2008) and White (2007) for similar conclusions based on different data sources.

<sup>4</sup>For example, borrowers tend to file on paydays (Mann and Porter (2009)) and when they receive tax rebates checks (Gross, Notowidigdo, and Wang (2012)). Additionally, borrowers who file for Chapter 7 bankruptcy pre-reform were documented to have extremely low incomes (Sullivan, Warren, and Westbrook (1994), Sullivan, Warren, and Westbrook (2006)), so that the magnitude of the rise in filings costs associated with the reform would be a significant impediment to filing for bankruptcy.

<sup>5</sup>Attorney fees account for a large fraction of the total cost of filing for bankruptcy: about 75% of the total cost of filing (Lupica (2012)). Even though the 2005 reform is a federal law, both the initial level of the fees and the change associated with the reform exhibit sizable variation across U.S. bankruptcy court districts. We show that this variation is unrelated to district level behavior, and exploit it using a difference-in-difference specification in order to quantify the effects of the fee changes.

fee change distribution reduces the flow from a new insolvency to a Chapter 7 bankruptcy by 15 log points. A crucial difference between Chapter 7 and Chapter 13 attorney fees is that fees for Chapter 7 have to be paid up-front, while fees for Chapter 13 can be paid in installments during the bankruptcy discharge period. Since the fees for both chapters increased by similar magnitudes post-reform, this suggests that the up-front nature of the filing cost for Chapter 7 bankruptcy plays a crucial role in discouraging potential filers, supporting the interpretation that these individuals are liquidity constrained.<sup>6</sup> When we estimate our results is sub-populations based on past credit score, we find that our effects are the strongest in the lowest credit score bins, suggesting that that low income borrowers are more affected by the rise in fees, consistent with the liquidity constraints interpretation.

If indeed binding liquidity constraints drive the decline in Chapter 7 filings, borrowers who are not filing for bankruptcy may have very limited options for repaying or even managing their debt obligations. We provide some evidence on this by accounting for the missing bankruptcies. Specifically, we examine the transition patterns from new insolvency to bankruptcy as well as other outcomes in the cross-section of court districts. By construction, newly financially distressed individuals who do not file for Chapter 7 bankruptcy flow into one of the other possible states, such as Chapter 13 filing, foreclosure, continued insolvency or return to being current. To capture this pattern, we estimate district-level average changes in credit outcomes, and then examine how the district-level decline in Chapter 7 filing rates is related to them. We find a strong negative and significant relation between the change in Chapter 7 filing rates and change in continued insolvency and in returning to being current. At the 4 quarter horizon, a one standard deviation increase in the estimated mean drop of flows into Chapter 7 bankruptcy implies a 2.4 log point increase in flows into continued insolvency, which accounts for 42% of the cross-sectional standard deviation of flows into insolvency. The same drop in flows into Chapter 7 implies an increase of 2.3 log points of flows into returning to current, which accounts for 31% of the cross sectional standard deviation of inflows into this state. We find a positive relation between changes in flows to Chapter 7 bankruptcy and Chapter 13 bankruptcy or foreclosure, which is consistent with the notion that the decline in Chapter 7 filing, by increasing the transitions to current, reduces the incidence for Chapter 13 or foreclosure.

Finally, since our analysis indicates a shift from Chapter 7 bankruptcy to persistent insolvency after BAPCPA, it is important to determine whether this change is consequential.

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<sup>6</sup>It would be difficult for filers to borrow to finance Chapter 7 filing costs, as these debts are junior and hence debts contracted close enough to filing date could be considered fraudulent, due to lack of intent to repay.

To this end, we examine access to credit and credit scores for initially financially distressed individuals, depending on whether they subsequently file for bankruptcy or not. Specifically, we consider cohorts of newly insolvent individuals, comparing those who file for Chapter 7 and or Chapter 13 bankruptcy in the 8 quarters after the new insolvency and those who don't. We then examine the behavior of several financial indicators for a 2 year window around that new insolvency. We find that individuals who file for Chapter 7 bankruptcy open new unsecured lines of credit and auto loans at a higher rate after filing than individuals who don't file, or file for Chapter 13 bankruptcy.<sup>7</sup> For mortgage originations, both Chapter 7 and Chapter 13 filers display an advantage relative to non-filers, with the gap growing post-reform. Since, as we show, the number of inquiries is very similar across the two groups, these findings indicate a difference in access to credit for these two groups, rather than demand for credit. This pattern is also reflected in the behavior of credit scores. Within the same cohort of newly insolvent individuals, we find that those who will eventually go bankrupt initially have lower credit scores, suggesting that they are negatively selected. However, these individuals experience a sharp boost in their credit score after they file for Chapter 7 bankruptcy, whereas credit scores recover at a much slower pace for individuals who remain insolvent or file for Chapter 13 bankruptcy. We conclude that, while both insolvency and bankruptcy are forms of default, the debt discharge associated with Chapter 7 bankruptcy outweighs the potentially negative signal associated with a bankruptcy flag and leaves filers with better access to credit than individuals who become insolvent in similar circumstances.

Our analysis has wide-ranging implications for the design of policies regulating consumer credit and bankruptcy, as well as for theoretical modeling of consumer default. Our results suggests that BAPCPA may have contributed to increasing the size of a class of financially distressed borrowers who are not able to file for Chapter 7 bankruptcy or to cure their insolvencies. We attribute this effect to liquidity constraints associated with the cost of filing for bankruptcy, which were made more severe by BAPCPA following the rise in filings costs. This is consistent with other work on the role of liquidity constraints in bankruptcy filing decisions, such as Mann and Porter (2009), Gross, Notowidigdo, and Wang (2014) and Indarte (2020), and more generally with evidence on binding liquidity constraints.<sup>8</sup> Our findings suggest that any policies affecting the monetary cost of filing for bankruptcy will impact disproportionately low-income liquidity constrained borrowers, who could benefit most from the relief offered by bankruptcy. Given that BAPCPA was enacted 2 years before the start

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<sup>7</sup>The fraction of Chapter 7 with new unsecured debt originations is approximately 25% higher than the fraction for Chapter 13 filers and non filers. The difference for auto loans is about 100%.

<sup>8</sup>See, for example, Gross and Souleles (2002a), Johnson, Parker, and Souleles (2006), Parker et al. (2013) among others.

of the 2007-2009 recession, our results suggest that absent this reform, more vulnerable borrowers would have benefitted from debt relief during this unprecedented downturn. Auclert, Dobbie, and Goldsmith-Pinkham (2019) argue that the debt forgiveness provided by the U.S. consumer bankruptcy system during the Great Recession helped stabilize employment levels during this episode, suggesting that the curtailment of debt relief associated with BAPCPA may also have adversely impacted aggregate economic performance.

**Related Literature** Our paper contributes to the literature studying the effects of BAPCPA’s introduction on credit market outcomes. In a pioneering study, Lawless et al. (2008) use the 2007 Consumer Bankruptcy Project to document the changes in the characteristics of bankrupts when compared with data from similar studies in 1981, 1991 and 2001. They find that the the 2005 reform did not change the income composition of bankrupts but increased their in-bankruptcy debt and the length of time before filing. Morgan, Iverson, and Botsch (2009) study the differential impact of the bankruptcy reform on foreclosures across states as a function of the homestead exemption levels, finding a positive effect. Li, White, and Zhu (2011) study foreclosure behavior in the 6 month window around the introduction of BAPCPA, finding a positive impact on foreclosures. In our analysis, we focus on longer-run average effect of the reform. Controlling for local economic conditions on court-district level, we find no average impact of BAPCPA on foreclosures. In our substitution analysis, we control for homestead exemption levels as well as other regulatory differences and find no substitution from Chapter 7 or 13 towards foreclosures – the mean estimated relationship is actually positive, implying comovement. Relative to this literature, we additionally provide analysis of behavior for credit outcomes other than foreclosure or bankruptcy, such as insolvency or transitioning into being current. Gross et al. (2019) study the impact of the reform on filing rates and pricing of debt, finding a persistent drop in filings, consistent with our results, and a significant pass-through to interest rates.

Our results also relate to the literature on the effects of the bankruptcy option and credit access on individual life outcomes. Dobbie and Song (2015) and Dobbie, Goldsmith-Pinkham, and Yang (2017) document the positive impact of Chapter 13 bankruptcy protection on labor market and other life outcomes. Herkenhoff, Phillips, and Cohen-Cole (2016) study the impact of differential credit access on labor market outcomes, pointing to a positive impact on entrepreneurship. Jagtiani and Li (2014) provide an analysis of post-bankruptcy credit market outcomes and is most closely related to this subset of our results. Our results focus on conditional transitions from a new insolvency, and we additionally provide evidence of the effects of persistent insolvency relative to either bankruptcy option.

Our work also contributes to the theoretical literature on consumer default. Standard models of default in heterogeneous agent economies with idiosyncratic risk in income or expenditure assume that bankruptcy prevents future access to credit, do not incorporate liquidity constraints associated with bankruptcy filing, and do not allow for a default state with no debt relief and severely curtailed credit access. (See for example Chatterjee et al. (2007), Livshits, MacGee, and Tertilt (2007) and Mitman (2016).) Our analysis suggests that incorporating monetary costs of bankruptcy, liquidity constraints, informal default without debt relief, and variation in credit access after bankruptcy, would allow them to offer a more accurate assessment of the welfare implications of incomplete insurance.

The rest of the paper is organized as follows. Section 2 provides a short overview of the bankruptcy law in the U.S., including the changes implied by the 2005 reform. Section 3.1 reports our estimates of transition probabilities starting from the onset of financial distress. Section 4 describes our cross-district regression analysis. Section 5 examines the implications for access to credit and of the inability to file for bankruptcy. Section 6 concludes.

## 2 The 2005 Bankruptcy Reform

In the United States, households in financial distress can resolve their insolvency by filing for bankruptcy protection, which grants them immediate relief from collection efforts, including direct communication, lawsuits and wage garnishment orders. Most unsecured debt is dischargeable, excluding taxes, alimony and child support obligations, student loans and debt obtained by fraud. There are two main bankruptcy filing chapters, 7 and 13.

Chapter 7, often called ‘straight bankruptcy’ or ‘fresh start,’ is the most commonly used bankruptcy procedure - up to 2005 a remarkably stable 70% of bankruptcies were filed under Chapter 7. Under this chapter, all of filers’ assets above certain exemption levels are used to satisfy unsecured creditors.<sup>9</sup> The remaining debt is discharged, and debtors are not required to use future income for debt repayment, but they carry a bankruptcy flag on their credit report for 10 years after filing. Pre-2005, Chapter 7 bankrupts were not allowed to re-file another Chapter 7 case for 6 years.

Under Chapter 13, filers keep all of their assets, but must use their future income to repay part of their unsecured debt.<sup>10</sup> Before the 2005 reform, filers could choose whether to file

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<sup>9</sup>Asset exemptions are determined at the state level. Exempt assets may include clothing, furniture, ‘tools of trade’, a vehicle up to some value. Additionally, most states have homestead exemptions, which protect equity in the house up to a state-level specified limit.

<sup>10</sup>More debts are dischargeable under Chapter 13 than Chapter 7, including some car loans and debts incurred by fraud or cash advances shortly before filing (the so called ‘super discharge’).

under Chapter 7 or 13 (see White (2007)), and for Chapter 13, they would propose their own repayment plans lasting 3-5 years, with the restriction that the total proposed repayment could not be lower than the value of their non-exempt assets under Chapter 7. A Chapter 13 bankruptcy is considered discharged after the debt repayment plan has been completed, and Chapter 13 bankruptcy flag stays on the credit record for 7 years after discharge. Prior to BAPCA, there were no limits to re-filing for Chapter 13 bankruptcy.

Since the introduction of the current legal framework for personal bankruptcy in 1978, both unsecured debt levels and bankruptcy rates have been rapidly rising over time. This trend gave rise to numerous studies on the sources of the rise,<sup>11</sup> and generated an active policy discussion on the efficiency of the existing law. That discussion resulted in the 2005 Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA). BAPCPA was signed into law on April 20, 2005 and applied to bankruptcy cases filed on or after October 17, 2005. It introduced several major changes to bankruptcy regulation which increased the burden, financial and otherwise, of filing for bankruptcy protection.

