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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, insolvency, and foreclosure, we explore the mechanism generating these responses and examine the consequences for households. We find that the reform caused a 50% permanent drop in Chapter 7 filings, a 25%permanent rise in insolvency, but had no effect on Chapter 13 filings. Exploiting the cross-district variation in filing costs resulting from the reform, we show that these responses are driven by liquidity constraints associated with the higher monetary cost of filing for bankruptcy. We show that insolvency is associated with worse outcomes than bankruptcy, in terms of access to credit and credit scores, suggesting that BAPCPA may have removed an important form of relief for financially distressed borrowers.

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A data appendix is available at http://www.nber.org/data-appendix/w24934

1 Introduction

Personal bankruptcy is a form of social insurance offering relief to individuals who are unable to repay previously contracted debt.[1] 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 response to 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 reform overhauled filing requirements and substantially increased the monetary cost of filing for bankruptcy. We treat it as a natural experiment to assess the impact of changes in eligibility requirements and monetary filing costs on bankruptcy and related outcomes. Such assessment provides valuable insights into the trade-off between the social insurance provided by personal bankruptcy and the moral hazard associated with any such insurance. Importantly, we are the first to study responses to the reform other than bankruptcy filings, which allows us to quantify the patterns of substitution of individuals between outcomes such as bankruptcy filing, insolvency, foreclosure or resolution of insolvency.

We find that the reform caused a 50% permanent drop in Chapter 7 filings, a 25% permanent rise in insolvency, but had no effect on Chapter 13 filings. Exploiting the cross-district variation in filing costs, we show that these responses are consistent with liquidity constraints associated with the higher monetary cost of filing for bankruptcy excluding lower income households from filing. We show that the decline in Chapter 7 bankruptcy filings is primarily associated with a rise in insolvency, and that insolvency is associated with worse outcomes than bankruptcy, in terms of access to credit and credit scores, suggesting that BAPCPA may have removed an important form of relief for financially distressed borrowers.

BAPCPA's main provisions were to introduce an income test requiring Chapter 7 filers to have income below their state's median, effectively removing the possibility of choosing the filing chapter. It mandated a fixed 5 year repayment plan for most Chapter 13 filers and increased refiling restrictions for both chapters. The new law also increased the monetary cost of filing in a variety of ways. It raised court filing fees and mandated that filers at-

[1] 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.

tend 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.[2] Previous evidence suggests that liquidity constraints play a sizable role in the decision to file for bankruptcy. 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.

Our analysis is based on anonymous administrative credit report data from a nationally representative panel of U.S. individuals from 1999 to 2013, provided by the Federal Reserve Bank of New York's Consumer Credit Panel/Equifax. These data allow us to observe bankruptcy filings by chapter and the changing characteristics of who file for bankruptcy, as well as the behavior of financially distressed individuals who post-2005 decide not to file. A large literature following BAPCPA's introduction studies its effects on the bankruptcy filing rate and on the characteristics of those who file for bankruptcy, based mainly on surveys of filers or bankruptcy courts records.[3] Our analysis is the first to shed light the individuals who no longer file for bankruptcy post-reform, and in particular their foreclosure and insolvency behavior, as well as their access to credit and credit score, in comparison to those who do file. We provide four sets of results.

First, we show that, controlling for a comprehensive set of court district level economic and regulatory variables, BAPCPA is associated with a large drop in Chapter 7 bankruptcy filings (50 log points), no change in Chapter 13 filings, and a rise in the fraction of individuals who are insolvent, who are 120 plus days delinquent but do not file for bankruptcy (25 log points). We also show that the response to the rise in attorney fees associated with the reform is stronger for individuals with income below their state's median, confirming the

[2]See Jones (2008), Lupica (2012), White (2007).

[3]In a leading 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.

hypothesis that the rise in filing costs, not the income test for Chapter 7 eligibility, was the main mechanism through which reform affected bankruptcy behavior.

Second, we examine how the district level decline in Chapter 7 filing rates is related to Chapter 13 filings, foreclosures, insolvency and resolution of insolvency. We find a strong substitution from Chapter 7 filing to insolvency, but no impact on the rate at which insolvent borrowers become current. The effect of the median estimated drop in flows into Chapter 7 bankruptcy can account for a 27.5% increase in flows to foreclosure (out of and estimated 33%) and a 2.65% increase in the persistence of insolvency (out of an estimated 3.5%). This indicates that individuals who are not filing for Chapter 7 bankruptcy protection remain insolvent. We find essentially no impact of substitution from Chapter 13 filing to insolvency and foreclosure, and no substitution from Chapter 7 to Chapter 13, which suggests that the reform was not effective in channeling individuals from Chapter 7 to 13. Thus, the individuals who no longer file for Chapter 7 bankruptcy post-reform experience a form of persistent and severe financial distress.

Third, we exploit the geographical variation in attorney fees, which account for about 75% of the total cost of filing for bankruptcy (see Lupica (2012)), pre- and post-reform to quantify the role of the monetary filing cost on bankruptcy filings.[4] We find that larger changes 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 fee distribution increases the drop in the flows from a new insolvency to a Chapter 7 bankruptcy by 18 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.[5]

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. To this end, we examine access to credit and credit scores for financially distressed individuals, distinguishing between whether they file for bankruptcy or not. We consider cohorts

[4] 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.

[5] It would be difficult for filers to borrow to finance Chapter 7 filing costs, since debts is contracted close enough to filing date are considered fraudulent, due to lack of intent to repay, and cannot be discharged.

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. 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.[6] 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 prior work on the role of liquidity constraints in bankruptcy filing decisions, such as Mann and Porter (2009) and Gross, Notowidigdo, and Wang (2012), and more generally with evidence on binding liquidity constraints.[7] 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.

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.

[6] The fraction of Chapter 7 with new unsecured debt originations in approximately 25% higher than the fraction for Chapter 13 filers and non filers. The difference for auto loans is about 100%.

[7] See, for example, Gross and Souleles (2002a), Johnson, Parker, and Souleles (2006), Parker et al. (2013) among others.

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.[8] 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.

Standard models of household default 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 delinquent state, in which no debt relief is possible and access to credit is severely curtailed. (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 endogenous credit access after bankruptcy, would significantly affect the quantitative predictions of these models for debt and delinquency behavior, and 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 reports our estimates of transition probabilities into various delinquency states. Section 4 describes our cross-district regression analysis. Section 5 examines the implications for access to credit and scores 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

[8] 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.

Chapter 7. Under this chapter, all of filers' assets above certain exemption levels are used to satisfy unsecured creditors.[9] 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.[10] Before the 2005 reform, filers could choose whether to file 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 bankruptcy law 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,[11] and generated an active policy discussion on the efficiency of theexisting law. That discussion resulted in the 2005 Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA). BAPCPA was signed by president George W. Bush 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 most notable 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 imposed some restrictions on the homestead exemption. First, a petitioner who

[9] 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.

[10] 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').

[11] 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).

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 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 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 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 \$600 for Chapter 7 and \$1600 for Chapter 13 to post-reform means of \$2,500 and \$3,500, respectively.[12] 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.

