Three Essays on the Effects of the Bankruptcy Abuse Prevention and Consumer Protection Act

by

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(Under the direction of Christopher M. Cornwell)

Abstract

The Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) which was passed in 2005 significantly reshaped the bankruptcy laws in the U.S. In this dissertation, using different datasets and estimation methods, I test the effects of the BAPCPA at both the state and individual levels. In chapter 2, I use the difference-in-difference estimation method to estimate the effects of the homestead restrictions and "means test" mandated under the BAPCPA on chapter composition, using panel data state-level bankruptcy filings, from 1998 to 2007. I find that both the restrictions on the homestead exemption rules and the means test increase the percentage of chapter 13 filings. The results suggest that the BAPCPA discouraged petitioners from moving to states with higher homestead exemption levels.

In chapter 3, I introduce a dataset I collected from the petition forms of the bankruptcy cases filed in the northern district of the Georgia bankruptcy court, for the period from 2003 to 2008.I provide a comprehensive description of the underlying data and the creation of the sample of petitioners that is the basis for my analyses of the effects of the BAPCPA in the later chapter.

In chapter 4, I examine the effects of the BAPCPA on petitioner behaviors, using the unique dataset introduced in chapter 3 and non-parametric covariate matching estimation.

I match the pre-BAPCPA petitioners to the post-BAPCPA petitioners on their personal characteristics and compare their percentages of total debt that is unsecured, percentage of unsecured debt associated with credit cards, monthly income, monthly payments to creditors and their legal costs. For both chapters 7 and 13 petitioners, I find increases on their percentage of total debt that is unsecured and the percentage of unsecured debt that is associated with credit card. In addition, petitioners' monthly income decreased and monthly payments to creditors increased and legal costs of filing also increased after the BAPCPA. The results are consistent with petitioners either increasing their potential dischargeable debt to compensate for the increased costs of filing or avoiding bankruptcy entirely because of the increase in costs. Finally, after the BAPCPA petitioners rely more heavily on bankruptcy lawyers to help to gain larger financial benefits, conditional on filing.

INDEX WORDS: Consumer bankruptcy, BAPCPA, Chapter 13, Chapter 7, Treatment effect analysis, Difference-in-differences, Non-parametric estimation, Covariate matching, Nearest-neighbor matching, PACER

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Dedication

To my beloved parents, Heping Xu and Dandan Wang for their everlasting love, trust and encouragement...

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Chapter 1

Introduction

1.1 Background on the BAPCPA and the U.S. Bankruptcy Law

On October 17, 2005, the U.S. congress enacted the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA.) It significantly redefined the standards and requirements for petitioners filing consumer bankruptcy prior to the BAPCPA, U.S. bankruptcy law was defined by the bankruptcy code of 1978. Since 1978, there have been changes to the law, but none were as significant as those established by the BAPCPA.

The primary reason for the 2005 reforms was pressure from credit card and loan companies, which sought a tightening of regulations to reduce their risks. The BAPCPA brought many changes, most of which had the goal of increasing the costs and standards of filing for petitioners. Policy makers defended the new law as a means to rule out opportunists who were abusing the bankruptcy system. Before the BAPCPA, consumer bankruptcy law in the U.S. was probably the most pro-debtor in the world.

Consumers can file under two chapters: 7 and 13. The major difference between them is how a petitioner's outstanding debt must be paid. When a petitioner files under chapter 7, the value of her assets above an exemption level would be used to repay outstanding debt. "Assets" in consumer bankruptcy are typically calculated by adding real estate properties, cash on hand, and other properties such as automobiles or valuable possessions. Bankruptcy exemptions fall into two categories: homestead and property. In most cases, the homestead exemption constitutes a relatively larger percentage of exemption during a bankruptcy; and it is easy to calculate, because, in general, it would be the value of the house that one possesses at the time of filing. If a petitioner lives in a state with a generous homestead

exemption, she can protect her house and write off her debt at little cost. For those who own a house but live in a state with a low homestead exemption, it was easy before the BAPCPA for them to move to a state with a better homestead exemption level to file. Chapter 7 made bankruptcy filings very attractive to debtors, because once the court rules, creditors no longer have any legal rights to hold debtors responsible.