Among the new provisions, BAPCPA introduced an income test to determine eligibility for filing for Chapter 7 bankruptcy. Specifically, to be eligible to file for Chapter 7, an individual's income must be below the state median adjusted for family size. Individuals who fail the income test can still file if (i) their monthly income net of allowable expenses calculated according to IRS rules is less than \$166.67 per month or (ii) their net monthly income multiplied by 60 is less than 25 percent of their unsecured debt. As an exception to that rule, individuals with business income can always file for Chapter 7. BAPCPA also imposed some restrictions on the homestead exemption. First, a petitioner who moves to a new state within two years from filing must use the exemption level of the original state. Second, if a home is purchased within 1,215 days of filing, the homestead exemption is capped at \$125,000. Finally, any additional equity converted from a non-exempt asset within 1,215 days prior to filing is not exempt. Under BAPCPA, Chapter 13 filers lost the ability to propose their own repayment plans. Payment plans now last 5 years and are based on a notion of disposable income, that is income net of necessary expenses, which depend on family size and possibly work related expenses (see White (2007)). The reform also increased the refiling limits from 6 to 8 years for Chapter 7 and from 0 to 2 years for Chapter 13.

BAPCPA also significantly increased the documentation burden for both chapters. Filers must submit detailed financial information with their petition, to prove their inability to

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<sup>11</sup>Including Athreya (2002), Domowitz and Eovaldi (1993), Domowitz and Sartain (1999), Gross and Souleles (2002b), Fay, Hurst, and White (2002), Livshits, MacGee, and Tertilt (2007), Livshits, MacGee, and Tertilt (2010).



pay and document good faith attempts at paying back. Bankruptcy lawyers must certify the accuracy of the information, and are held liable for the accuracy of claims. In addition, the new law requires debtors to enroll in a credit counseling class before they file and a financial management course before their debts are discharged.

The sum of these provisions resulted in a significant rise in the cost of filing for bankruptcy. The total out-of-pocket cost of filing for bankruptcy increased from pre-reform means of \$697 for Chapter 7 and \$1910 for Chapter 13 to post-reform means of \$975 and \$2531, respectively.<sup>12</sup> In our study, we focus on attorney fees and their increase associated with the reform. Attorney fees comprise 75% of the total monetary cost of filing for Chapter 7 bankruptcy and 90% of the cost of filing for Chapter 13 (Lupica (2012)), and rose on average by 35% and 29%, respectively, after the reform. These numbers are consistent the averages reported in the study on filing costs in Government Accountability Office (2008), which also documents that the fraction of pro se cases is only 11% for Chapter 7, and no change in the fraction of filers getting free legal advice, making the increase in the cost applicable to most filers.

### 3 Data and Sample Construction

We use the Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data, which is an anonymous longitudinal panel of individuals, comprising a nationally representative random sample of all individuals who have a credit report with Equifax. The data is quarterly, starting in 1999:Q1 and ending in 2013:Q3 and is described in detail in Lee and van der Klaauw (2010). In our analysis, we use a 1% sample, which includes information for approximately 2.5 million individuals in each quarter. The data contains over 600 variables, including bankruptcy and foreclosure, mortgage status, detailed delinquencies, various types of debt, with number of accounts and balances. Apart from the financial information, the data contains individual descriptors such as age, ZIP code and credit score. The variables included in our analysis are described in detail in Appendix A.<sup>13</sup>

We aggregate our data to the bankruptcy court district-level, as this allows us to observe changes in filing rates over time within a geographically and legislatively coherent region. The goal of our analysis is to shed light on the mechanism leading to the aggregate response to BAPCPA and the resulting implications for household balance sheets and access to credit.

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<sup>12</sup>See Lupica (2012), also consistent with findings in White (2007).

<sup>13</sup>We also supplement our analysis with similar data from the Experian credit bureau. These data corresponds to a representative panel of 1 million borrowers for the time period 2004Q1 to 2012Q4.

We focus on a sample of individuals at the onset of a new spell of financial distress. Which we characterize as a *new insolvency*. We call an individual insolvent if they have an account that is 120 days or more late, derogatory or in charge-off. An insolvency is new if it occurs after at least 8 quarters of no insolvencies, bankruptcies or foreclosures.<sup>14</sup> We focus on new spells of financial distress to capture shocks such as job loss, disability, divorce, etc., that may have not been anticipated at the time the debt was contracted and that we do not directly observe in our data. Additionally, we consider borrowers who are 120 days or more past due to identify severe financial distress that may lead them to file for bankruptcy, as opposed to more minor episodes of delinquency. In fact, in our dataset, the majority of new Chapter 7 and 13 filers experience a new insolvency in the 2 quarters preceding the bankruptcy filing (55%).<sup>15</sup> We then calculate the frequency of transition from a new insolvency to a mutually exclusive set of states, including Chapter 7 and Chapter 13 bankruptcy filing, continued insolvency, foreclosure (without bankruptcy) and returning to current, at various horizons.

### 3.1 The Aggregate Effects of BAPCA

Before we analyze country district level variation, we document the behavior of the aggregate bankruptcy filing rates around the date of the reform. We start by presenting raw aggregate data for filing rates, and then discuss the behavior of filing rates after controlling for local business cycles. This descriptive evidence motivates our analysis in Section 4.

Figure 1 presents the aggregate filing rate from bankruptcy court data. The filing rate for both chapters dropped in the quarter of the introduction of the reform, and the drop is larger and more persistent for Chapter 7. However, not surprisingly, there is a temporary resurgence of filings during the Great Recession starting in 2007 and lasting into 2010. We are interested in document how the incidence of bankruptcy filing varies with the enactment of BAPCPA for borrowers who are financially distressed. For this reason we will examine transitions from a new insolvency into bankruptcy filing and other outcomes. Figure 2 displays the quarterly transition rates into a new insolvency for the sample population. Approximately 0.6% of the overall population becomes newly insolvent in each quarter. We also plot the

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<sup>14</sup>A newly insolvent borrower could have accounts up to 90 days past due in the last eight quarters. We use this threshold since our data is quarterly, so a borrower is 120 days or more past due will have been delinquent for one whole quarter. We also exclude borrowers who have flags for prior bankruptcies or foreclosures in the 8 quarters prior to a new insolvency. We seek to exclude chronically insolvent borrowers whose state may depend on disability, poor financial literacy or behavioral traits such as time inconsistent preferences.

<sup>15</sup>37% of new filers experience a new delinquency in the 2 quarters prior. This lower number may reflect the quarterly nature of our data, with individuals switching from current to insolvency in 1 quarter.

transition into a new delinquency, which define as 60 days or less past due, without prior delinquencies bankruptcies of foreclosures in the prior 8 quarters. Approximately, 0.8% of the population becomes newly delinquent in each quarter in our sample. New insolvencies and new delinquencies track each other closely and, while exhibiting considerable business cycle fluctuations, do not exhibit substantial discontinuities at the time BAPCPA was enacted and implemented. This behavior suggests that selection into new spells of financial distress has not changed systematically in response to the reform - at least not in the way that filings did. As previously discussed, we focus on new insolvency in the rest of the analysis to narrow in on borrowers experiencing severe spells of financial distress that are most likely to benefit from bankruptcy protection.<sup>16</sup>

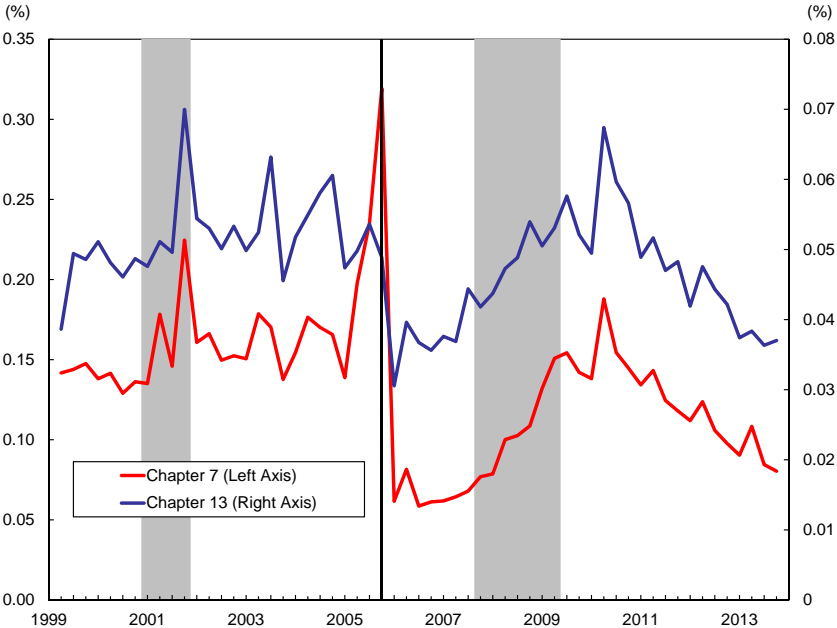


Figure 1: Quarterly Filing Rates by Chapter. Source: US Bankruptcy Courts.

For the rest of the analysis, we examine data at the court district level. We choose this level of aggregation because it is the smallest geographical unit over which there is variation in bankruptcy practices, specifically, filing fees, as we discuss in Section 4, and because we are able to control for local economic conditions using a rich set economic indicators. We estimate quarter dummies for the transition from a new insolvency to Chapter 7 and Chapter 13 bankruptcy filing, which capture the evolution of the time series of bankruptcy

<sup>16</sup>In the Online Appendix, we report estimates of the changes in new delinquency and new insolvency rates in various periods around the reform using individual level data, and confirm that indeed selection into new spells of financial distress did not significantly change in response to BAPCPA.

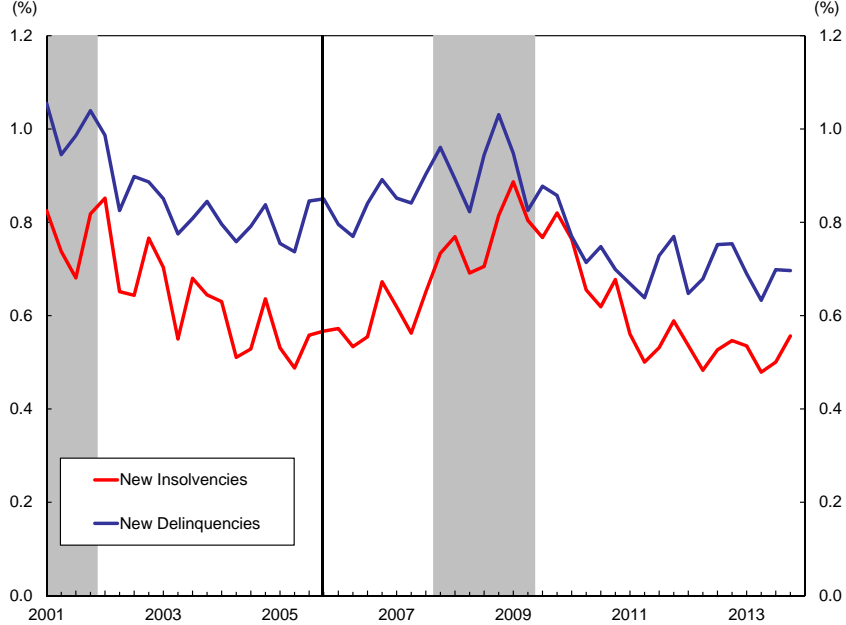


Figure 2: Quarterly New Delinquency and New Insolvency Rates. Source: Authors’ calculation based on Federal Reserve Bank of New York’s Consumer Credit Panel/Equifax Data.

filings not explained by time variation in local economic conditions. We consider the 1 and 4 quarter-ahead transition probabilities, for each quarter in the sample, and include district-level economic indicators, such as the unemployment rate, personal disposable income and an index of house prices, as well as one year log changes in those variables. The regression specification is given by:

$$y_{it} = \sum_{s(t) \neq 0} \beta_{s(t)} I_{s(t)} + \gamma_i + \phi X_{it} + \epsilon_t, \quad (1)$$

where  $y_{it}$  is the log of the transition of interest in district  $i$  at quarter  $t$  rescaled by its pre-reform mean,  $\beta_{s(t)}$  capture time effects,  $I_{s(t)}$  is an indicator for quarter  $s$ ,  $\gamma_i$  denote district effects, and  $X_{it}$  denotes the district level economic indicators in logs, as well as the 4 quarter change in these variables.