3 The Effects of BAPCA over Time

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 5% 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

[12]See White (2007), also consistent with findings in Lupica (2012).

are described in detail in Appendix A.[13]

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. Figure 1 presents the aggregate filing rate from bankruptcy court data. The filing rate for both chapters dropped following the reform, and the drop was larger and more persistent for Chapter 7. In this section, we aim to isolate the effects of the reform on bankruptcy filing rates, and other related outcomes such as delinquencies and foreclosures.

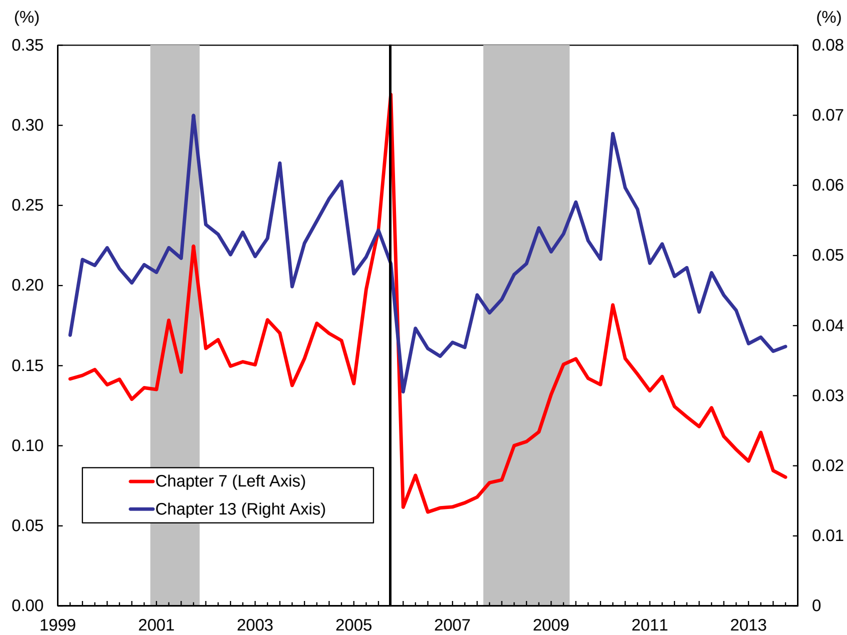


Figure 1: Quarterly Filing Rates by Chapter. Source: US Bankruptcy Courts.

To examine the path to bankruptcy filing, we estimate the probability of transition from a *new delinquency* or *new insolvency* to a mutually exclusive set of states. We call an account delinquent if it is 30, 60 or 90 days late and insolvent if it 120 days or more late, derogatory or in charge-off. A delinquency is new if it occurs after a least 8 prior quarters of no delinquencies, insolvencies, bankruptcies or foreclosures. An insolvency is new if it occurs after at least 8 quarters of no insolvencies, bankruptcies or foreclosures. New or outstanding delinquencies may appear in the last 8 quarters before a new insolvency. New delinquencies and new insolvencies are designed to capture the onset of a *new spell of financial distress*. We are interested in the resolution of spells of financial distress as these could be caused by events unforeseen at the time debt was contracted, such as job loss, disability, divorce and so

[13]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.

on. The debt relief offered by bankruptcy is supposed to offer insurance against such events, rather than deal with chronic insolvency. And indeed, approximately 37% of new Chapter 7 and 13 filers experience a new delinquency, and 55% display new insolvency in the 2 quarters preceding the filing. Considering borrowers who do not experience adverse credit events for two prior years is a way to identify spells of financial distress in the absence of information on changes in income or unanticipated changes in expenditures. By contrast, the stock of borrowers who is delinquent or insolvent may include a sizable fraction who are persistently in that state, because of poor financial planning skills, or other behaviors.[14]

Figure 2 displays the quarterly transition rates into a new delinquency and a new insolvency for the sample population. Approximately, 0.8% of the population becomes newly delinquent in each quarter in our sample, and approximately 0.6% of the overall population becomes newly insolvent in each quarter. Most importantly, these fractions are stable over time but for mild business cycle fluctuations and do not exhibit substantial changes after BAPCPA was enacted and implemented. This behavior suggests that selection into insolvency and delinquency has not changed systematically in response to the reform. In the Online Appendix, we report estimates of the changes in new delinquency 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.

Newly delinquent and newly insolvent individuals can transition to the following set of outcomes: *Current*, if there are no delinquencies or any insolvencies their record for that quarter, with no bankruptcy or foreclosure flags; *Delinquent* or *Insolvent*, as defined above,[15] or *Bankrupt*, if they display a bankruptcy flag, which is activated by a new bankruptcy filing, where we distinguish between Chapter 7 and Chapter 13. An individual can also be in *Foreclosure* if she displays a foreclosure flag.[16]

We estimate the 1 and 4 quarter ahead transition probabilities from a new delinquency and new insolvency to any of the outcome states for each quarter in the sample. We also control for available district level economic indicators, which are the unemployment rate, personal disposable income and an index of house prices. The regression specification is as follows:

[14]Based on Experian Data for 2004-2011, 44.96% of all borrowers ever experience a 90 day or more past due delinquency.

[15]Student debt is not dischargeable in bankruptcy, and is excluded from the analysis.

[16]The foreclosure flag is activated by a new foreclosure record on the borrower's credit file, and lasts for 7 years from its first appearance.

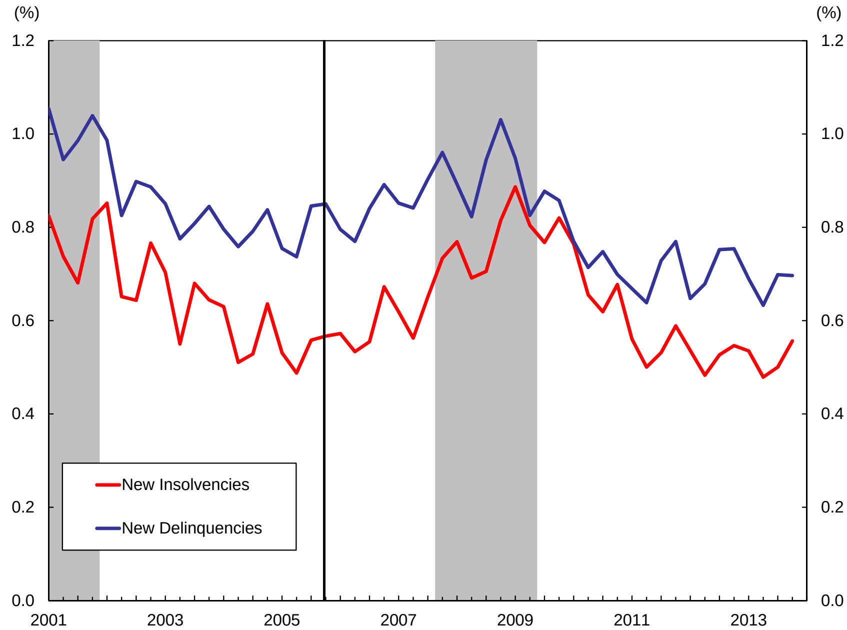
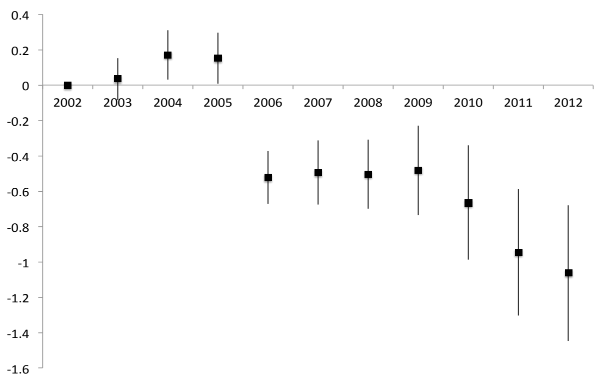


Figure 2: Quarterly New Delinquency and New Insolvency Rates. Source: Source: Authors' calculation based on Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data.