Unlike under chapter 7, creditors and chapter 13 petitioners have a future relationship even after the bankruptcy case is filed and closed. Under chapter 13, petitioners's assets are protected, but they are required to withdraw a portion of their income over the next five years for debt repayment. Compared to chapter 7, chapter 13 appears less attractive to bankruptcy petitioners. In fact, chapter 7 filings have always been higher than chapter 13 filings in the U.S. Nevertheless, chapter 13 is usually the choice of homeowners. In addition, wealthy people without jobs often choose to file under chapter 13, because they have not recently worked and do not plan on working in the near future. Those petitioners use chapter 13 to protect their assets from being factored into their debt repayment plan.

The passage of the BAPCPA reshaped U.S. bankruptcy law. As I have mentioned, early in the decade, credit card and loan companies lobbied for a stricter and less "pro-debtor" consumer bankruptcy law in the U.S. The act brought about many provisions and modifications to the existing law, two of the most important of which were restrictions on how homestead exemptions can be applied and a means test for limiting a petitioner's right to file chapter 7. Homestead exemptions were affected in three ways. First, now when a petitioner moves to a new state within two years prior to filing chapter 7, she must use the homestead exemption in the state she is originally from. Second, if a home is purchased within 2.5 years prior to filing chapter 7, the homestead exemption is capped at $\$125,000$. Third, any additional equity converted from a nonexempt asset (by paying down a mortgage) within 3.5 years prior to filing chapter 7 cannot be exempted. The legislation did not change the federal homestead exemption level, nor restrict a state's right to impose its own exemption level.

The first restriction was made to prevent "opportunists" from exploiting differences in state homestead exemption levels to hide assets. However, there is no scholarly evidence on the extent of such opportunism. White [1] argues there are few such petitioners due to the high transaction cost of moving. The other two restrictions also indirectly discourage potential filers to hide their assets before filing in order to pay less debt and receive higher benefits.

Capturing the extent of such opportunism is, in principle, possible after the passage of the BAPCPA. If states with more generous homestead exemption rules experience a greater decrease in chapter 7 filings after the BAPCPA, then we may infer that some filer moved to other states with high exemptions to file. In chapter 2, I employ difference-in-difference estimation using state-level panel data on the number of filings by chapter and demographic characteristics, covering the 1998–2008 period to estimate the changes in chapter composition due to the BAPCPA. I compare the changes in the percentage of chapter 13 filings before and after the BAPCPA across two groups of states: those with the ratio of a homestead exemption to median housing price greater than 1 and rest of the states. I find larger increases in percentage chapter 13 filings in the states with better homestead exemption levels, consistent with the hypothesis that there were petitioners move to other states to file for better homestead exemptions.

Another important modification of the 2005 BAPCPA is the "means test", which essentially abolishes petitioner's free choice between chapters. After the enactment of the BAPCPA, petitioners whose incomes are higher than their state median incomes are required to take a means test. The test calculates a petitioner's disposable income to her ability to pay debt. If a petitioner's annual income exceeds $166.67 after deduction of necessary living costs, she is required to file under Chapter 13 or not at all; Chapter 7 is no longer an option.

In chapter 2, I also test the effect of the means test provision on chapter composition at state level. Again, using a difference-in-difference estimation method, I assign states to the treatment and control groups by a state's population share with income above the state

median and below the mean. States with a 13.4 percent [1] population share or more within that area of the income distribution are assumed to be more affected by the means test. I find an increase on the percentage of chapter 13 filings in the treatment states after the BAPCPA. The result supports that the means test has induced more petitioners file for chapter 13.

Beside these two major provisions, the BAPCPA also generally increased costs and standards under both chapters. For chapter 7 petitioners, the filing cost increased from \$600 to $\$2,500$ and from $\$1,600$ to $\$3,500$ for chapter 13 cases. The required length between two filings also increased, from 6 to 8 years for chapter 7 filers and from 6 months to 2 years for chapter 13 petitioners (White [2]).

The bankruptcy decision is based on a simple comparison of costs and benefits. For those who file for bankruptcy after the BAPCPA, the potential financial benefit they receive should be higher than their pre-reform counterparts to compensate the increased filing costs. Thus, I test this by comparing the percentage of total debt that is unsecured and the percentage of the unsecured debt that is associated with credit cards of the post-BAPCPA filers with those individuals who filed before 2005. I focus on these two percentages because the unsecured debt, and credit-card debt in particular, is dischargeable and easy to generate. These hypotheses are tested using non-parametric covariate matching estimation and a dataset contains information on about $5,000$ individual petitioners who filed in Georgia from 2003 to 2008. The dataset is constructed by collecting information from the petition forms of bankruptcy petitioners; these petition forms are for public view through the Public Accessed Court Electronic Record (PACER) system. I find increases in both the percentages of total debt that is unsecured and unsecured debt that associates with credit cards after the BAPCPA, for each petitioner type.