The estimated  $\beta_{s(t)}$  coefficients capture the timing and magnitude of the potential response to the reform. They are also able to detect the presence of any pre-existing trends in the transitions of interest. The first year in the sample is 2002, and the corresponding value of  $\beta_{s(0)}$  is set to zero in the first quarter of 2002, so that all other estimates can be interpreted as changes from the 2002 value.<sup>17</sup>

<sup>17</sup>The patterns of transition from a new delinquency are very similar to those for a new insolvency, with

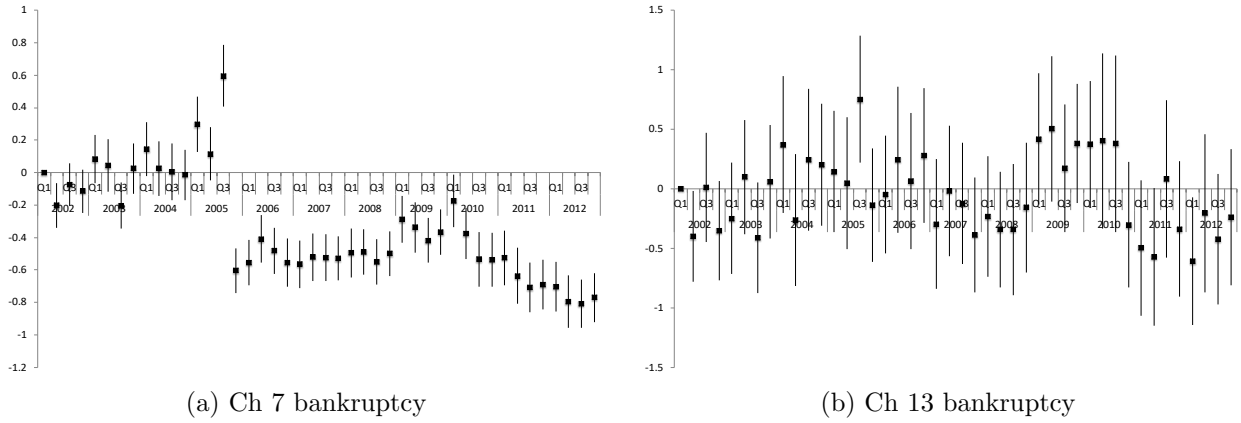


Figure 3:  $\beta_s(t)$  for 1 quarter ahead transition probability from a New Insolvency. Bars denote 90% confidence intervals. Source: Authors’ calculation based on Federal Reserve Bank of New York’s Consumer Credit Panel/Equifax Data.

Figure 3 reports estimates of the 1 quarter-ahead time effects for the transitions from a new insolvency to bankruptcy. Controlling for local business cycles has significant effects on the estimated time series dynamics. The transition into Chapter 7 bankruptcy in panel (a) displays a sizable and permanent drop of about 60 log points relative to the pre-reform period for 2006-2009 which rises to almost 100 log points for 2010-2012. In the first half of 2005, an anticipation effect is clearly visible, as transitions into Chapter 7 filings rise by about 60 log points relative to 2002.<sup>18</sup> For Chapter 13 filings, we find no pattern related to the date of the introduction of the reform, as is evident from panel (b).

The findings in Figure 3 are consistent with the evidence that the ratio of Chapter 13 to Chapter 7 bankruptcies has risen post reform (see Han and Li (2011) and Zhu (2011)), and suggests that the effect on this ratio is driven by the response of Chapter 7 filings, not by Chapter 13 filings. However in Section 4.2, we examine the degree to which the decline in Chapter 7 may have induced a rise in Chapter 13 filing rates in response to the reform and find no evidence of a shift from Chapter 7 to Chapter 13. Our analysis of the effects of the filing costs in Section 4 also points to very different mechanism of response of Chapter 7 versus Chapter 13 filings to the reform.

One of BAPCPA’s key provisions was to introduce an income test for Chapter 7 filing, but we have credit score of each borrower in every quarter of our sample, so we proxy for income using credit scores. We validate our approach in Appendix C, using a subset of our

significant effects for Chapter 7 only.

<sup>18</sup>These findings are consistent with Gross et al. (2019), who also find a permanent drop in filings.

data, for which we do have access to income data for a limited period of time. This is a small nationally representative subsample or our overall dataset which is described in detail in Appendix C. Using those data, we show that credit scores are strongly positively related to income conditional on age. To explore the degree to which the income test on Chapter 7 filing may be responsible for the decline in filings, we estimate specification 1 by quartile of the 4 quarter lagged credit score. The credit score is a proxy for income and we use a lagged credit score, as credit scores will respond to delinquency behavior, and we want to capture the borrower's income prior to the current spell of financial distress.

The detailed results are reported in Appendix B, and they suggest that the decline in Chapter 7 filing was concentrated in the lower half of the credit score distribution. For borrowers with credit scores in the first quartile, the transition from a new insolvency to Chapter 7 filing is 100 log points lower than the pre-reform average, whereas it is 75 log points lower for borrowers in the second quartile. By contrast, for borrowers in the third and fourth quartile of the credit score distribution, there is no drop in this transition. These findings suggest that the drop in Chapter 7 filing rates associated with BAPCPA were concentrated among income borrowers with income below the median, implying that the income test on Chapter 7 filing imposed by the reform was not the primary driver of this drop.

These results motivate the hypothesis that the rise in filing costs may be behind the response of filing rates, which we explore in the next section.

## 4 Mechanism Behind the Response

In this section, we use variation on the percentage increase in attorney fees for each chapter across court districts to pin down their effect on individual filing behavior. The introduction of BAPCPA and the resulting increase in the documentation requirements and filing fees, together with the debtor education expenses, gave rise to a significant increase in the monetary filing costs for households. It also increased the costs for attorneys representing bankruptcy petitioners, which raised their fees. Attorney fees comprise approximately 75% of total direct access costs for Chapter 7 and 90% for Chapter 13 both pre- and post-reform and are the biggest component of filing costs. Based on a comprehensive study of filing fees, Lupica (2012) reports an average increase in attorney fees of 35% for Chapter 7 filers and of 29% for Chapter 13 filers. Behind these average increases, there is significant district level variation. For example, for Chapter 7 filers, the 90th percentile of the cost change is 61% while the 10th percentile is 17%. These numbers are consistent the averages reported in

the study on filing costs in Government Accountability Office (2008) which also documents that the fraction of pro se cases is only 11% for Chapter 7, and no change in the fraction of filers getting free legal advice, making the increase in the cost applicable to most filers. In this section, we take attorney fees as a proxy for bankruptcy costs and exploit their variation across court districts in order to provide further evidence of the effects of BAPCPA on bankruptcy decisions, and specifically on the role of liquidity constraints in shaping the response to the reform.

For Chapter 7, we use attorney fees for no asset cases, which account for approximately 90% of all filings (see Lupica (2012)). Table 1 presents descriptive statistics on the distribution of Chapter 7 attorney fees and their change after BAPCPA. These costs exhibit a large cross-district variation both before and after the bankruptcy reform. The pre-reform range for Chapter 7 attorney fees was \$356 (Tennessee Middle) to \$1920 (Florida Southern), while the post-reform range was \$543 (Illinois Central) to \$1530 (Arizona). As shown in Lupica (2012), even controlling for state characteristics and filers' characteristics, BAPCPA had a significant effect on attorney fees changes across districts. The cross-district average Chapter 7 attorney fee pre-reform was \$697 and went up to \$975 post-reform.

Table 1: Chapter 7 Attorney Fees

	Pre-reform	Post-reform	Log Difference
Mean	\$697	\$975	35%
90th percentile	\$907	\$1293	61%
75th percentile	\$786	\$1123	50%
Median	\$663	\$986	33%
25th percentile	\$589	\$810	22%
10th percentile	\$473	\$686	17%

Source: Author's calculations based on Lupica (2012).

A similar pattern of cost increases can be seen for Chapter 13 filings, which are reported in Table 2. Since Chapter 13 cases are more complicated and usually involve working with the filer for several years to oversee the repayment plan process, the level of the costs is much higher than for Chapter 7. The percentage increase in Chapter 13 fees post-BAPCPA is 29% on average, with a wide cross-district dispersion, as for Chapter 7. The correlation between the change in Chapter 7 and Chapter 13 attorney fees associated with the reform is only 0.046, which suggests that the geographical dispersion of these changes differs substantially across the two chapters.

Table 2: Chapter 13 Attorney Fees

	Pre-reform	Post-reform	Log Difference
Mean	\$1910	\$2531	29%
90th percentile	\$2483	\$3265	58%
75th percentile	\$2245	\$2832	43%
Median	\$1847	\$2515	25%
25th percentile	\$1561	\$2141	15%
10th percentile	\$1246	\$1839	3%

Source: Author's calculations based on Lupica (2012).

A rise in filing fees would be expected to decrease the incentive to file for bankruptcy for both chapters, especially since the benefits of filing have been reduced by the reform, by stricter homestead exemption requirements for Chapter 7 and by less flexibility in the design of the payment plan for Chapter 13, among other factors. One important difference between Chapter 7 and Chapter 13 attorney fees is that Chapter 7 fees have to be paid up-front, while Chapter 13 fees can be paid in installments over the course of the payment plan approved by the bankruptcy court. Therefore, the rise in Chapter 7 attorney fees could potentially prevent filing for borrowers who do not have sufficient cash on hand, even with a favorable cost-benefit analysis. For Chapter 13, the only criterion that would affect filing decisions post-reform is the change in costs and benefits of filing.

To quantify the effects of the change in attorney fees on filing behavior, we first estimate the district-level mean change in the transitions from a new insolvency to Chapter 7 and 13, while using the same set of district-level economic controls as in (1). That is, we control for district-level income, unemployment rate and house price index and their changes. The regression equation is:

$$y_{it} = \gamma_i + \beta_i^{ins \rightarrow y} + \phi X_{it} + \epsilon_t, \quad (2)$$

where the variables are as in (1) and  $\beta_i^{ins \rightarrow y}$  is the district-specific post-reform effect. We estimate the above equation at the 1 quarter and 4 quarter horizon, where we exclude the anticipation period and the immediate post-reform period in order to avoid attributing the average effect of the reform to the change in the timing due to households anticipating a change in the regulation. Specifically, informed by the evidence in figure 3, for the 1 quarter horizon, we exclude quarters  $2004Q4 < t < 2006Q4$ , and for the 4 quarter horizon specification, we exclude quarters  $2004Q1 < t < 2006Q4$ . The outcome of interest in the estimation is the district-specific post-reform indicator  $\beta_i^{ins \rightarrow y}$ , which corresponds to the



average post-reform log change of flows to outcome  $y$  in district  $i$ . We then relate the estimated  $\beta^{ins \rightarrow bank7}$  and  $\beta^{ins \rightarrow bank13}$  from (2) to the post-reform change in attorney fees, with the following regression specification:

$$\beta^{ins \rightarrow y} = \alpha_0 + \alpha_1 \log(c_i^{post}/c_i^{pre}) + J_i + R_i + \xi G_i + \chi H_i + \mu_i, \quad (3)$$

where  $c_i$  is the average attorney fee in district  $i$ . In this regression, we also control for state level variation in regulations that can affect the decision to file for bankruptcy. These include dummies for whether the state has a judicial or non-judicial foreclosure regime,  $J_i$ , and dummies for whether the state has a recourse or no-recourse foreclosure regime,  $R_i$ . Additionally, we include the upper limit on wage garnishment,  $G_i$ , measured in dollars, and the dollar value of the homestead exemption limit,  $H_i$ . In judicial foreclosure states, a borrower can continue residing in their home while foreclosure procedures are processed by the courts, reducing the adverse consequences of mortgage default and the incentives of filing for bankruptcy. Similarly, in no-recourse states, underwater borrowers are not liable for residual mortgage debt after a foreclosure, also reducing the benefits from filing. By contrast, a higher limit of wage garnishment increases the benefits of filing for bankruptcy under any chapter, while a higher homestead exemption increases the benefits from filing for Chapter 7.