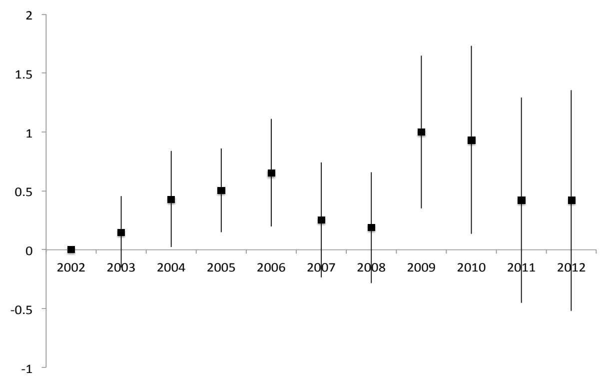
$$y_{it} = \sum_{s(t)\neq 0} \beta_{s(t)} I_{s(t)} + \gamma_i + \phi X_{it} + \epsilon_t, \tag{1}$$

where y_{it} is the transition of interest in district i at quarter t, rescaled by its pre-reform mean, $\beta_{s(t)}$ capture time effects, relative to base period 0, $I_{s(t)}$ is an indicator for period s (year or quarter), γ_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 any 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, so that all other estimates can be interpreted as changes from the 2002 value. We report the estimates of the time effects for the yearly specification below, starting from the transitions from a new insolvency.

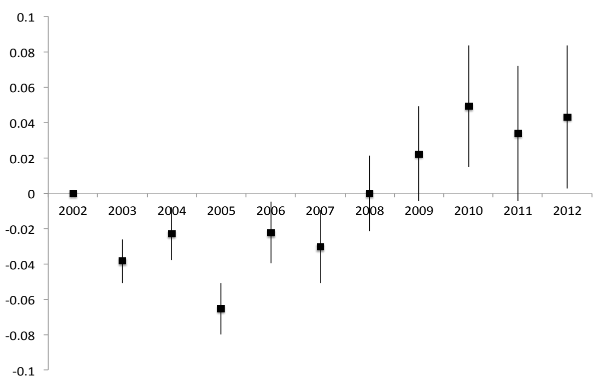
Figure 3 reports estimates of the 1 quarter ahead time effects for the transitions from a new insolvency. Several interesting patterns emerge. First, the transition into Chapter 7 bankruptcy, displayed in panel (a), shows a sizable and permanent drop. The magnitude of the drop is approximately equal to 50% relative to the pre-reform period for 2006-2009, and rises to 100% for 2010-2012. In 2004 and 2005, an anticipation effect is clearly visible, as transitions into Chapter 7 filings rise by about 10%. Second, the transition from a new insolvency to Chapter 13 filing or to Current, displayed in panels panels (b) and (d) respectively, do not seem to be affected by the reform. By contrast, the transition from a new insolvency to insolvency without foreclosure, which captures changes in the persistence of insolvency, rises by approximately 10% after 2005, though most of the rise occurs from 2009 onwards, as can be seen in panel (c).



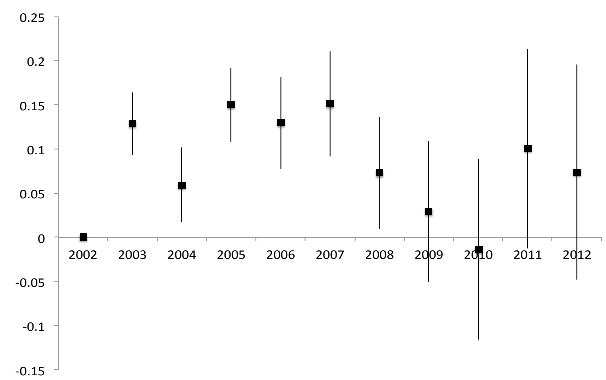
(a) Ch 7 bankruptcy



(b) Ch 13 bankruptcy



(c) Insolvency without foreclosure



(d) Current

Figure 3: Annual $\beta_{s(t)}$ 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.

The patterns of transition from a new delinquency are very similar to those for a new insolvency. Figure 4 displays the estimated time effects for the 1 period ahead transition from a new delinquency to a new insolvency. This transition starts rising in 2005. It is 20% higher than pre-reform levels in 2006 and reaches a peak of 50% higher to the pre-reform level in 2009, when it stabilizes. This pattern is consistent with the notion that after the implementation of BAPCPA financially distressed borrowers are more likely to experience a transition to a more severe form of distress, which may in part due to the reduction in Chapter 7 filing rates.

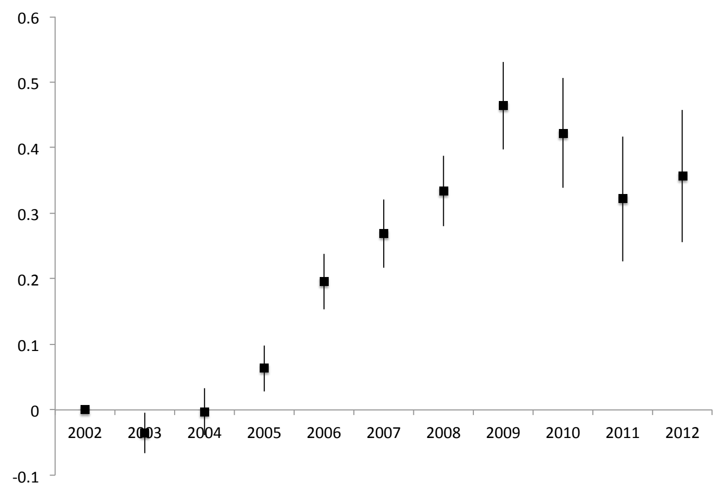


Figure 4: $\beta_{s(t)}$ for 1-quarter transition from New Delinquency to a New Insolvency. Bars denote 90% confidence intervals. Source: Authors' calculation based on Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data.

To determine the exact timing of the response to BAPCPA, figure 5 reports the estimated quarterly $\beta_{s(t)}$s in a 4 year window centered around the quarter in which the reform was enacted. The drop in Chapter 7 filing transitions occurs exactly in the quarter of which the reform was implemented, which suggests that the change in Chapter 7 transition rates were indeed associated with the reform.

Figure 6 displays the estimates for the transition from a new insolvency to foreclosure. This transition exhibits an upward trend throughout the sample period, and does not show a detectable response to the 2005 bankruptcy reform. Filing for Chapter 13 stays foreclosure proceedings, however, there seems to be no relation between the time path of transition into foreclosure and the time path of transition into Chapter 13 filing.