The BAPCPA should have affected other features of the petitioner's profile as well. In chapter 4, I also test whether the reforms affected reported monthly income and monthly

[1] 13.4 percent is the median of the population share with income above the median and below the mean variable.

payments to creditors. I find decreases in monthly income and increases in monthly payments to creditors for each petitioner type. This suggests that after the BAPCPA, those who are deliberately generate more dischargeable debt before filing fell because such petitioners would be less likely to make regular monthly payments to creditors before filing for bankruptcy.

The BAPCPA includes two changes that only apply to chapter 13 filings. First, after the BAPCPA was enacted, chapter 13 petitioners could no longer propose their own repayment plan and the length of the repayment are now restricted to five years; before the BAPCPA, chapter 13 petitioners could propose their own repayment plan and the length can vary from three to five years. Second, the "super discharge" was abolished. Before the BAPCPA, the courts tried to promote voluntary chapter 13 filings as opposed to chapter 7 by allowing chapter 13 petitioners to be able to discharge more types of debts, such as student loans.

Both changes have decreased the potential benefit a petitioner can receive from filing chapter 13. The nature of the repayment plan directly affects the total financial benefit of a chapter 13 petitioner. Because the judge decides the final version of the repayment plan, having an experienced lawyer who is familiar with what income and expenses to propose would not only help to expedite the filing, but substantially increase the amount of actually dischargeable debt. In chapter 4 of the dissertation, I again use non-parametric covariate matching estimation and the PACER dataset to estimate the effect of the BAPCPA on the legal cost of bankruptcy petitioners. I find estimated increases in legal cost for both chapters of petitioners and especially for chapter 13 petitioners.

1.2 Literature Review

The empirical literature on consumer bankruptcy has generally ignored the BAPCPA. However, there are several studies that provide some background for my dissertation and I review them below.

Domowitz and Sartin [3] used similar data as the PACER data I employ in chapter 4. Their data were generated by the United States General Accounting Office (USGAO, 1983),

the dataset contains 575 Chapter 7 cases and 252 Chapter 13 cases. However, Domowitz and Sartin [3] matched their data from the USGAO with the Survey of Consumer Finances (SCF) to create a sample with both bankrupt and non-bankrupt households. Using a nested logit model, they examined the roles of adverse shocks, such as unemployment in the bankruptcy decision.

Domowitz and Sartin [3] found that medical bills had the largest impact on the filing decision, and that homeownership deterred bankruptcy. In addition, they found that the single largest impact on the probability of filing was the amount of credit-card debt. Medical bills, on the other hand, had the greatest sensitivity in the relevance to other unsecured debt, for example, a household with substantial medical bill has roughly 1.5 times higher increase in the probability of filing, compared to those with medical bills less than 2% of their total unsecured debt, if the household's credit-card debt rise to the level of bankruptcy.

In addition, they also estimated the conditional probability of filing under one chapter versus the other. Domowitz and Sartin asked the question of "what household conditions would make a typical chapter 7 household more likely to file for chapter 13 protection?" They found that giving the household has otherwise similar characteristics as a chapter 7 household, being married and employed increases the household's conditional probability to file chapter 13. The fact that marriage increases chapter 13 probability is reasonable, because real property is sometimes a by-product of marriage. However, the fact that employment also increases the conditional probability of chapter 13 is harder to understand, because future income is not protected from being used to pay outstanding debt. Domowitz and Sartin did not give a detailed explanation for this result in their paper. It could be that because most of the chapter 13 petitioners seek help through bankruptcy to either protect their house from being foreclosed, or to rebuild their current financial situation; then it is reasonable to believe that such petitioners have higher likelihood of being employed. Domowitz and Sartin also estimated the effect of lowering the exemption levels on both homestead and personal properties, and predicted that it would increase the probability of chapter 13. They proposed

this idea as a way to induce more chapter 13 filings; however, as we know today, it was not one of the changes included in the BAPCPA.