Table 3 reports the estimated coefficient  $\alpha_1$ , for transitions from new insolvency to Chapter 7 and 13, at 1 quarter and 4 quarter horizon. The estimates for Chapter 7 indicate a strong negative relationship between the change in fees and the change in mean Chapter 7 flows from new insolvency across districts. The estimated coefficient at the 1 quarter horizon implies that the mean change in Chapter 7 fees is associated with a reduction of Chapter 7 flows from a new insolvency of 21.7 log points relative to pre-reform mean. This amounts to 40% of the estimated mean drop in Chapter 7 flows, which is 54.2 log points, and 80% of the standard deviation of the change in flows to Chapter 7. A similar pattern is estimated for the 4 quarter ahead horizon.<sup>19</sup>

The corresponding estimates for Chapter 13 suggests that there is no statistically significant relation between the rise in attorney fees and the change in the flows from new

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<sup>19</sup>For robustness, we also conducted the analysis of the conditional transitions with an expanded set of district level time varying economic and demographic controls. In addition to IRS personal income, Corelogic house price index, and the unemployment rate used in the main analysis, we also include the following variables as controls: share white, share black, share with less than 9th grade, share 9th-12th grade, share high school graduates, share some college, share associate's degree, share bachelors degree, and the share of urban population, obtained from the Census. We find that the results are broadly consistent with our main analysis and we omit them for brevity.

insolvency to Chapter 13 filing associated with the reform. Since the fees for Chapter 13 increased by similar relative magnitudes as fees for Chapter 7, this suggests that liquidity constraints driven by the upfront nature of Chapter 7 attorney fees may explain the difference in response. This pattern is also consistent with the reduction of the flows from a new insolvency to Chapter 7 filing being concentrated in the bottom half of the credit score distribution, as shown in Section 3.1.

Table 3: Effects of the Change in Attorney Fees

Horizon	1Q	4Q
New Insolvency to Ch 7		
Change in Ch 7 Fees	-0.62 (-3.68)	-0.51 (-3.88)
$N$	74	87
New Insolvency to Ch 13		
Change in Ch 13 Fees	-0.38 (-0.53)	-0.18 (-0.46)
$N$	74	87

Estimates for the coefficient  $\alpha_1$  for regression equation 3. T-statistics in parentheses. Since the null is that the coefficients are zero, as in Pagan (1984), our estimates are robust to using generated regressors. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

**Results by Credit Score** Below, we explore which sub-populations of individuals are most affected by the increases in filing fees. Specifically, we quantify the effects of the change in attorney fees on the change in the transitions from new insolvency to Chapter 7 filings for subpopulations based on 4 quarter lagged credit scores, which once again we interpret as a proxy for income. The resulting estimates are reported in Table 4. The estimates confirm that most of the effects on the reform via the change in attorney fees are concentrated at the bottom of the credit score distribution. A mean increase in attorney fees of 35 log points reduces the 1 quarter ahead transition from a new insolvency to Chapter 7 filing by 11 log points for borrowers in the first quartile of the credit score distribution, and by 14 log points for borrowers in the second quartile. For borrowers with credit score above the median there is no significant change in the transition to Chapter 7 filing. These findings, together with the results in Appendix B, reinforce the hypothesis that liquidity constraints are an important factor in driving the responses, as low credit score and low income borrowers are most likely to be facing liquidity constraints. Additionally, they confirm that a binding income test is not the primary mechanism through which BAPCPA reduced Chapter 7 filings, since lower

credit score borrowers are unlikely to be affected by the income test.

Table 4: Effect of the Change in Attorney Fees by Credit Score

Credit score quartile	1	2	3	4
	New Insolvency to Ch 7			
Change in Ch 7 Fees	-0.31 (-2.20)	-0.41 (-2.82)	0.61 (0.76)	0.57 (0.95)
<i>N</i>	87	86	87	76

Estimates for the coefficient  $\alpha_1$  for regression equation 3. Dependent variable is the transition from a new insolvency to Chapter 7 filing at the 1Q ahead horizon by 4Q lagged Equifax Risk Score quartile. T-statistics in parentheses. Since the null is that the coefficients are zero, as in Pagan (1984), our estimates are robust to using generated regressors. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

**Results by Time Period** We also examine the variation in the response to the reform across the credit slump and pre-recession time periods, defined earlier. We re-estimate both stages of our regression for each time period, with the results reported in Table 5. In both time periods, the relationship between the change in attorney fees and flows to Chapter 7 bankruptcy is significant economically and statistically. Not surprisingly, the magnitude of the effect of the change in filing fees on Chapter 7 filings in the pre-recession period is smaller than in the credit slump period. In both time periods, there is no relation between the change in Chapter 13 attorney fees and the the change in the transition into Chapter 13 filing.

These findings suggest that there is a strong negative relation between the change in Chapter 7 fees and the change in the transition from a new insolvency to Chapter 7 bankruptcy, consistent with the notion that borrowers entering a spell of financial distress are less likely to resolve it by filing for Chapter 7 bankruptcy.

**Unconditional Transitions** In the Online Appendix, we also examine the relation between the change in Chapter 7 and Chapter 13 filing fees and the change in the rate at which borrowers experience a new delinquency, a new Chapter 7 or Chapter 13 bankruptcy and a new foreclosure. 'New' there corresponds to an occurrence of the event after 4 quarters without any delinquencies, foreclosures and bankruptcies for new delinquencies, or 4 quarters without any bankruptcies of foreclosures before the bankruptcy or foreclosure. While these unconditional transitions are not the main focus of our analysis, they provide important

Table 5: Effects of the Change in Attorney Fees by Time Period

Sub-period	pre-recession	credit slump
	New Insolvency to Ch 7	
Change in Ch 7 Fees	-0.28 (-2.47)	-0.53 (-3.56)
<i>N</i>	88	87
	New Insolvency to Ch 13	
Change in Ch 13 Fees	-0.044 (-0.12)	-0.088 (0.20)
<i>N</i>	87	86

Estimates for the coefficient  $\alpha_1$  for regression equation 3. Dependent variables are the transition from a new insolvency to either Chapter 7 or Chapter 13 filing at the 1Q ahead horizon. T-statistics in parentheses. Since the null is that the coefficients are zero, as in Pagan (1984), our estimates are robust to using generated regressors. Pre-recession: 2005Q4-2007Q3. Credit slump: 2007Q4-2011Q1. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

corroborating evidence for the impact of the change in attorney fees on default behavior in response to the reform.

We estimate district level BAPCPA-induced changes in the rates at which these events occur and then relate them to the change in Chapter 7 and Chapter 13 attorney fees. We find that changes in Chapter 7 bankruptcy rates after BAPCPA are negatively related to increases in Chapter 7 attorney fees for positive values of the change in fees, and positively related otherwise.<sup>20</sup> The magnitude of the effect is sizable, with the a change in fees from the median to the 90th percentile corresponding approximately to a 1 percentage decline in the Chapter 7 bankruptcy rate.<sup>21</sup> By contrast, there is a positive relation between the change in Chapter 13 filing fees and the change in Chapter 13 bankruptcy rates at the district level for values of the change lower than 0.42 and negative otherwise, though the magnitude is approximately half as the estimates for Chapter 7. There is no relation between the change in Chapter 7 (13) bankruptcy rates and the change in Chapter 13 (7) fees. Taken together, these results confirm that a rise in Chapter 7 fees is associated with a decline in Chapter 7 bankruptcies. For changes in Chapter 13 fees that are small enough Chapter 13 bankruptcies respond positively to a change in Chapter 13 fees, but negatively for higher changes. This is consistent with the notion that Chapter 13 filers are typically positively selected relative

<sup>20</sup>The non-monotonicity of the relation between the change in fees and the change in default outcomes is due to the fact that we estimate a non-linear relation between these two variables. More details of the specification can be found in the Online Appendix.

<sup>21</sup>The unconditional results are weaker than the conditional results, as expected. The conditional results are better able to capture the individuals which are at the decision point after a new spell of financial distress.

to Chapter 7 filers, and Chapter 13 filings are less sensitive to cost.

## 4.1 Exogeneity of the Change in Attorney Fees

An important concern with using the filing fees as explanatory variables for the change in bankruptcy filing rates in response to BAPCPA is that the change in fees associated with the reform may be jointly endogenous with the bankruptcy rate or its change, or related to other state level characteristics. To address this concern, we examine the relation of the changes in filing fees with state level regulation, pre-reform economic indicators, and pre-reform bankruptcy, insolvency and foreclosure behavior at the district level to detect possible endogeneity of the change in attorney fees.<sup>22</sup>

The results are presented in Table 6. The top panel reports estimates for the relation between attorney fee changes and district level economic indicators. There is no relation between the change in attorney fees and income or housing values, or any relation between the unemployment rate and the level of the change in attorney fees.

The middle panel considers some important regulatory variables that vary at the state level. We consider the homestead exemption, the maximum wage garnishment limit, whether foreclosures are judicial or not, and whether there is recourse for mortgage lenders in foreclosure. The homestead exemption is clearly an important determinant for Chapter 7 filing, as shown in Fay, Hurst, and White (2002). Additionally the incentive to file for Chapter 7 bankruptcy may depend on the ability of lenders to garnish the borrowers' income. The foreclosure variables are more relevant for potential Chapter 13 filers, however, via the homestead exemption, they may affect the incentive to file for Chapter 7 and possibly influence attorney fees. We find that judicial foreclosure indicator and a garnishment limit are significantly negatively related to Chapter 7 attorney fee changes. In our regression specification of the substitution effects as well as the effects of the change in fees, we include all of the regulatory variables in order to capture the effect of fees not driven by these district-level characteristics.

The bottom panel considers the relation between pre-reform behavior and the level and

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<sup>22</sup>We have had conversations with several bankruptcy attorneys from different bankruptcy court districts about the determination of attorney fees. These practitioners agreed on the fact that the level and change in attorney fees in a particular district is driven by the bankruptcy court's objective to enable bankruptcy attorneys to remain in the practice in the face of changing operating costs, as well as as to maintain filing affordable for borrowers. In small bankruptcy court districts with a limited number of bankruptcy attorneys, the attorneys may have direct influence on the setting of fees. In very large court districts, with many attorneys the process is more arms length. Judicial culture and custom may have very persistent effect on the level of permissible fees and the frequency with which they are adjusted over time.

change in Chapter 7 filing fees. We find no relation with district level pre-reform filing bankruptcy filing rates, insolvency rates or foreclosure rates.

While these findings do not categorically exclude endogeneity of attorney fees and their change in response to the reform, the estimates do not suggest that attorney fees increases are jointly endogenous with variables that could potentially influence filing decisions and filing costs. Based on these results, we maintain that the post-BAPCPA change in Chapter 7 attorney fees is plausibly exogenous.

Table 6: Exogeneity of Chapter 7 attorney fees and their BAPCPA related change

Panel I: Economic Indicators				
	Income	Unemployment	HPI	
Log Change	-0.03 (-0.31)	-0.04 (-0.53)	-0.08 (-0.44)	
<i>R</i> squared	0	0	0	
N	89	89	85	
Panel II: Regulatory Variables				
	Homestead	Garnishment	Recourse	Judicial
Log Change	-0.005 (-0.42)	-0.0002 (-2.40)	-0.04 (-0.93)	-0.12 (-3.30)
<i>R</i> squared	0.002	0.06	0.01	0.11
N	89	89	89	89
Panel III: Pre-BAPCPA Behavior				
	Bankruptcy	Foreclosure	Insolvency	
Log Change	0.005 (0.46)	-0.003 (-0.06)	-0.02 (-0.28)	
<i>R</i> squared	0.002	0	0	
N	89	89	89	

Numbers in parentheses are t-statistics. Bankruptcy, Foreclosure and Insolvency are average pre-BAPCPA Chapter 7 filing rate, foreclosure rate and insolvency rate at the district level. Homestead and Garnishment are log homestead exemption and wage garnishment. Judicial and Recourse are indicators for judicial foreclosure state and recourse state. Income, Unemployment and HPI are district level pre-BAPCPA means of the logs of those variables. Source: Authors' calculation based on Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data.