The fact that the transition into Chapter 13 bankruptcy does not significantly respond to the reform is consistent with 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 a response of Chapter 13 filings. In Section 4.1, we show that there is no evidence of substitution between Chapter and Chapter 13 filing. Moreover, in Section 4, we show that there is no link between the change in Chapter 13 attorney fees and the decline in Chapter 13 filings across districts. Because

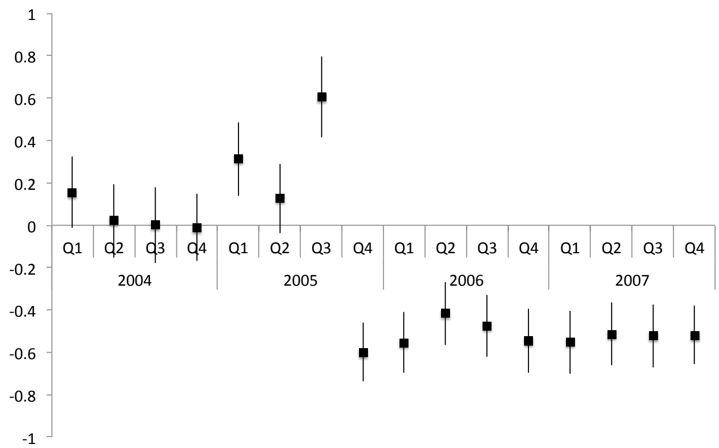


Figure 5: Quarterly $\beta_{s(t)}$ for 1 quarter ahead transition probability from a New Insolvency to Chapter 7 filing. Bars denote 90% confidence intervals. Source: Authors' calculation based on Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data.

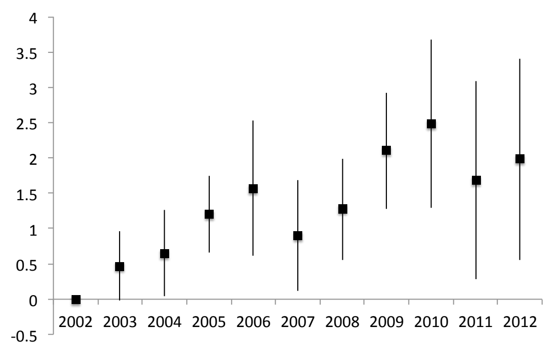
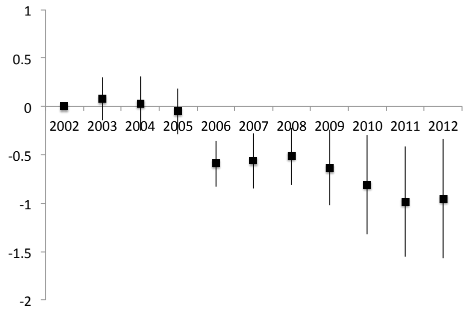


Figure 6: $\beta_{s(t)}$ for 1-quarter transition from New Insolvency to Foreclosure. Bars denote 90% confidence intervals. Source: Authors' calculation based on Federal Reserve Bank of New York's Consumer Credit Panel/Equifax Data.

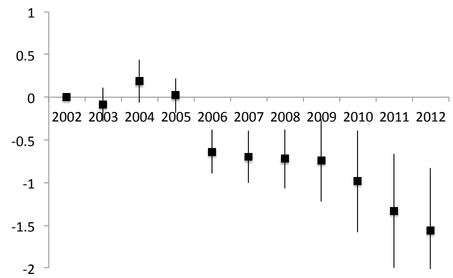
a major difference between these two fees is that Chapter 7 fees have to be paid up-front and Chapter 13 fees can be paid in installments, we take this as evidence supporting our hypothesis that the reduction of bankruptcy filings following BAPCPA was due to liquidity constraints.

3.1 Effects by credit score

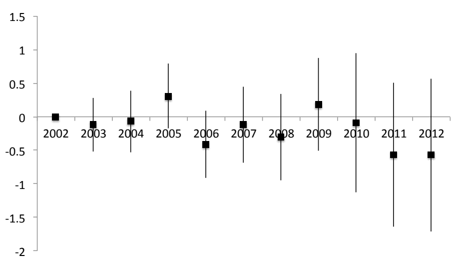
In this section, we provide further evidence of the effects of the reform by focusing on subsets of individuals according to their credit score 1 year prior to the observed new insolvency. We then allocate individuals to credit score quartiles and estimate the time effects in (1) for each sub-population. The results are presented in figure 7. The effects of the reform are exclusively 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 the top credit scores (panels (c) and (d)). In fact, the second quartile exhibits the most dramatic drop in flows to Chapter 7, with the initial drop exceeding 50% and getting bigger over time.



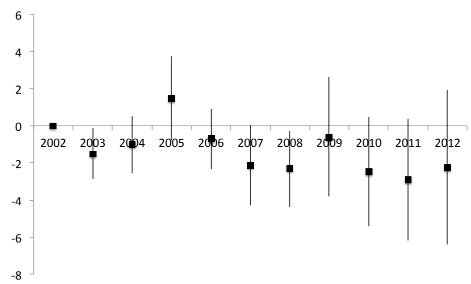
(a) Quartile 1



(b) Quartile 2



(c) Quartile 3



(d) Quartile 4

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 are 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 B, we show that the income distribution in this payroll data set is very similar to CPS data on labor income by age.[17] 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. More details on the specification are described

[17] 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.

in Appendix B. The estimation results are summarized graphically in figure 10. 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, and 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 implies that most of the 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 driven by a different mechanism. In the next section we explore the role of liquidity constraints associated with the rising monetary costs of filing as a potential factor.

4 Mechanism Behind the Response

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 attorney 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%. 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 fess and their change after BAPCPA. These costs exhibit a large cross-district variation both prior 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 argued 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.

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 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).

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 of filing behavior, we adopt a two step procedure. In the first step, we estimate the district-level effect of the reform, based on the following specification:

$$y_{it} = D_i + D_i \times I_t^{post} + \phi X_{it} + \epsilon_t, \tag{2}$$

where y is the log of an outcome of interest, i denotes court districts and I_t^{post} is an indicator variable for the post-reform period, that is $t \geq 2005Q4$. District level fixed effects correspond to D_i and X_{it} contains district level time varying economic controls, as in specification (1). The estimated value for the interaction between the district fixed effect and the post-reform indicator $\Delta_i = D_i \times I^{post}$ corresponds to the average post-reform log change in outcome y for district i.

We then relate the estimated Δ_is to the post-reform change in attorney fees, with the following regression specification:

$$\Delta_i = \alpha_0 + \alpha_1 \log\left(c_i^{post}/c_i^{pre}\right) + \mu_i, \tag{3}$$

where c_i is the average attorney fee in district i. Table 3 reports the estimated coefficient α_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 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 15.6% relative to pre-reform mean. This amounts to 30% of the estimated mean drop in Chapter 7 flows, which is 54%, and 67% of the standard deviation of the change in flows to Chapter 7, which is 24%. A similar patter is estimated for the 4 quarter ahead horizon.