This paper was the first one to employ the court data which provides information on individual bankruptcy petitioners. However, the sample period for the dataset used in this paper was only one year, whereas the PACER dataset I constructed for the later chapters in this dissertation has a sample period of six years, therefore, using observations from before and after the BAPCPA, by comparing their estimated differences, I can observe the effects of the law change.

Fay, Hurst and White [4] used the Panel Study of Income Dynamics (PSID) dataset to test the hypothesis that U.S. household bankruptcy decisions are related to the financial benefits they receive from filing. This hypothesis is supported by the idea of a strategic bankruptcy model introduced by Fay, Hurst and White, as opposed to the nonstrategic model, which argues that the decision for filing consumer bankruptcy is mainly because of adverse selection such as illness or unemployment.

Fay, Hurst and White [4] used 1984-1995 waves of the PSID. The PSID questioned participants about bankruptcy in 1996 by asking whether they ever filed, and if so, in what year. The obvious concern with their sample was selection. As the authors pointed out in the paper, the correlation between the national rate and the PSID rate is 0.67, which means that the PSID only has about the half of the national rate. Despite this problem, the authors did find evidence supporting their prediction that as the financial benefit from filing increases, the probability that a household will file for bankruptcy increases as well, using a probit regression model. In addition, they found little evidence supporting the nonstrategic bankruptcy model.

For my purposes, Fay, Hurst and White [4] clarifed the financial benefit that petitioners receive from filing for bankruptcy. They calculated it as the maximum value of, 0 or the difference between expected dischargeable amount and the maximum value of, 0 or the household's wealth beyond an exemption level. Household's wealth (assets) above an exemp-

tion level could not be protected and would be used to pay any outstanding debt; therefore, if a household could exempt all of its assets, the financial benefit they receive from filing for bankruptcy would be their total amount of discharged debt. Although this equation was set up for the chapter 7 petitioners, Fay, Hurst and White argued that it could also be applied to chapter 13 petitioners because before October 2005, petitioners could freely choose which chapters to file, therefore the benefit they received from either chapter were highly correlated with each other.

The idea of this strategic bankruptcy model is adopted in chapter 4 of this dissertation. Assuming that this model is true, then as the costs of filing increase due to the BAPCPA, an increase in the amount of potential dischargeable debt should also be expected. Using the PACER dataset and non-parametric covariate matching, I find that the percentages of dischargeable debt such as unsecured debt and credit-card debt both increase after the BAPCPA, which is consistent with the idea of the strategic bankruptcy model.

White and Zhu [5] found that the intention to save homes from being foreclosed was the primary motivation for chapter 13 filings. White and Zhu collected a dataset containing bankruptcy related information on 586 bankruptcy petitioners who filed in Delaware in 2006. The information was gathered from the petition forms and repayment plans of these 586 petitioners, which were publicly available on the PACER.

Within the dataset there was a large percentage of chapter 13 petitioners with incomes that pass them the means test, who still voluntarily file for chapter 13. White and Zhu [5] argued that one of the reasons for this behavior was that Delaware had a homestead exemption of $\$50,000$. However the average home equity of these petitioners exceeded that amount, so if these petitioners were to file chapter 7, they would have to sell their houses and pay for partial outstanding unsecured debt. In addition, most of these petitioners proposed to pay the secured debt on their houses in their repayment plans and only 9% of which only proposed to pay unsecured debt.

White and Zhu [5] argued that these findings support the idea that the most chapter 13 petitioners are homeowners. They choose to file under this chapter to prevent their houses from being foreclosed. Because foreclosure is a costly procedure for the creditor and debtor, once a petitioner files for chapter 13, the court grants the petitioner additional time allowance to make her next mortgage payment. By discharging unsecured debt, petitioner can also relax her budget constraint, thus will be more easily to start making regularly mortgage payments. In addition, the BAPCPA introduces a homeowner subsidy, which reduces the debtor's obligation to repay unsecured debt by a dollar for each additional dollar of secured debt on the real property. Altogether, this makes chapter 13 a favorable choice for homeowners.

White and Zhu [5] also used the same dataset to perform a stimulation study to compare the homeowner subsidy to allowing cram-down mortgage in chapter 13, for attracting more homeowners at the margin to file for chapter 13 instead of defaulting. Cram-down mortgages were suggested by White and Zhu as an alternative option to attract more homeowners to file for chapter 13 in protecting their houses from defaulting. Under this policy, the judge can forgive partial mortgage debt of the house owners if the value of the secured debt on the house exceeds its current market value. White and Zhu found that compared to the homeowner subsidy, which only increased the percentage people within their dataset filing for chapter 13 instead of defaulting on the house by 1 percentage point, the cram-down mortgage increased this percentage by 10 folds.