## 4.2 Accounting for Missing Bankruptcies

In the previous section, we show that the reform-implied increase in filing fees was associated with a decline in the transition to Chapter 7 bankruptcy. By construction, the drop in flows

from new insolvency to Chapter 7 bankruptcy must be associated with a rise in transition to other outcomes, such as insolvency, Chapter 13 filing or returning to current. In this section, we quantify these substitution effects. Specifically, we estimate the district-level average effect of the reform on all outcomes, while, as in (1), we control for district-level income, unemployment rate and house price index and their changes. The regression equation we estimate is:

$$y_{it} = \gamma_i + \beta_i^{ins \rightarrow y} + \phi X_{it} + \epsilon_t, \quad (4)$$

where the variables are as in (1) and  $\beta_i^{ins \rightarrow y}$  is the district-specific post-reform effect. We estimate the above equation at the 1 quarter and 4 quarter horizon, where we exclude the anticipation period and the immediate post-reform period as when estimating equation (2).

The outcome of interest in the estimation is the district-specific post-reform indicator  $\beta_i^{ins \rightarrow y}$ , which corresponds to the average post-reform log change of flows to outcome  $y$  in district  $i$ . After estimating (4), we run a second regression estimating the relation of the change in one outcome on another, controlling for state level variation in regulations that affect the incentives to file for bankruptcy. Specifically, we are interested in how an estimated drop in flows to Chapter 7 bankruptcy relates to changes in flows to other outcomes:

$$\beta_i^{ins \rightarrow y} = \delta_0 + \delta_1 \beta_i^{ins \rightarrow bank7} + J_i + R_i + \xi G_i + \chi H_i + \nu_i, \quad (5)$$

where  $J_i$  and  $R_i$  and are indicators for whether the district is in a state with judicial foreclosure proceedings and recourse, respectively.  $G_i$  is a measure of the upper limit on wage garnishment, measured in dollars and  $H_i$  is the dollar value of the homestead exemption limit in district  $i$ . The estimated coefficient  $\delta_1$  captures the direction and statistical strength of the relation between the change in the transition into Chapter 7 bankruptcy, and the other transitions of interest, after controlling for the effect of the economic indicators on these transitions. The estimates from regression equation (4) for the 4 quarter horizon are presented in figure 4. Most of the estimated district means are significantly different from zero at the 90% significance level, and also there is significant variation in responses across districts. We explore this variation in the substitution regression (5).

**Insolvency** Our analysis indicates that the most robust pattern in the data is a substitution from Chapter 7 filing to continuing Insolvency. Estimates of (5) for transition into insolvency, presented in panel A of table 7, imply that the mean drop in estimated transition to Chapter 7 is associated with an increase in the transition to insolvency of 1.8 log points at the 1 quarter horizon and 5.8 log points at the 4 quarter horizon. These effects are very large

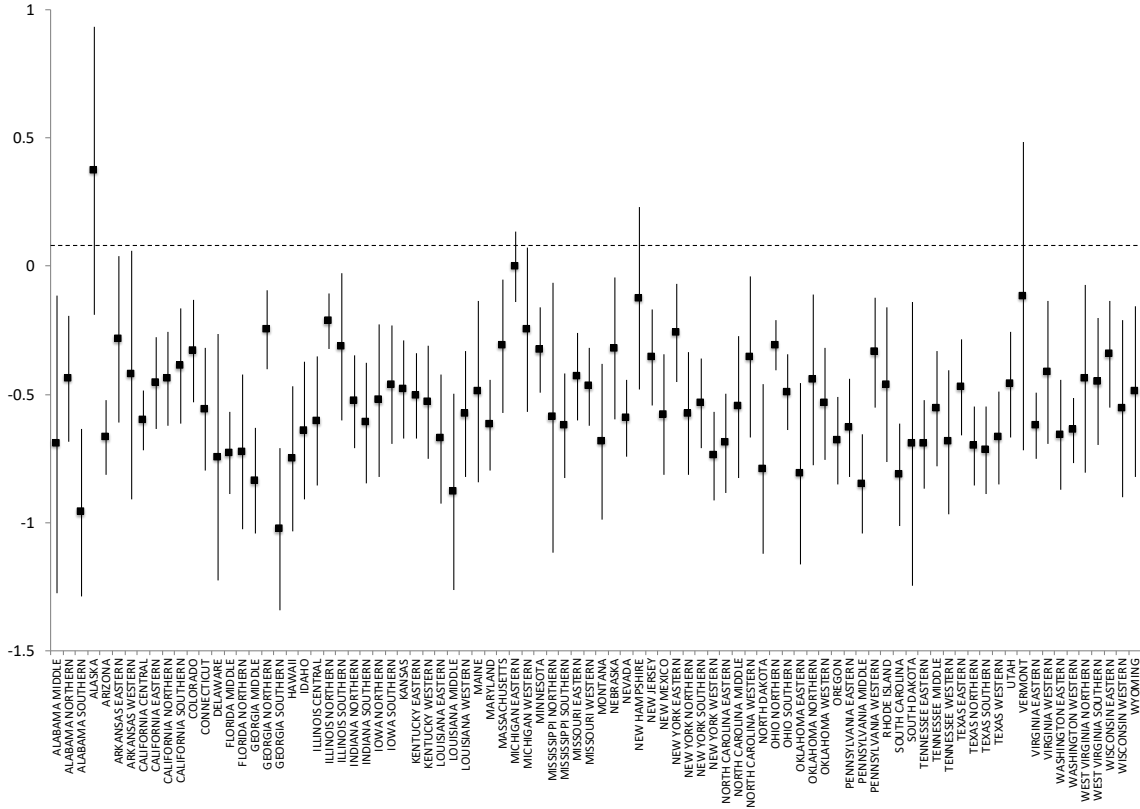


Figure 4: Average 4 quarter horizon response to the reform across court districts:  $\beta^{ins \rightarrow bank7}$  estimated from equation (2) with 90% confidence bands. Source: Authors' calculation based on Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data.

when compared to the cross sectional standard deviation of the change in the transitions from a new insolvency to insolvency, that is  $\beta^{ins \rightarrow ins}$ , which is estimated to be 3.3% at the 1 quarter horizon and 5.66% at the 4 quarter horizon. The rate at which newly insolvent individuals transition to insolvency measures the persistence of insolvency, therefore, these results are consistent with the notion that the decline in the rate at which newly insolvent individuals file for Chapter 7 bankruptcy translates in an increase in the persistence of insolvency. Panel B in Table 7 reports estimates for the substitution from Chapter 7 filing to insolvency at the 4 quarter horizon for different time periods following the reform. The year following the reform corresponds to the last phase of a large increase in household borrowing at particularly low interest rates that started in 2001. The low interest payments may have reduced the need to file for Chapter 7 bankruptcy. By contrast, mortgage default rates started rising dramatically at the end of 2006 (see Albanesi, Giorgi, and Nosal (2017)), which would affect the incentives to file for both Chapter 7 and Chapter 13 bankruptcy, as discussed in Section 2. To address these considerations, we examine the response to the



reform in two separate time periods: (i) the pre-recession period of 2005Q4-2007Q3 and (ii) the credit slump period of 2007Q4-2011Q1. The magnitude of substitution to insolvency corresponding to a decline in Chapter 7 is higher in the pre-recession period. This may be driven by the fact that the relatively good economic conditions in that period made it less costly not to file for bankruptcy for distressed borrowers.

Table 7: Substitution from Chapter 7 Bankruptcy Filing to Insolvency

A. New Insolvency to Insolvency by Horizon		
Horizon	1Q	4Q
New Insolvency to Ch 7	-0.034 (-2.96)	-0.11 (-4.63)
$N$	88	88
B. New Insolvency to Insolvency by Time Period		
4Q Horizon	Pre-recession	Credit slump
New Insolvency to Ch 7	-0.17 (-3.51)	-0.13 (-4.63)
$N$	88	88

Estimates of the coefficient  $\delta_1$  in regression equation 5. Dependent variable is the transition from a New Insolvency to Insolvency at various horizons. Results are from weighted OLS with weights equal to the inverse variance of the estimated regressors  $\beta^{ins \rightarrow bank7}$ . T-statistics in parentheses. Since the null is that the coefficients are zero, as in Pagan (1984), our estimates are robust to using generated regressors. Panel A includes all post-reform time periods. Panel B reports estimates for the 4 quarter ahead transition in different post-reform time periods. Pre-recession includes only quarters 2005Q4-2007Q3 post-reform. Credit slump includes only quarters 2007Q4-2011Q1 post-reform. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

We also consider how the substitution from a Chapter 7 filing to insolvency varies by 4 quarter lagged credit score. Table 8 reports the corresponding estimates for transitions at the 4 quarter horizon, for the entire post-reform period and by sub-period. The negative relation between the Chapter 7 filing and insolvency is significant and robust for the bottom 2 quartiles of the 4 quarter lagged credit score distribution. The estimates are large and statistically significant in the entire post-reform period and also in sub-periods. We find small and insignificant effects in quartile 3 of the credit score distribution. For the top quartile, we estimate a significant effect in the entire sample, but no effects if we split it by time period, suggesting the estimates are not robust for the top quartile.

**Other Outcomes** We also consider how the decline in Chapter 7 filings may have affected transitions to outcomes other than continuing insolvency, and report the corresponding estimates in Table 9. Panel A reports the transition from a new insolvency to being current.

Table 8: Substitution from Chapter 7 Bankruptcy Filing to Insolvency by Credit Score

	New Insolvency to Insolvency							
Credit Score Quartile	1		2		3		4	
	A. All periods							
New Insolvency to Ch 7	-0.127	(-3.44)	-0.16	(-4.36)	0.21	(1.43)	-0.97	(-2.35)
	B. Pre-recession							
New Insolvency to Ch 7	-0.09	(-1.83)	-0.18	(-3.43)	-0.07	(1.04)	-0.001	(-0.01)
	C. Credit slump							
New Insolvency to Ch 7	-0.11	(-3.05)	-0.19	(-4.42)	0.09	(0.41)	-0.14	(-0.65)
<i>N</i>	87		86		84		76	

Estimates of the coefficient  $\delta_1$  in regression equation 5. Dependent variable is the transition from a New Insolvency to Insolvency at a 4Q ahead horizon. Results are from weighted OLS with weights equal to the inverse variance of the estimated regressors  $\beta^{ins \rightarrow bank7}$ . T-statistics in parentheses. Since the null is that the coefficients are zero, as in Pagan (1984), our estimates are robust to using generated regressors. Pre-recession includes only quarters 2005Q4-2007Q3 post-reform. Credit slump includes only quarters 2007Q4-2011Q1 post-reform. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

The estimates suggest that the mean estimated drop in transition from a new insolvency to Chapter 7 filing is associated with a 5.8 log point rise in the transition from new insolvency to current at the 4 quarter horizon. For the 1 quarter horizon, there is also a negative relation between the transition to Chapter 7 filing and to being current, but this is much smaller in magnitude and less statistically significant. The difference in the estimates for the 1 quarter ahead and 4 quarter ahead horizons is intuitive, as one would expect that over a longer time period it should be easier to cure an insolvency for a distressed borrower.

Turning to the transition from a new insolvency to foreclosure in panel B, we find that there is a small positive relation with the transition to Chapter 7. At the 1 quarter horizon, the mean decline in the transition from a new insolvency to Chapter 7 filing is associated with a 0.7 log point decline in the transition to foreclosure. The magnitude is larger at the 4 quarter horizon, where the estimated coefficient implies a 1.9 log point decline in transitions to foreclosure.

We also find a positive relation between the change in the transition to Chapter 7 filing and the change in the transition to Chapter 13 filing. The magnitude of the estimated coefficients is large, with a 1 log point decline in the transition from a new insolvency to Chapter 7 filing associated with a decline in the transition to Chapter 13 filing by 1 log point

at the 1 quarter horizon and 0.87 log points at the 4 quarter horizon.