The corresponding estimates for Chapter 13 suggests that there is no relation between the rise in attorney fees and the change in the flows from new insolvency to Chapter 13 filing associated with the reform. Since the fees for Chapter 13 increased by similar magnitudes to 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	-0.46 (-3.06)	-0.293 (-2.67)
N	88	88
	New Insolvency to Ch 13	
Change in Ch 13 Fees	-0.017 (-0.03)	-0.22 (-0.60)
N	87	87

T-statistics in parenthesis. Robust to adjustment for generated regressors. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

For robustness, we also conduct 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.

Results by credit score Based on our findings on the variation in the aggregate decline in Chapter 7 bankruptcy filings by credit score, we revisit this relation at the district level. To do so, we repeat the two step estimation procedure for quantifying 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. 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. An increase in attorney fees of 1 log points reduces the 1 quarter ahead transition from a new insolvency to Chapter 7 filing by 0.33 log points for borrowers in the first quartile of the credit score distribution, and by 0.36 log points for borrowers in the second quartile. These coefficients are significant at the 1% level and are similar to the coefficients for the transition at the 4 quarter horizon. 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 Section 3.1, reinforce the hypothesis that the driving force behind the responses are liquidity constraints.

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	-0.331 (-2.00)	-0.364 (-2.13)	-0.610 (-1.24)	0.303 (0.49)
N	88	88	88	88

1Q ahead transitions by 4Q lagged Equifax Risk Score quartile. T-statistics in parenthesis. Robust to adjustment for 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 different sub-periods. 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. We re-estimate both stages of our regression for each time period. The results are reported in Table 5. Not surprisingly, though there is a very significant negative relation between the change in attorney fees and the change in the transition even in the pre-recession period, the magnitude is relative small, with only a 0.18 decline in the flow into Chapter 7 filing for a 1 log point increase in the attorney fees. For the credit slump period, the decline in the transition from a new insolvency to Chapter 7 filing is 0.51 for every log point increase in attorney fees. 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.

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	-0.177 (-1.81)	-0.512 (-3.01)
N	88	88
	New Insolvency to Ch 13	
Change in Ch 13 Fees	-0.032 (-0.08)	0.254 (0.36)
N	87	74

1Q ahead transitions. T-statistics in parenthesis. Robust to adjustment for generated regressors. Pre-recession: 2005Q4-2007Q3. Credit slump: 2007Q4-2011Q1. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

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 here 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 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, and also examine the substitution from Chapter 7 and Chapter 13 bankruptcy to other outcomes. 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, and negative otherwise.[18] The magnitude of the effect is sizable, with the a change in fees from the

[18]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.

median to the 90th percentile corresponding approximately to a 1 percentage decline in the Chapter 7 bankruptcy rate. 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. We also find that new delinquencies in the Pre-Recession phase increase with the change in Chapter 7 fees for changes smaller than approximately 0.35 log points and decrease for higher changes The change in new delinquency rates is negatively related to the change in Chapter 13 fees for the Credit Slump period. The magnitude of these relations based on the estimates is negligible, confirming the notion that the incidence of new delinquencies did not substantially respond to BAPCPA.

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

Exogeneity of the change in attorney fees One 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 filing costs and their changes 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.[19]

The results are presented in Table 6. The top panel reports estimates for the relation between post-reform attorney fees and district level economic indicators. There is a positive and significant relation between post-reform fees and personal disposable income and house

[19] 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.

prices, suggesting the attorney fees are increasing with household income and wealth at the district level. This may be driven by the cost of doing business, since house prices are typically positively related to rental rates, which is a large component of expenditures for law practices. There is no relation between the change in attorney fees and income or housing values, or any relation between the unemployment rate and the post-reform 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. A higher level of the homestead exemption and a higher garnishment limit are significantly positively related to post-reform Chapter 7 attorney fees, but not related to the change in fees around the reform. Recourse states have significantly lower post-reform Chapter 7 attorney fees, but there is no relation between recourse and the change in fees. Judicial foreclosure is not related with post-reform fees in any significant way, however, it is negatively related to the change in fees, suggesting that states with judicial foreclosures experience a smaller rise in attorney fees.

The bottom panel considers the relation between pre-reform behavior and the level and 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 are jointly endogenous with variables that could potentially influence filing decisions and filing costs. Based on these results, we maintain that the post-BAPCPA level and change in Chapter 7 attorney fees is plausibly exogenous.

4.1 Substitution from Bankruptcy

In the previous section, we show that the reform was associated with a decline in the transition to Chapter 7 bankruptcy. The drop in flows from new insolvency to Chapter 7 bankruptcy must be associated with a rise in transition to other outcomes, such as insol-

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

Panel I: Economic Indicators				
	Income	Unemployment	HPI	
Post-Reform Fees	0.43 (3.38)	-0.02 (0.18)	0.64 (2.93)	
R squared	0.11	0	0.08	
Log Change	-0.03 (0.31)	-0.04 (0.53)	-0.08 (0.44)	
R squared	0	0	0	
N	89	89	85	
Panel II: Regulatory Variables				
	Homestead	Garnishment	Recourse	Judicial
Post-Reform Fees	0.04 (2.64)	0.0002 (1.91)	-0.17 (2.96)	-0.04 (0.81)
R squared	0.08	0.04	0.09	0.008
Log Change	-0.005 (0.42)	-0.0002 (2.40)	-0.04 (0.93)	-0.12 (3.30)
R squared	0.002	0.06	0.01	0.11
N	89	89	89	89
Panel III: Pre-BAPCPA Behavior				
	Bankruptcy	Foreclosure	Insolvency	
Post-Reform Fees	- 0.01 (0.93)	-0.05 (0.76)	-0.008 (0.09)	
R squared	0.01	0.007	0	
Log Change	0.005 (0.46)	-0.003 (0.06)	-0.02 (0.28)	
R squared	0.002	0	0	
N	89	89	89	

Numbers in parentheses are the absolute values of 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.

vency, Chapter 13 filing or returning to current. Below, we quantify these substitution effects, by using a regression approach similar to the one used in the previous section. Specifically, we run the same first stage regression as in (2) in order to capture the district-specific mean change in flows associated with the reform. In the second step of our estimation procedure, we regress the district mean effects for other outcome states, $\{\beta_i^{ins \to y}\}$ estimated in the first stage, on the district dummies estimated for flows into Chapter 7 bankruptcy filings:

$$\beta_i^{ins \to y} = \gamma_0 + \gamma_1 \beta_i^{ins \to bank7} + \nu_i. \quad (4)$$

The estimated coefficient γ_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.

Substitution to Insolvency Our analysis indicates that the most robust pattern in the data is a substitution from Chapter 7 filing to Insolvency. Starting from a new insolvency, the mean drop in transition to Chapter 7 is associated with an increase in the transition to insolvency by 2.3 percentage points at the 1 quarter horizon and 7 percentage points at the 4 quarter horizon, reported in panel A in Table 7. These effects are very large when compared to the cross sectional standard deviation of the change in the transitions from a new insolvency to insolvency, that is $\beta^{ins \to ins}$, which in the previous section was estimated to be 3.2% at the 1 quarter horizon and 5.5% 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 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.