White and Zhu [5] were trying to identify the characteristics of chapter 13 petitioners; and the roles that their real estate assets play in their bankruptcy decisions after the BAPCPA. Their sample year was 2006; therefore they concluded that even after the BAPCPA, chapter 13 filers chose to file under this chapter with the intention to save their home. While this conclusion might be reasonable to some level, it was not convincing enough to say that the BAPCPA had no effect on the chapter choice of petitioners. In fact, in chapter 2, I find positive effects of two reforms under the BAPCPA on the percentage of chapter 13 at state level. In addition, although the major motivation of chapter 13 petitioners might still be

the same after the BAPCPA, profiles of chapter 13 petitioners might be different due to the legal reform. Using a similar dataset on individual petitioners as White and Zhu [5], however, covering the period from 2003 to 2008, I find the BAPCPA affected the characteristics of chapter 13 petitioners, such as their debt structures, ability to pay and legal costs.

1.3 Contributions

This dissertation's major contribution is to evaluate the effects of the BAPCPA. In the following chapters of the dissertation, I first use a state level dataset to test for the effect of the two major changes under the BAPCPA on chapter composition, at the aggregate level. I also construct a dataset including about information on about $5,000$ bankruptcy petitioners who filed in Georgia, from 2003 to 2008, which allows me to test for the effects of the BAPCPA on petitioners' behaviors. Few bankruptcy studies employ actual court data. Most of the empirical papers are based on PSID or SCF data, which contain few individuals who actual filed for bankruptcy.

More importantly, each year millions of dollars are discharged through bankruptcy courts in the U.S., which makes the bankruptcy law and its provisions critical to the financial system. For the lenders, tightening of the bankruptcy law directly decreases the costs of lending, which in the long run can also help to decrease the price of lending, which is the interest rate. Therefore, the effectiveness of the BAPCPA in the direction of providing stricter bankruptcy laws is important, which I find evidence to support. On the other hand, the major goal of the bankruptcy law is still to provide those who suffer financial stress with a chance to have a fresh start. Therefore, impacts on the petitioners brought by the BAPCPA are also policy relevant. In this dissertation, I find how debt structure, ability to pay and legal costs of petitioners react to the BAPCPA.

Bibliography

[1] Michelle J. White. Personal bankruptcy under the 1978 bankruptcy code: An economic analysis. *Indiana Law Journal*, 63:1–53, 1987.

[2] Michelle J. White. Bankruptcy reform and credit cards. *Journal of Economic Perspectives*, 21(4):175–199, 2007.

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

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

[5] Michelle White and Ning Zhu. Save your home in chapter 13 bankruptcy. *Journal of Legal Studies*, 39, 2010.

Chapter 2

The Bankruptcy Abuse Prevention and Consumer Protection Act, Consumer Bankruptcy Filings and Chapter Composition

2.1 Introduction

> "U.S. households are under great financial stress today; for many, bankruptcy seems to be their best option. We expect more than 1.4 million new cases filed in 2009."
>
> - - Samuel J. Gerdano, Executive Director of American Bankruptcy Institute

In 2008, there were $1,074,225$ consumer bankruptcy cases filed in the U.S., and this number was expected to rise in 2009. Bankruptcy filings have been steadily growing in the recent decades, with the exception of 2006, when there was a sharp drop. The 2006 decline was concentrated in chapter 7 filings and a response to the passage of the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) in 2005.

In this chapter, I estimate the effects of the BAPCPA on consumer bankruptcy petitioners's behaviors precipitated. The BAPCPA was the first major bankruptcy law revision since 1978 instituting many changes and modifications. I focus on two major reforms: a set of modifications to the homestead exemption rules and a new "means test". Modifications to the homestead exemption rules added new restrictions to how personal assets could be exempted through chapter 7 bankruptcies. The new means test restricts certain petitioners' freedom of choice between chapter 7 and chapter 13. It applies to those with incomes exceeding their states' median; failure mandates a chapter 7 filing.

Consumers who face financial stress can file for bankruptcy under two chapters: chapter 7 or chapter 13. They differ in what the court requires petitioners to use to pay outstanding

debt. Generally speaking, chapter 7 petitioners' assets are exposed, whereas in chapter 13 cases, petitioners' future incomes are at stake. Therefore, future incomes can be protected for chapter 7 petitioners, while for chapter 13 petitioner asset values do not get factored into the calculation of their ability to pay their debts.