Table 9: Substitution from Chapter 7 Bankruptcy Filing

Horizon	1Q	4Q
A. New Insolvency to Current		
New Insolvency to Ch 7	-0.059 (-1.70)	-0.11 (-3.03)
$N$	74	87
B. New Insolvency to Foreclosure		
New Insolvency to Ch 7	0.015 (2.84)	0.036 (3.19)
$N$	74	87
C. New Insolvency to Chapter 13		
New Insolvency to Ch 7	0.97 (2.19)	0.87 (2.52)
$N$	74	87

Estimates of the coefficient  $\delta_1$  in regression equation 5. Dependent variables are the transition from a New Insolvency to with Current, Foreclosure and Chapter 13 filing at either a 1Q or 4Q ahead horizon. Results are from weighted OLS with weights equal to the inverse variance of the estimated regressors  $\beta^{ins \rightarrow bank7}$ . T-statistics in parentheses. Since the null is that the coefficients are zero, as in Pagan (1984), our estimates are robust to using generated regressors. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

The positive relation between the transition from a new insolvency to Chapter 7 filing and the transition to foreclosure and Chapter 13 filing may be a consequence of the rise in the transitions to current. This pattern is consistent with the notion that the decline in Chapter 7 filing, by increasing the transition into current, reduces the demand for Chapter 13 filing and the incidence of foreclosures after a new insolvency. Based on these results, BAPCPA does not seem to have steered potential Chapter 7 filers to Chapter 13, as found in Cornwell and Xu (2014). The difference in findings may be due to the fact that Cornwell and Xu (2014) rely on state-level variation in the homestead exemption as the main mechanism through which BAPCPA could have induced a shift from Chapter 7 to Chapter 13. Additionally, we do not find evidence that the decline in bankruptcy filings following BAPCPA is associated with a rise in foreclosures rates, as in Mitman (2016). Our analysis accounts for the state level variation in the homestead exemptions and other regulatory variables. Additionally, our results are not consistent with the notion that BAPCPA may have led to a rise in foreclosures, as argued by White and Zhu (2010). Their results suggest that a decline in Chapter 13 filing following BAPCPA may be associated with a rise in foreclosures. However, we find that BAPCPA had no effect on either Chapter 13 filings or foreclosures following

a new insolvency in the aggregate, and the rise in the transition from new insolvency to current associated with the reform may be responsible for the positive relation between the change in Chapter 7 filing and the change in Chapter 13 filing and foreclosure following a new insolvency at the court district level.

## 5 Insolvency, Bankruptcy and Access to Credit

Our analysis shows that the decline in Chapter 7 bankruptcy filing is associated with a sizable rise in continuing insolvency. We now compare the effects of Chapter 7 and Chapter 13 bankruptcy filing on access to credit and credit score, and compare them to those of borrowers who remain insolvent but do not file for bankruptcy. We consider all borrowers who experience a new insolvency in a given quarter, and then distinguish among that group borrowers who file for Chapter 7 and Chapter 13 bankruptcy in the 8 quarters after the new insolvency, from those who do not file for bankruptcy over that period.

We first examine the differences in access to credit. Panels A to C in figure 5 display the fraction of individuals with at least one new unsecured line of credit, auto loan or mortgage origination in quarters 5-8 after the new insolvency for those who do not file and in quarters 1-4 after filing for those who file for Chapter 7 and for Chapter 13. This choice of time periods is motivated by the fact that borrowers with a new insolvency who file for bankruptcy in the 8 quarters following the new insolvency typically do so between 2 and 6 quarters after the new insolvency. Given this pattern, our choice of time horizon implies that we are comparing filers and non filers at approximately the same time. Clearly, borrowers who file for Chapter 7 bankruptcy originate new unsecured lines of credit and auto loans at higher rates after filing than borrowers who do not file and become newly insolvent in the same quarter, Except at the height of the Great Recession, Chapter 7 filers have an approximately 30% higher probability of displaying a new unsecured origination relative to individuals who don't file, and a 60% higher probability of obtaining a new auto origination 4 quarters after filing, when compared to individuals who do not file. For these two outcomes, Chapter 7 filers are also considerably more successful than Chapter 13 filers. Indeed, the fraction of new unsecured originations and auto loans for Chapter 13 filers is very similar to non-filers. Borrowers who file for bankruptcy in the 8 quarters after a new insolvency are also more successful than non-filers in obtaining a new mortgage origination. However, in this case, Chapter 13 filers display a substantially higher new mortgage origination rate than Chapter 7 filers, especially after 2005. Before 2005, the probability of obtaining a new mortgage origination for bankruptcy filers of either chapter was approximately 50% higher than for individuals

who become newly insolvent in the same quarter but do not file for bankruptcy. After 2005, it is approximately double for Chapter 7 filers, relative to non filers, and four times as large for Chapter 13 filers relative to non filers. The higher rate of mortgage originations for Chapter 13 filers relative to Chapter 7 filers after 2005 may be due to the fact that, after the income eligibility requirement was introduced for Chapter 7 bankruptcy by BAPCPA, the pool of Chapter 13 filers has higher average income, thus making it easier for them to obtain mortgage credit. Additionally, Chapter 13 bankruptcy is particularly beneficial for home owners, as it stays foreclosure proceedings, and some of the new mortgage originations may be refinance mortgages for this group.

The difference in the fraction of new originations for insolvent borrowers by filing status may be driven by differences in access to credit (supply) or by differences in the demand for credit. To explore this question, Panel D in figure 5 displays the average number of new *hard inquiries* for unsecured, auto and mortgage loans for borrowers who become newly insolvent in the same quarter, based on whether they file for bankruptcy in the subsequent 8 quarters. Hard inquiries are a good indicator for credit demand, as they are recorded in credit files after a borrower initiated loan application. Pre-BAPCPA, the average number of new inquiries for filers in the 4 quarter after filing was approximately 0.9, irrespective of bankruptcy chapter. It was approximately 10 percentage points lower for non-filers in quarters 5-8 after the new insolvency. Post-BAPCPA the difference in the average number of new inquiries for filers and non-filers virtually disappears. This suggests that the average number of new hard inquiries does not vary substantially by filing status, which is consistent with similar demand for credit across the three groups. It follows that the variation in the fraction with new originations by filing status is mostly driven by differences in the supply of credit.<sup>23</sup>

Finally, we examine the variation in credit scores by filing status, at the time of the new insolvency occurs and in an 8 quarter window following the new insolvency. Panel A in figure 6 compares credit scores at the time of the new insolvency by filing status in the 8 quarter after the new insolvency. Borrowers who eventually file for bankruptcy display

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<sup>23</sup>These results are consistent with Jagtiani and Li (2014), who study credit access after Chapter 7 and Chapter 13 bankruptcy in detail. Specifically, Jagtiani and Li (2014) find that Chapter 13 filers are much less likely to receive new credit cards than Chapter 7 filers, even after controlling for borrower characteristics and local economic environment. They also find that Chapter 13 filers end up with a slightly larger credit limit amount than Chapter 7 filers overall, because they are able to maintain more of their old credit from before bankruptcy filing. Chapter 13 filers may be at a disadvantage given their substantial recidivism in delinquency. As shown in Norberg and Velkey (2007) and Eraslan et al. (2014), only 33% of all Chapter 13 filers successfully complete the court mandated repayment plan. Moreover, 30-33% of Chapter 13 filers whose bankruptcy was discharged or dismissed filed again at least once. Even for those who emerged successfully from their cases through discharge, the refiling rate exceeds 20%.

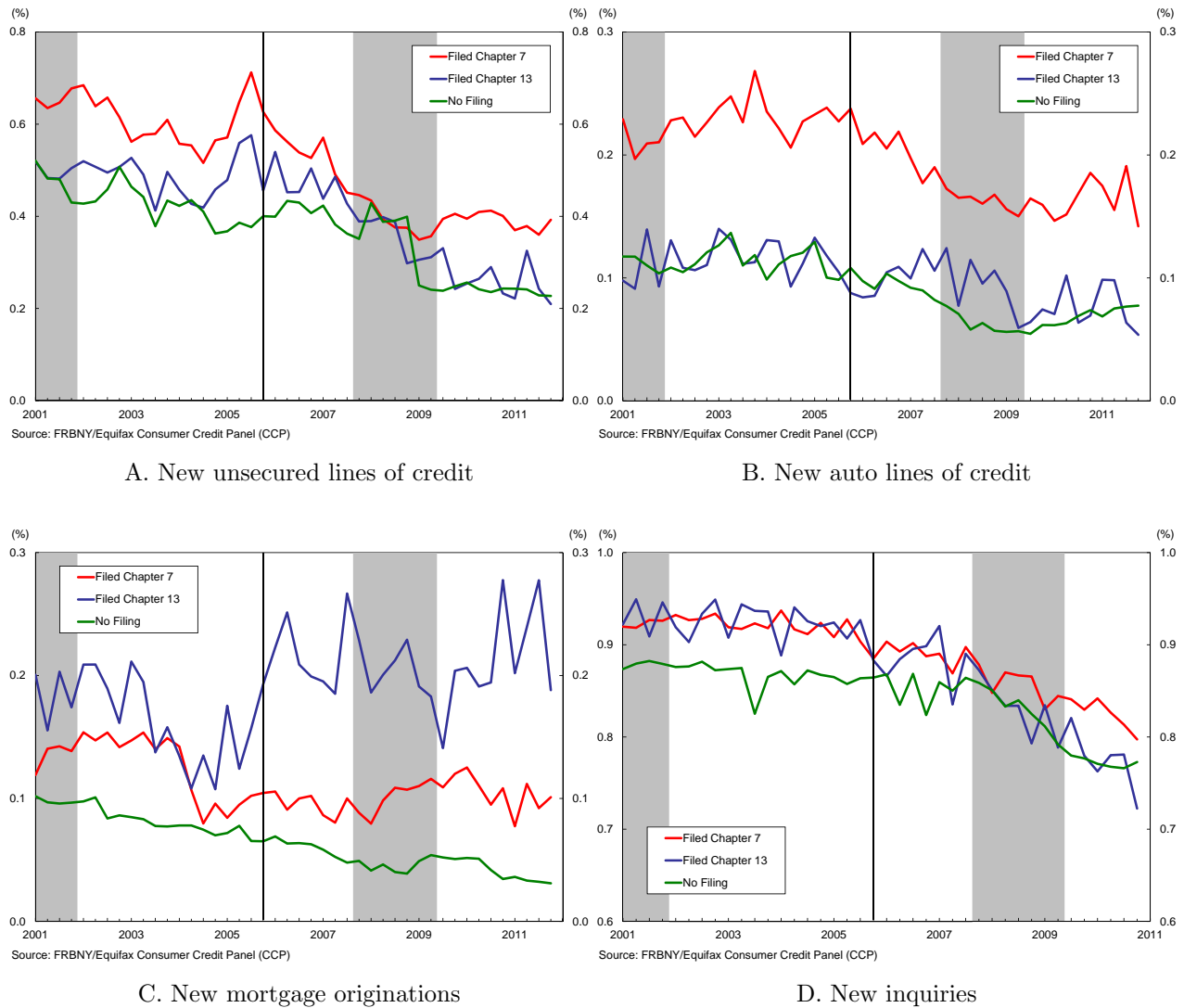
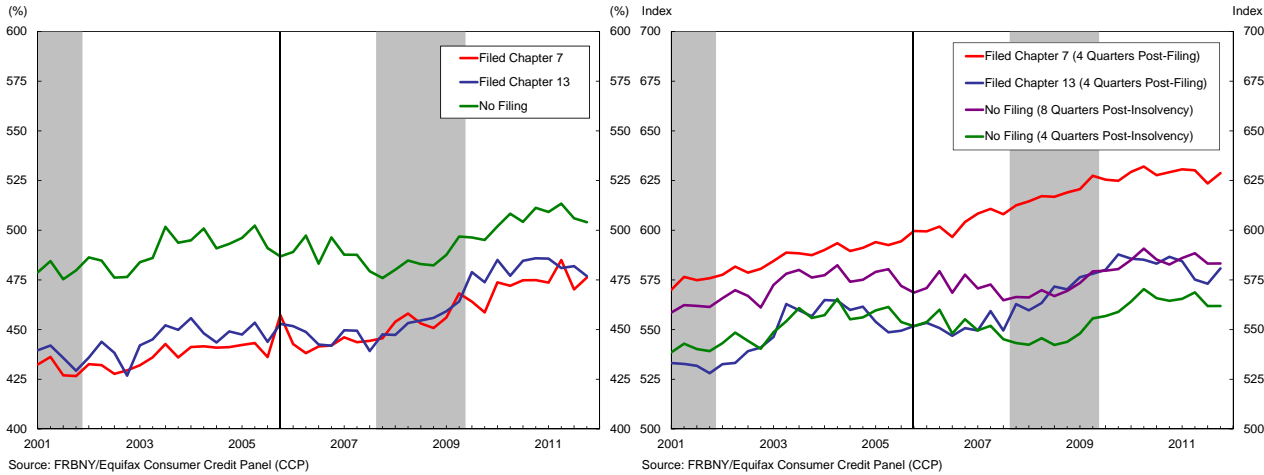