We also consider the extent of the substitution from a Chapter 7 filing to insolvency 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. For the entire post-reform period, the negative relation between the transition into Chapter 7 filing and the transition to insolvency from a new insolvency is significant and sizable for the first 3 quartiles of the 4 quarter lagged credit score distribution, with a 1 log point reduction in the transition into Chapter 7 filing associated with approximately a 5 percentage point rise in the transition to insolvency for borrowers with credit score below the median. Considering the estimates by sub-period, the patterns are similar but the magnitude of the substitution into insolvency is larger, averaging 7.8 percentage points for the pre-recession period and

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	-0.043 (-3.37)	-0.13 (-4.48)
N	88	88
	B. New Insolvency to Insolvency by Time Period	
4Q Horizon	Pre-recession	Credit slump
New Insolvency to Ch 7	-0.186 (-4.36)	-0.125 (-4.73)
N	88	88

T-statistics in parenthesis. Robust to adjustment for 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. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

10.1 percentage points for the credit slump period for borrowers with below median credit scores.

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	-0.054 (-3.45)	-0.044 (-2.77)	-0.044 (-2.36)	0.066 (1.61)
	B. Pre-recession			
New Insolvency to Ch 7	-0.093 (-2.20)	-0.062 (-1.22)	-0.019 (0.18)	-0.093 (-1.13)
	C. Credit slump			
New Insolvency to Ch 7	-0.074 (-1.66)	-0.128 (-3.90)	-0.113 (-0.85)	-0.180 (-1.41)
N	88	88	87	79

4Q ahead transitions. T-statistics in parenthesis. Robust to adjustment for generated regressors. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

Substitution to Other Outcomes We also consider the substitution from Chapter 7 filing to all other outcomes, and report the corresponding estimates in Table 9. We first consider the transition from a new insolvency to being current. The estimates suggest that a 1 log point decline in the transition from a new insolvency to Chapter 7 filing is associated with a 10 percentage point rise in the transition from new insolvency to current at the 4 quarter horizon, with the coefficient significant at the 5% level. 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 not 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, we find that there is a small positive relation with the transition to Chapter 7. At the 1 quarter horizon, a 1 log point decline in the transition from a new insolvency to Chapter 7 filing is associated with a 1 percentage point decline in the transition to foreclosure, though this estimate is only significant at the 10% level. The magnitude is larger at the 4 quarter horizon, where the estimated coefficient implies a 2.5 percentage point decline in transitions to foreclosure and is significant at the 5% level. 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 over 1 log point at both the 1 and 4 quarter horizon, with the estimated coefficients significant at the 5% level.

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 did not steer potential Chapter 7 filers to Chapter 13, as found in Cornwell and Xu (2014). This 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 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, but incorporates the district level variation in the change in attorney fees, which seems to be a stronger determinant of the incentive to file for Chapter 7. 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.

Table 9: Substitution from Chapter 7 Bankruptcy Filing

Horizon	1Q	4Q
	A. New Insolvency to Current	
New Insolvency to Ch 7	-0.038 (-0.90)	-0.1 (-2.62)
N	88	88
	B. New Insolvency to Foreclosure	
New Insolvency to Ch 7	0.008 (1.77)	0.025 (2.56)
N	88	88
	C. New Insolvency to Chapter 13	
New Insolvency to Ch 7	1.01 (1.99)	1.08 (2.55)
N	74	87

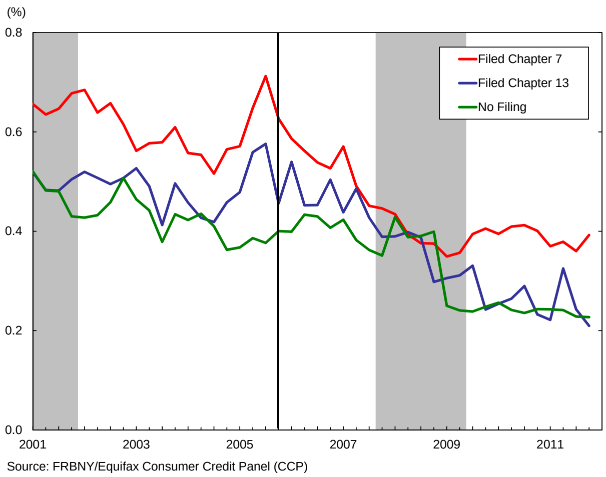
T-statistics in parenthesis. Robust to adjustment for generated regressors. Source: Authors' calculations based on FRBNY's CCP/Equifax Data.

Unconditional Transitions The Online Appendix also reports a substitution analysis for unconditional transitions. We find very strong evidence of substitution from Chapter 7 bankruptcy for the unconditional transitions. Specifically, for new delinquency rates, we find a significant negative relation between the change in Chapter 7 filing rates and the change in Chapter 13 filing rates for the entire Post-Reform period and the Credit Slump period. The elasticity is about twice as large for Chapter 13 than for Chapter 7. We also find a positive relation between the change in Chapter 7 and Chapter 13 bankruptcies and foreclosures, which is also consistent with the conditional transitions. These results broadly confirm a substitution from Chapter 7 bankruptcies to insolvency post BAPCPA, and the positive relation between the change in Chapter 7 and the change in Chapter 13 and foreclosures. In addition, we find substitution from Chapter 13 to new delinquency in the unconditional transitions, which is not present for the conditional transitions.

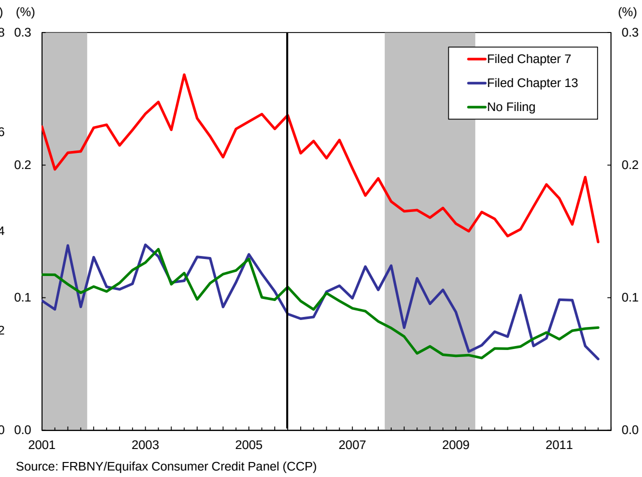
5 Insolvency, Bankruptcy and Access to Credit

Our analysis shows a sizable substitution from Chapter 7 bankruptcy to insolvency without foreclosure from a new insolvency, and a rise of the persistence of insolvency without foreclosure. 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.

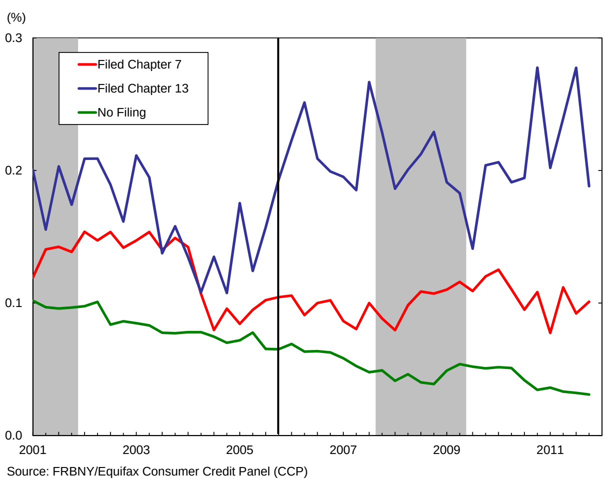
We first examine the differences in access to credit. Panels A to C in figure 8 display the fraction of individuals with at least one new unsecured line of credit, auto loan or mortgage origination in quarters 5-8 after the new insolvency for those who do not file and in quarters 1-4 after filing for 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 products, 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 larger 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.