Because the 2005 BAPCPA is such recent legislation, little research has been done on its effects. However, White [1] examined the effect of variations in states homestead exemption levels on aggregate bankruptcy filing rates. Controlling for unemployment rate, divorce rate, personal income and other demographic characteristics, she estimated the relationship between county level consumer bankruptcy filing rates and the corresponding homestead exemption levels. She found that every thousand dollar increase in homestead exemption increased 0.006 chapter 7 bankruptcy filings per thousand people; and decreased 0.00044 chapter 13 bankruptcy filings per thousand people. The positive relationship of homestead exemption levels with chapter 7 filing rates and the negative relationship with chapter 13 filing rates were as expected, since higher exemption level allows more assets to be protected through bankruptcy, therefore increased the incentive to choose chapter 7. As White pointed out, her "exemption variable captures only debtor's incentives vis-a-vis exemption levels within a particular state"; it did not capture the probability that a petitioner would move to another state with a more favorable exemption level. White made the assumption that because of the high cost and the need of resource for moving, few petitioners would actually do so. However, I relax this assumption and also test whether there is the presence of such kind of petitioners.

Scheelings [2] examined the effects of raising a state's homestead exemption level on credit rationing. Scheelings used data from 1983 and 1987 Survey of Consumer Finances (SCF). The dependent variable in Scheelings' model was a binary indicator whether an individual has been denied a credit card or bank loan in the past three years. Scheelings compared denials in states that increased their homestead exemption levels with those that did not. In his difference-in-difference analysis, Scheelings found a negative and significant

estimated treatment effect. This result was consistent with predications because an increase in a state's homestead exemption level increased the probability that the residents in those states file for bankruptcy. Therefore, lenders would be less likely to make loans, because they could lose money once their debtors file for bankruptcy. Scheelings also estimated this treatment effect in logit and probit regressions, however, none of which returned significant difference-in-difference coefficients. I believe that this was because bankruptcy petitioners only constituted a very small fraction of the population, the magnitude for which homestead exemption levels affect the probability of an individual being granted a loan is expected to be insignificant.

In this chapter, I first estimate aggregate bankruptcy filings and how they are affected by different demographic and economic characteristics. This analysis lays the groundwork for my examination of the two BAPCPA reforms. Next, I employ a difference-in-difference strategy on chapter composition, taking states that are relatively more affected by the reforms as treatment group. I use data collected from the U.S. Bankruptcy Institute, which reports state-level annual bankruptcy filings, and from the Current Population Survey, which provides information on geographic and economic characteristics.

I find that both of the two reforms increase the percentage chapter 13 filings. Because the modifications to homestead exemption rules prohibit petitioners to strategically move to states with better homestead exemptions to file, therefore causing chapter 7 filings to decrease in these states, thus increase percentage chapter 13 by 2.13%. The means test tightens the requirements for filing chapter 7; as a result, I observe that in states that are categorized as "chapter 7" states, much less chapter 7 cases are filed. Compare to the control states, the means test increases percentage chapter 13 in these states by 2.14%.

2.2 Consumer Bankruptcy and the BAPCPA

Consumer bankruptcy law in the U.S. is probably the most generous in the world. Generous in the sense that it has long been "pro-debtor", where petitioners with large amount of

financial stress and little ability to repay can dispose of their debt and seek a fresh start simply by filing for bankruptcy.

Consumers can file under two chapters: 7 and 13. The major difference between them is how a petitioner's outstanding debt must be paid. When a petitioner files under chapter 7, the value of his or her assets above an exemption level would be used to repay outstanding debt. "Assets" in consumer bankruptcy are typically calculated by adding real estate properties, cash on hand, other properties such as automobiles or valuable possessions. Bankruptcy exemptions fall into two categories: homestead and property. In most cases, homestead exemption constitutes a relatively larger percentage of exemption during bankruptcy; and it is easy to calculate, because, in general, it would be the value of the house that one possesses at the time of filing. In other words, a petitioner who possesses few or no assets at the time of filing can theoretically write off all the debt he or she owns at no cost. In addition, if a petitioner has some assets, in the U.S. this value is usually dominated by one's housing value. In addition, if this petitioner lives in a state with a generous homestead exemption level, he or she can protect his or her house, and, at the same time, writes off his or her debt at little cost. For those who own a house, but live in a state with low homestead exemption, it is still possible for them to move to a state with a better homestead exemption level to file. chapter 7 has made bankruptcy filings very attractive to debt owners, and it is probably the reason why creditors have complained, because once the court rules, they no longer have any legal rights to hold debtors responsible.