Figure 5: New originations and inquiries after a new insolvency by filing status

Panels A-C: Fraction of newly insolvent individuals who exhibit a new unsecured, auto or mortgage origination either 4 quarters after filing for Chapter 7 and Chapter 13 bankruptcy, or 8 quarter after the new insolvency if they do not file. Panel D: Average number of new inquiries for newly insolvent individuals in quarter 1-4 after filing for bankruptcy for Chapter 7 and 13 filers or in quarters 5-8 after the new insolvency for non-filers.

a lower credit scores when the new insolvency occurs, irrespective of the filing chapter. This is not surprising, as we would expect insolvent borrowers who file for bankruptcy to be more financially distressed than borrowers who choose not to file. Four quarters after the new insolvency, this ranking still prevails, even though credit scores have increased for both groups. However, as show in panel B of figure 6, the pattern changes after filing.

While credit scores for non-filers are approximately 50 points higher 8 quarters after the new insolvency relative to 4 quarters after, credit scores for those who file for Chapter 7 are substantially higher 4 quarters after filing and this difference increases after BAPCPA. The pre-reform difference between credit scores 4 quarters after filing for Chapter 7 and non-filers 4 quarters after the new insolvency is approximately 50 points, and it shrinks to 15 points at quarters after the new insolvency for non-filers. Post-reform, these differences grow to approximately 125 and 50 points respectively. Chapter 13 filers, on the other hand, do not display significantly higher credit scores than non-filers. The credit score for non-filers 4 quarter after the new insolvency is virtually the same as the credit score for Chapter 13 filers 4 quarters after filing until mid-2007. Subsequently, the credit score 4 quarters after filing for Chapter 13 becomes very similar to the credit score for non filers 8 quarters after the new insolvency. The credit score advantage for Chapter 7 filers relative to non-filers and Chapter 13 filers rises after BAPCPA, suggesting positive selection of borrowers who file for Chapter 7 bankruptcy in the post-reform period compared to the pre-reform period. This post-reform change in the selection pattern for insolvent borrowers who file for Chapter 7 and those who do not file or file for Chapter 13 is consistent with binding liquidity constraints preventing the more financially distressed and lower income potential filers for Chapter 7 being excluded due to liquidity constraints.



A. Credit score at new insolvency

B. Credit score in 8 quarters after new insolvency

Figure 6: Credit scores on or after a new insolvency by filing status

Panel A: Credit score at new insolvency. Panel B: Credit score 4Q and 8Q after the new insolvency for non-filers, and 4Q after filing by chapter

These findings suggest that bankruptcy offers relief from financial distress, not only

because it provides debt discharge and stays collections, foreclosures, wage garnishment and other court actions against the borrower, but also because it allows filers more access to new lines of credit. Additionally, our results show that Chapter 7 offers the most effective relief and is clearly a better outcome than insolvency for most filers. Moreover, the fact that we show evidence of liquidity constraints restricting access to Chapter 7 bankruptcy for potential filers contradicts the notion in Ausubel and Dawsey (2004) that marginal households would be indifferent between bankruptcy and insolvency.

Our results also clearly contradict the widely held view that bankruptcy is associated with exclusion from credit markets. This view is incorporated in virtually all models of personal bankruptcy. Based on our findings, realistic models of household credit should include separately both an informal default option, associated with no debt relief and curtailed access to credit, and a bankruptcy option, associated with both debt relief and access to credit. They should also incorporate monetary costs of filing for bankruptcy and liquidity constraints. This additional richness will allow these models to offer a more adequate assessment of the impact of income and expenditure shocks on default behavior and welfare implications of incomplete insurance, as well as the consequences of policies introduced to ameliorate this incompleteness.

## 6 Conclusion

One of the main goals of personal bankruptcy is to provide insurance against unplanned loss of income or large expenditure shocks. Our finding that bankruptcy filings have declined mostly for groups associated with low income, possibly liquidity constrained individuals, resulting in a substantial rise in the rate and persistence of insolvency, suggests that BAPCPA may have curtailed access to this form of insurance for these households. It also suggests that the income means test that was introduced to ameliorate possible moral hazard associated with Chapter 7 bankruptcy is not the primary driver of the reduction in Chapter 7 filings. Additionally, we show that the main effect of the 2005 bankruptcy reform was to shift financially stressed individuals from Chapter 7 bankruptcy to persistent insolvency.

We also show that insolvency is associated with a high degree of financial distress in comparison to bankruptcy, suggesting that insolvency would not be the preferred choice for most individuals. This consequence of BAPCPA is potentially welfare reducing for households. However, since the recovery rates for creditors from insolvent loans should be higher than on bankrupt loans, this could have induced banks and credit card companies to expand access and improve conditions for personal loans. Simkovic (2009) finds that BAPCPA reduced



credit card company losses and increased their profits. However, he finds little evidence that credit conditions for consumers improved, which is also confirmed in Gross et al. (2019).

Viewing bankruptcy in the broader sphere of social insurance programs, our results suggest that the personal bankruptcy procedure in its current form would benefit from reform. If we interpret the monetary costs associated with bankruptcy filing from a costly state verification perspective— as in Townsend (1979) and related literature— it is natural to assume that these costs should be borne by the filer to provide incentives. However, this framework does not allow for binding liquidity constraints on the filer and is thus inadequate, as currently formulated, to provide realistic policy prescriptions.<sup>24</sup> Moreover, for other programs in which verification of the state is required, such as disability insurance, the applicant does not incur in any direct monetary expenses to determine eligibility. Reducing filing costs or making them palpable over time for Chapter 7, as is the practice for Chapter 13, would enable financially distressed borrowers to access this important form of relief.

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<sup>24</sup>Grochulski (2010) presents a private information environment in which bankruptcy with an income test is used to implement the constrained efficient allocation. There is no fee for bankruptcy filing and liquidity constraints are not considered.

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# A Consumer Credit Panel Data and Variables

## *Transition Matrices*

Our transition matrices include 14 possible states: seven debt states for individuals who are not in foreclosure, and seven debt states for individuals who are in foreclosure. We define the seven debt states and foreclosure as follows:

1. **Delinquent:** An individual is delinquent if they have at least one loan in their CCP report in that quarter that is 30, 60, or 90 days past due (crtr\_attr13, crtr\_attr14, or crtr\_attr15), while not having any loans that are 120+ days past due, severely derogatory, or bankrupt (crtr\_attr16, crtr\_attr17, or crtr\_attr18). Also, at least one of crtr\_attr16, crtr\_attr17, or crtr\_attr18 must be non-missing, and the individual must not be in a state of bankruptcy.

2. **Insolvent:** An individual is insolvent if they have at least one loan in their CCP report in that quarter that is 120+ days past due, severely derogatory, or bankrupt (crtr\_attr16, crtr\_attr17, or crtr\_attr18), while not having any loans that are 30, 60, or 90 days past due (crtr\_attr13, crtr\_attr14, or crtr\_attr15). Also, at least one of crtr\_attr13, crtr\_attr14, or crtr\_attr15 must be non-missing, and the individual must not be in a state of bankruptcy.

3. **Both:** An individual is both delinquent and insolvent if they both have at least one loan in their CCP report in that quarter that is 30, 60, or 90 days past due (crtr\_attr13, crtr\_attr14, or crtr\_attr15) and have at least one loan in their CCP report in that quarter that is 120+ days past due, severely derogatory, or bankrupt (crtr\_attr16, crtr\_attr17, or crtr\_attr18). Also, at least one of crtr\_attr13, crtr\_attr14, or crtr\_attr15 and one of crtr\_attr16, crtr\_attr17, or crtr\_attr18 must be non-missing, and the individual must not be in a state of bankruptcy.

4. **Current:** An individual is current if she is neither delinquent nor insolvent, that is if she has no loans that are 30, 60, 90 or 120+ days past due, severely derogatory, or bankrupt (crtr\_attr13, crtr\_attr14, crtr\_attr15, crtr\_attr16, crtr\_attr17, or crtr\_attr18). Also, at least one of crtr\_attr13, crtr\_attr14, or crtr\_attr15 and one of crtr\_attr16, crtr\_attr17, or crtr\_attr18 must be non-missing, and the individual must not be in a state of bankruptcy.

5. **Missing:** An individual's debt status is missing if the number of loans in their CCP report in that quarter that are 30, 60, or 90 days past due (crtr\_attr13, crtr\_attr14, or crtr\_attr15) are all not reported, or the number of loans that are 120+ days past due, severely derogatory, or bankrupt (crtr\_attr16, crtr\_attr17, or crtr\_attr18) are all not reported. Non-reporting occurs when Equifax does not receive enough information from the respective financial institutions to generate its credit trend variables.

6. **Chapter 7 Bankruptcy:** There are two scenarios in which an individual is identified as being in the state of Chapter 7 bankruptcy. First, if the individual experiences Chapter 7 bankruptcy commencement (see below), then that individual is marked as being in a state of Chapter 7 bankruptcy for ten years after the date of their foreclosure. Second, if the individual enters the dataset for the first time marked with the bankruptcy flag (cust\_attr290)

coded "Chapter 7 discharged" (which almost exclusively occurs at the dataset's 1999 Q1 truncation), that individual is marked as being in the state of Chapter7 bankruptcy until the flag (which is supposed to stay on for ten years after the bankruptcy's commencement) turns off. We define the commencement of Chapter 7 bankruptcy as the following pattern in `cust_attr290`: the individual is marked as having filed for Chapter 7 in the present quarter.

7. Chapter 13 Bankruptcy: There are two scenarios in which an individual is identified as being in the state of Chapter 13 bankruptcy. First, if the individual experiences Chapter 13 bankruptcy commencement (see below), then that individual is marked as being in a state of Chapter 13 bankruptcy for ten years after the date of their foreclosure. Second, if the individual enters the dataset for the first time marked with the bankruptcy flag (`cust_attr291`) coded "Chapter 13 discharged" (which almost exclusively occurs at the dataset's 1999 Q1 truncation), that individual is marked as being in the state of Chapter13 bankruptcy until the flag turns off. We define the commencement of Chapter 13 bankruptcy as the following pattern in `cust_attr291`: the individual is marked as having filed for Chapter 13 in the present quarter.

8. Foreclosure: There are two scenarios in which an individual is marked as being in the state of foreclosure. First, if the individual forecloses on a home (that is, if `cma_attr3905` switches from off ("0") to on ("1" or "7")), then that individual is marked as being in a state of foreclosure for seven years after the date of their foreclosure. Second, if the individual enters the dataset for the first time while under foreclosure (which almost exclusively occurs at the dataset's 1999 Q1 truncation), that individual is marked as being in the state of foreclosure until the flag (which is supposed to stay on for seven years after the date of the foreclosure) turns off.

### *Regressions*

The variable of interest in our regression analysis is the "average attorney fee by district for discharged no-asset Chapter 7 cases adjusted for inflation (including converted cases)," Table A-23 of Lupica (2011). The other covariates include:

1. Income: Annual county-level income data for 3,142 counties are drawn from the Internal Revenue Service's (IRS) Statistics of Income program, which annually aggregates household-level adjusted gross income as reported on US tax forms. We calculate income at the district level as the weighted average of the average income in counties covered by that district, using the CCP district populations as weights.