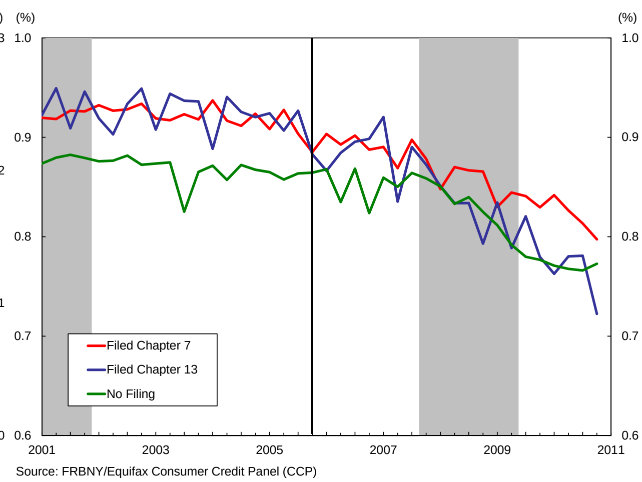
A. New unsecured lines of credit



B. New auto lines of credit



C. New mortgage originations



D. New inquiries

Figure 8: New originations and inquiries after a new insolvency by filing status

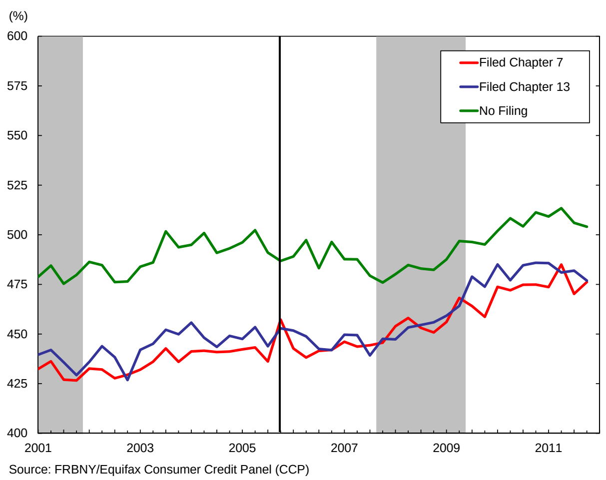
Panels A-C: Fraction of newly insolvent individuals who exhibit a new unsecured, auto or mortgage origination either 4 quarters after filing for Chapter 7 and Chapter 13 bankruptcy, or 8 quarter after the new insolvency if they do not file. Panel D: Average number of new inquiries for newly insolvent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

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 8 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 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.[20]

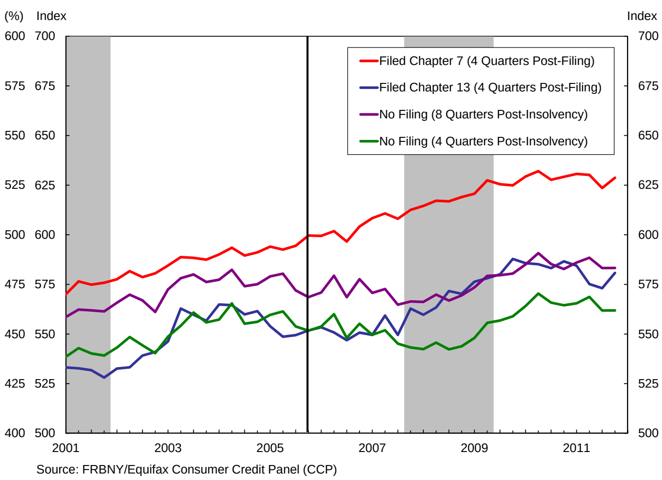
To conclude, we examine the variation in credit scores by filing status, at the time of the new insolvency occurs and in an 8 quarter window following the new insolvency. Panel A in figure 9 compares credit scores at the time of the new insolvency by filing status in the 8 quarter after the new insolvency. Borrowers who eventually file for bankruptcy display 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 if credit scores have increased for both groups. However, as show in panel B of figure 9, the pattern changes after filing. Even if 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

[20]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%.

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 9: 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 incentive compatible insurance against unplanned loss of income or large expenditure shocks. Our finding that bankruptcy filings have declined mostly for 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 may not have been effective.

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, contrary to the notion proposed in Ausubel and Dawsey (2004). 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. Taken together, these findings suggest the main effect of the 2005 bankruptcy reform was to shift financially stressed individuals from Chapter 7 bankruptcy to insolvency.

References

Albanesi, Stefania, Giacomo De Giorgi, and Jaromir Nosal. 2017, August. "Credit Growth and the Financial Crisis: A New Narrative." Working paper 23740, National Bureau of Economic Research.

Athreya, Kartik B. 2002. "Welfare implications of the bankruptcy reform act of 1999." *Journal of Monetary Economics* 49 (8): 1567–1595.

Ausubel, Lawrence, and Amanda Dawsey. 2004. "Informal bankruptcy." *Work. Pap., Dep. Econ., Univ. Maryland.*

Chakravarty, Sugato, and Eun-Young Rhee. 1999. "Factors affecting an individual's bankruptcy filing decision." *Available at SSRN 164351.*

Chatterjee, Satyajit, Dean Corbae, Makoto Nakajima, and José-Víctor Ríos-Rull. 2007. "A Quantitative Theory of Unsecured Consumer Credit with Risk of Default." *Econometrica* 75 (6): 1525–1589.

Cornwell, Christopher, and Bing Xu. 2014. "Effects of the BAPCPA on the chapter composition of consumer bankruptcies." *Economics Letters* 124 (3): 439–442.

Domowitz, Ian, and Thomas L Eovaldi. 1993. "The Impact of the Bankruptcy Reform Act of 1978 on Consumer Bankruptcy." *Journal of Law & Economics* 36:803.

Domowitz, Ian, and Robert L Sartain. 1999. "Determinants of the consumer bankruptcy decision." *The Journal of Finance* 54 (1): 403–420.

Eraslan, Hulya, Gizem Kosar, Wenli Li, and Pierre-Daniel G Sarte. 2014. "An anatomy of us Personal bankruptcy under chapter 13."

Fay, Scott, Erik Hurst, and Michelle J White. 2002. "The household bankruptcy decision." *American Economic Review* 92 (3): 706–718.

Grochulski, Borys. 2010. "Optimal personal bankruptcy design under moral hazard." *Review of Economic Dynamics* 13 (2): 350–378.

Gross, David B, and Nicholas S Souleles. 2002a. "Do Liquidity Constraints and Interest Rates Matter for Consumer Behavior? Evidence from Credit Card Data." *The Quarterly Journal of Economics* 117 (1): 149–185.