Unlike under chapter 7, creditors and chapter 13 petitioners have a "future" relationship even after the bankruptcy case is filed and closed. Under chapter 13, petitioners's assets are protected but instead they are required to withdraw a portion of their income over the next five years for debt repayment. Compared to the chapter 7 option, chapter 13 appears less attractive to bankruptcy petitioners. In fact, chapter 7 filings have always been higher than chapter 13 filings in the U.S. Nevertheless, chapter 13 is usually the choice of house owners. In addition, there are also many cases where wealthy people without jobs choose to file under

chapter 13, because they have not worked recently and do not plan on working in the near future. Those petitioners use chapter 13 to protect their assets from being calculated into their debt repayment plan.

The passage of the BAPCPA reshaped U.S. bankruptcy law. As I have mentioned, early in the decade, credit card and loan companies lobbied for a stricter and less "pro-debtor" consumer bankruptcy law in the U.S. The act brought about many provisions and modifications to the existing law, two of which are the basis of the empirical questions examined in this chapter.

The BAPCPA added restrictions on how homestead exemptions can be applied. First, it requires that when a petitioner moves to a new state within two years prior to filing chapter 7, he or she must use the homestead exemptions in the state he or she is originally from. Second, if a home is purchased within 2.5 years prior to filing chapter 7, the homestead exemption is capped at $\$125,000$. Third, any additional equity converted from a nonexempt asset (by paying down a mortgage) within 3.5 years prior to filing chapter 7, cannot be exempted. The legislation did not change the federal homestead exemption level, nor restricted a state's right to impose its own exemption level and override the federal's.

The first restriction was made to prevent "opportunists" from using the variations in states homestead exemption levels to hide assets. However, there is no evidence for the extent of such opportunism. White [1] believes there is few such petitioners due to the high transaction cost of moving. Fortunately, this new restriction allows us to empirically test this assumption. If there is a considerable number of opportunists existed before 2005, after the BAPCPA was passed, we should observe a significant decrease of chapter 7 filings in those states with very high homestead exemption levels.

Other important modification of the 2005 BAPCPA is an added "means test",which essentially abolishes petitioners' freedom to choose between chapters. After the enactment of the act, petitioners whose incomes are higher than their states median income are required to take a means test. The test calculates a petitioner's disposable income to his ability to

pay debt. If a petitioner's annual income exceeds $166.67 after deduction of necessary living costs, he or she is required to file under chapter 13 or not at all; chapter 7 is no longer an option.

I estimate the effect of the means test on petitioner behavior. One of the first questions the means test raises is whether the percentage of chapter 13 filings increases. Empirical policy-related questions are: Who is the marginal chapter 7 petitioner? To what degree did the law change preclude legitimate chapter 7 petitioners from filing?

2.3 State Bankruptcy Data

I use the data on consumer bankruptcy filings by state covering the period from 2000 to 2007. Figure 2.1 shows the total filings by chapter over this period. Table 2.1 reports per capital filings by chapter in each state in 2000 and 2007.

Figure 2.1 has both chapter 7 and chapter 13 filings graphed. The two graphed lines, one above and one below it represent chapter 7 and chapter 13 filings respectively. Chapter 7 filings exceed chapter 13 during the entire sample period. However, a year after the passage of the BAPCPA, difference between these two chapters of filings dropped to $100,582$ from $662,846$ in 2004, an almost 85% decline. These numbers are indeed consistent with what policy makers had in mind when they passed the BAPCPA, the migration from chapter 7 to chapter 13 filings. Although the gap started to increase again after 2006, size of the gap remains much smaller than before BAPCPA.

From Table 2.1 it is easy to see that percentage of chapter 13 filings dramatically increased when comparing 2000 to 2007. Most states have chapter 7 filings exceeding chapter 13 filings except in North Carolina, South Carolina, Georgia, Tennessee and Alabama, which are all southeastern states. Note that in a few states, chapter 7 filings decreased below chapter 13 after 2005; those states are Mississippi, Arizona, Louisiana and Texas. Both Arizona and Texas have very generous homestead exemption levels, and Louisiana is in the treatment group for the estimation on the means test effects.