2. Unemployment Rate: Annual county-level unemployment data are drawn from the Bureau of Labor Statistics's (BLS) Local Area Unemployment Statistics program. The unemployment data are reported on a monthly basis, and they cover a total of 3,145 counties. We calculate the unemployment rate at the district level as the weighted average of the average unemployment rate in counties covered by that district, using the CCP district populations as weights.

3. House Price Index: House Price Index (HPI) values are drawn at the zip code level from the CoreLogic HPI. The CoreLogic HPI uses repeat sales transactions to track changes

in sale prices for homes over time, with the January 2000 baseline receiving a value of 100, and it is the most comprehensive monthly house price index available. The CoreLogic data cover a total of 6739 zip codes (representing 58 percent of the total U.S. population) in all 50 states and the District of Columbia. We calculate the HPI at the district level as the weighted average of the average HPI in zip codes covered by that district, using the CCP district populations as weights.

4. **Wage Garnishment:** Wage garnishment laws specify the amount of an individual’s wage that may not be garnished by judgment creditors to repay debt. States either adopt federal wage garnishment restrictions—the lesser of (a) 75 percent of the employee’s disposable earnings or (b) 30 times the federal minimum wage—or adopt their own stricter restrictions. We calculate our proxied wage garnishment covariate by estimating the wage level protected from wage garnishment under two scenarios, the minimum wage scenario and the average wage scenario. Under the minimum wage scenario, states are bound either by a multiple of the minimum wage or, in states that only designate a percentage of total income, by that percentage of estimated average income, where estimated average income is the 40-hour minimum wage over 0.298, the average ratio between 40-hour minimum wage and average income (drawn from the IRS’s Statistics of Income program) across states. Under the average wage scenario, states are bound by either the designated percentage of their average wage or, in states that only specify a minimum wage, by the the designated multiple of estimated minimum wage, calculated as the average wage times 0.298. These methods rank states very similarly. We take the minimum of the two estimates as our wage garnishment covariate.

5. **Judicial State Indicator:** An indicator for whether the state requires that all foreclosures be judicial (where judicial states are coded as 1).

6. **Recourse State Indicator:** An indicator for whether the state is a recourse state regarding mortgages (where recourse states are coded as 1).

7. **Homestead Exemption:** Homestead exemption laws specify the maximum value of primary residences that are generally shielded from debt repayment to judgment creditors. We use homestead exemption values collected in Table 1 of Rohlin and Ross (2013), extrapolating the exemption from 1999 to 2005 Q2 as the 2004 exemption and the exemption from 2005Q3 to 2013 as the 2006 exemption.

## **B Variation in Bankruptcy Filings by Credit Score**

We provide further evidence of the effects of the reform by focusing on subsets of individuals according to their credit score 1 year prior to the observed new insolvency. We then allocate individuals to credit score quartiles and estimate the time effects in (1) for each sub-population. The results are presented in figure 7. The effects of the reform are primarily driven by the response of individuals at the bottom of the credit score distribution 1 year prior to new insolvency (panels (a) and (b)), with no effects for quartile 3 and very noisy effects for quartile 4 (panels (c) and (d)). In fact, the first two quartiles exhibit drops of 100

log points (Quartile 1) and 60 log points (Quartile 2) relative to pre-reform. For quartile 4, the base default rate is extremely low and hence the estimated effects are very noisy.

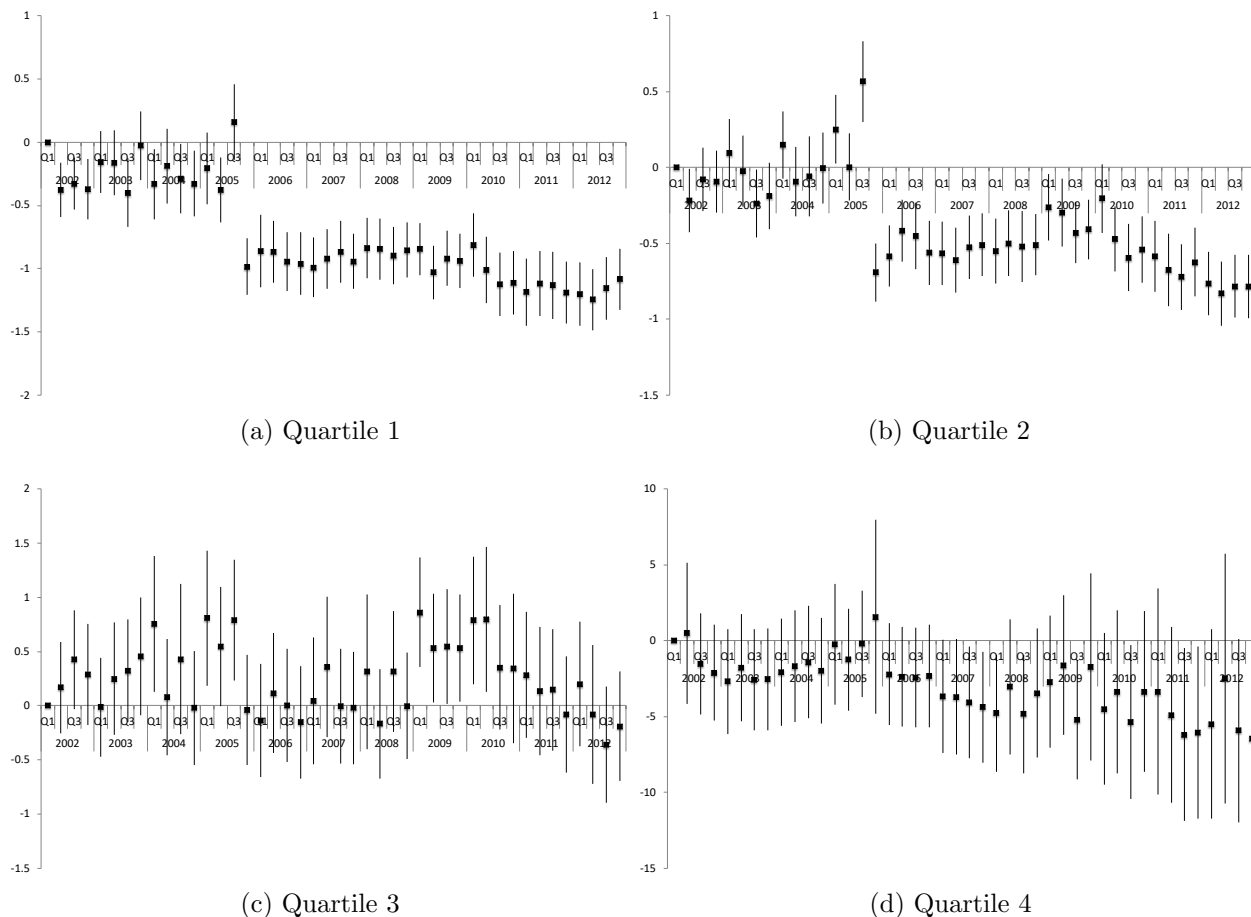


Figure 7:  $\beta_{s(t)}$  for 1-quarter transition from New Insolvency to Chapter 7 bankruptcy, by risk score quartile measured 1 year prior to new insolvency. Bars denote 90% confidence intervals. Source: Authors' calculation based on Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data.

The variation in the response to the reform by recent credit score is important because the credit score is strongly positively related to income. We illustrate this connection using supplementary income data, merged with the Equifax panel, for 11 thousand individuals for the year 2009. For these borrowers, we observe their payroll income in 2009 and their credit record for their entire sample period. The sample for which income data is available is nationally representative. In Appendix C, we show that the income distribution in this payroll data set is very similar to CPS data on labor income by age.<sup>25</sup> To quantify the relation between credit score and income, we regress the Equifax Risk Score on income and

<sup>25</sup>We also compare the income distribution by state in our sample to data in the American Community Survey and find that the distributions match quite closely.



age, their interaction and state fixed effects. More details on the specification are described in Appendix C. The estimation results are summarized graphically in figure ???. There is a positive relation between credit score and income at all ages, but the relation is steeper for younger borrowers. For 25 year olds, an increase in income from \$35,000 to \$50,000 is associated with an increase in the credit score from 640 to 659. For a 40 year old, an increase in income from \$50,000 to \$75,000 is associated with an increase in the credit score from 674 to 702. The positive relation between income and credit score suggests that individuals at the bottom half of the credit score distribution will most likely have also incomes below the sample median. Since these borrowers are likely to pass the income test for Chapter 7 filing introduced by BAPCPA, the reduction in Chapter 7 filings for borrowers with credit scores below the median displayed in figure 7 is likely to be driven by a different mechanism. In Section 4, we explore the role of liquidity constraints associated with the rising monetary costs of filing as a potential factor.

## C Income Data and Imputation

In this section, we describe the supplementary payroll data used for the income imputation procedure. This data is merged with our credit panel data, allowing us to map individuals' incomes for 2009 to their credit files.

The Equifax Workforce Solutions data provided by Equifax is a nationally-representative random sample of individuals containing employment and payroll verification information provided directly from the employers. The information provided for each employee includes the last three years of total income, the date of first hire, tenure, and for the current year status (part time/full time), weekly hours, pay rate and pay frequency.

**Income Measure Description** There are various income measures provided in the Worknumber data. For each year of data available variables are given for the total 12-month base, bonus, overtime, and commission compensation in year  $t$ ,  $t - 1$ , and  $t - 2$ . This information however is only available for a little over  $\frac{1}{3}$  of the sample. The other measure of income, which is widely available across the sample, is rate of pay and pay frequency. We therefore impute total income using a simple  $rate \times frequency$  approach to account for the lack of representation found in the sample regarding the total 12-month income variables. This yields about 11,000 observations for 2009. The sample of records is nationally representative, both in terms of geographical and age distribution.

**Comparison with the CPS** To gauge the accuracy of the income measure in our data, we performed a simple comparison with the income levels reported in the Consumer Population Survey. We present results based on income quintiles in Table 10.

Table 10: Income Distribution Comparison by Quintile

Calculation	Dataset	1	2	3	4	5
Mean	CPS	11058.67	24791.32	36584.61	51872.45	110192.2
	TALX	17078.07	26565.46	39589.76	58510.22	117260.1
Median	CPS	12000	25000	36000	50000	85000
	TALX	16640	27040	39520	57512	99990

Source: IPUMS, TALX. Worknumber income calculations made using proxied income from pay periods and pay rate. CPS income calculations made using total wage and salary income.

### C.1 Relationship between credit score and income

To quantify the relation between credit score and income, we regress the Equifax Risk Score on income and age, their interaction and state fixed effects:

$$s_{i,2009} = \omega + \alpha y_{i,2009} + \beta y_{i,2009}^2 + \gamma a_{i,2009} + \delta a_{i,2009}^2 + \eta y_{i,2009} \times a_{i,2009} + \nu y_{i,2009}^2 \times a_{i,2009}^2 + I_{i,state} + \varepsilon_i,$$

where  $i$  denotes individual borrowers,  $s$  denotes the credit score,  $y$  denotes labor income,  $a$  denotes age and  $I_{i,state}$  is a state fixed effect. The estimation results are reported in Table 11.

Table 11: Relation Between Credit Score and Income

	Equifax Risk Score
Income	0.00101 (0.000353)
Age	-2.63 (0.668)
IncomeXAge	2.91E-05 (1.48e-05)
IncomeXAge Squared	-5.42E-07 (1.53e-07)
Income SquaredXAge	0 (0)
Income Squared	-1.37E-09 (3.90e-10)
Age Squared	0.0603 (0.00740)
Income SquaredXAge Squared	0 (0)
Constant	620.5 (14.30)
Observations	10,511
R-squared	0.203

Dependent variable is average Equifax Risk Score in 2009. All other variables measured in 2009. Specification also includes state fixed effects. T-statistics in parenthesis, robust standard errors clustered at the state level. Source: Authors' calculations based on the Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.