———. 2002b. "An empirical analysis of personal bankruptcy and delinquency." *Review of Financial Studies* 15 (1): 319–347.

Gross, Tal, Matthew J Notowidigdo, and Jialan Wang. 2012. "Liquidity constraints and consumer bankruptcy: Evidence from tax rebates." *Review of Economics and Statistics*, no. 00.

Han, Song, and Geng Li. 2011. "Household borrowing after personal bankruptcy." *Journal of Money, Credit and Banking* 43 (2-3): 491–517.

Jagtiani, Julapa, and Wenli Li. 2014. "Credit access after consumer bankruptcy filing: new evidence."

Johnson, David S, Jonathan A Parker, and Nicholas S Souleles. 2006. "Household Expenditure and the Income Tax Rebates of 2001." *The American Economic Review*, pp. 1589–1610.

Jones, Yvonne D. 2008. *Bankruptcy Reform: Dollar Costs Associated with the Bankruptcy Abuse Prevention and Consumer Protection Act Of 2005.* DIANE Publishing.

Lawless, Robert M., Angela K. Littwin, Katherine Porter, John Pottow, Deborah Thorne, and Elizabeth Warren. 2008. "Did bankruptcy reform fail? An empirical study of consumer debtors." *American Bankruptcy Law Journal* 82:349–406.

Lee, Donghoon, and Wilbert van der Klaauw. 2010. "An Introduction to the FRBNY Consumer Credit Panel." FRBNY Staff Report 479.

Livshits, Igor, James MacGee, and Michele Tertilt. 2007. "Consumer bankruptcy: A fresh start." *The American Economic Review* 97 (1): 402–418.

———. 2010. "Accounting for the Rise in Consumer Bankruptcies." *American Economic Journal: Macroeconomics* 2 (2): 165–193.

Lupica, Lois R. 2012. "The Consumer Bankruptcy Fee Study: Final Report." *Am. Bankr. Inst. L. Rev.* 20:17–759.

Mann, Ronald J, and Katherine Porter. 2009. "Saving up for Bankruptcy." *Geo. LJ* 98:289.

Mitman, Kurt. 2016. "Macroeconomic effects of bankruptcy and foreclosure policies." *American Economic Review* 106 (8): 2219–55.

Norberg, Scott, and Andrew Velkey. 2007. "What Do We Know About Chapter 13 Personal Bankruptcy Filings?" *manuscript*.

Parker, Jonathan A, Nicholas S Souleles, David S Johnson, and Robert McClelland. 2013. "Consumer Spending and the Economic Stimulus Payments of 2008." *The American Economic Review* 103 (6): 2530–2553.

Sullivan, Teresa A, Elizabeth Warren, and Jay Lawrence Westbrook. 1994. "Consumer debtors ten years later: A financial comparison of consumer bankrupts 1981-1991." *Am. Bankr. LJ* 68:121.

———. 2006. "Less stigma or more financial distress: An empirical analysis of the extraordinary increase in bankruptcy filings." *Stanford Law Review*, pp. 213–256.

Townsend, Robert M. 1979. "Optimal contracts and competitive markets with costly state verification." *Journal of Economic theory* 21 (2): 265–293.

White, Michelle J. 2007. "Bankruptcy reform and credit cards." NBER Working Paper 13265.

White, Michelle J., and Ning Zhu. 2010. "Saving Your Home in Chapter 13 Bankruptcy." *The Journal of Legal Studies* 39 (1): 33–61.

Zhu, Ning. 2011. "Household consumption and personal bankruptcy." *The Journal of Legal Studies* 40 (1): 1–37.

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 datasets 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 datasets 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 datasets 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 Services (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 Statisticss (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 estiamted 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 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.

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.

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* × *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.

B.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. The implied relation between credit score and income by age is plotted in figure 10.

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.

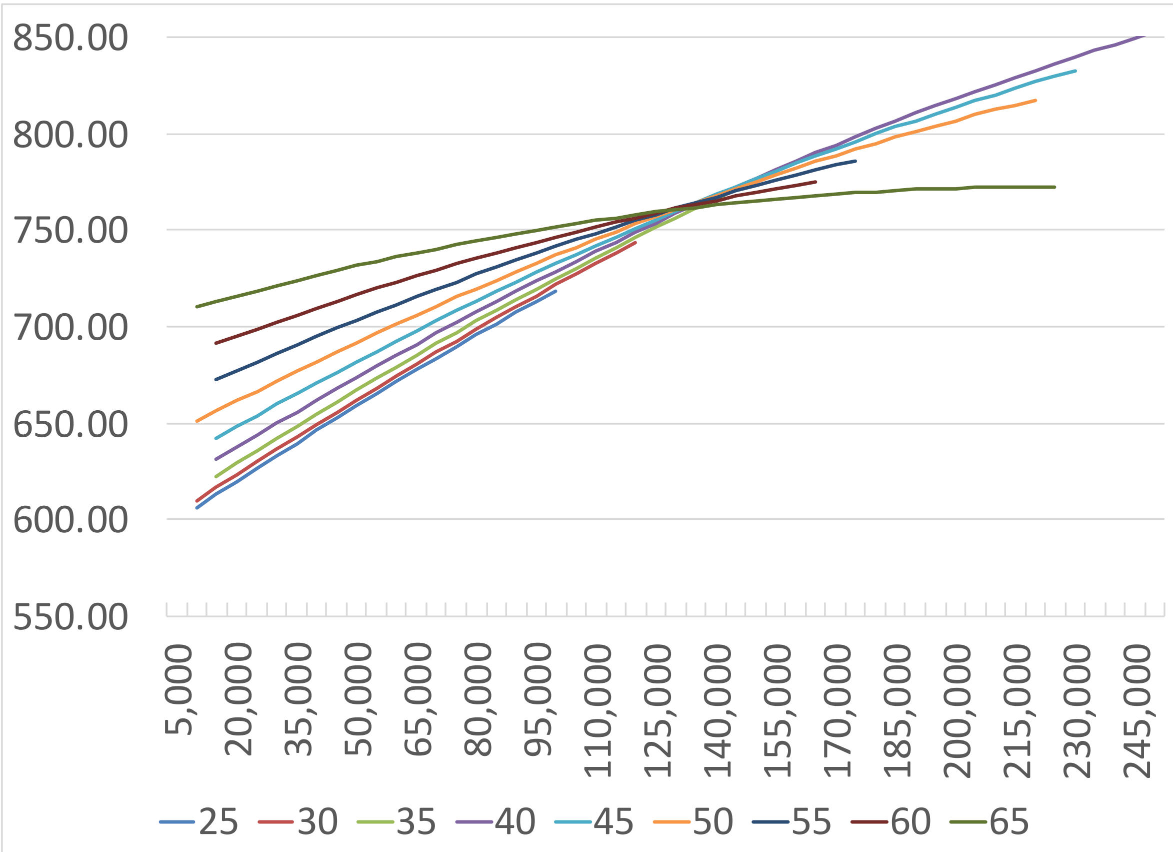


Figure 10: Relation between credit score and income by age. Source: Authors' calculations based on the Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.