2.4 Explaining Filings and Chapter Choice

2.4.1 Estimation Method

Before estimating the effects of the homestead exemption rules and the means test, I examine how total bankruptcy filings and chapter composition vary with state level demographic and economic characteristics. The empirical framework is a panel-data regression of the form

$$y_{it} = demo_{it}\beta + econ_{it}\gamma + c_i + d_t + u_{it} \tag{2.1}$$

where y_{it} is either total filings or the percentage filings that are chapter 13, $demo_{it}$ is a vector of demographic variables, $ecno_{it}$ is a vector of economic variables, and c_i and d_t are the state and year fixed effects.

2.4.2 Covariates: State Demographic and Economic Data

Table 2.2 reports the summary statistics of the demographic and economic variables. The demographic variables include percentage white, percentage female, percentage with college degree, percentage divorced, percentage between age 25 to 45, percentage without health insurance and unemployment rate. The data source for these variables is the Current Population Survey (CPS) March Supplement from 1998 to 2007. The CPS is a public survey dataset and has observations at individual level. States demographic percentages are aggregated by dividing the number of individuals reporting certain characteristics by the total number of individual surveyed. Demographic variables also included are log of state population and log of average personal income.

In addition to the demographic variables, housing variables are also very important in determining states' bankruptcy filings and especially the chapter composition within a state (Michelle and Zhu [3]). I therefore include housing variables in the regressions as well. They are: percentage household with a mortgage or trust, percentage owner occupied housing, log of average monthly owner cost, log of average monthly mortgage payment and state median housing price. These variables are collected from the American Community Survey,

Public Used Microdata Samples (ACSPUMS) from 2000 to 2007. The ACSPUMS dataset includes observations at household level. It is then aggregated to state level using the same technique as the demographic variables. In addition, a state's homestead exemption level is also included. For states with unlimited homestead exemption, I use the value of $\$10,000,000$ instead for regression purpose.

2.4.3 Results

The results from the overall filings and chapter composition regressions are reported in Table 2.3. Column 1 reports the effects of the set of covariates on chapter 7 filings and column 2 shows their effects on chapter 13 filings. chapter 7 filings are higher in the states with higher unemployment rates, as expected. The reason that unemployment does not increase chapter 13 filings is that temporary unemployment is different from permanently not having a job, and most joblessness is temporary. Those temporarily unemployed choose chapter 7, because their future income will be protected. The reason why chapter 13 filings are lower in states with higher divorce rates is not certain. According to Michelle and Zhu [3], one major reason that people file for chapter 13 is to protect their house against foreclosure. To the extent that divorce and impending foreclosure are correlated, which may explain the negative relationship of chapter 13 filings and divorce.

Column 3 in Table 2.3 reports the effect of the demographic characteristics on chapter composition. Although none of the demographic variables are significant in determining the aggregate bankruptcy filings, on the contrary, female percentage, divorce rate and unemployment rate all have significant effects on chapter composition. This is probably because at the margin, for a petitioner, compared to the decision to file or not, the decision on which chapter to file the bankruptcy under is more vulnerable to some of the demographic variables.

Because the housing variables vary much more than the demographic variables for the period from 2000 to 2007, their effects are more precisely estimated. Percentage owner occupied housing increases chapter 7 filings, median housing price increases chapter 13 filings, and

of course both of the variables increase total filings. These results suggest that the overall housing ownership affects chapter 7 filings, and the "quality" of this housing ownership, which can be seen from the median housing price, affects chapter 13 filings.

2.4.4 Before and After the BAPCPA

As seen in Figure 2.1, if we look only at 2003 and 2007, both chapter 7 and chapter 13 bankruptcy filings decreased in 2007, two years after the passage of the BAPCPA compared to 2003, two years before 2005. The purpose of this paper is estimating what fraction of this decline in filings was caused by the 2005 BAPCPA. The motivation for the next experiment is controlling for all the demographic and economic variables and ideally having the year dummy for 2007 to pick up all the effects on filings and chapter composition brought by this exogenous law change.

Table 2.4 reports the estimation results using data from only 2003 and 2007 for the aggregate filing regressions. Both chapter 7 and chapter 13 filings decreased in 2007 compared to 2003, and the percentage chapter 13 increased in 2007 compared to 2003. These results are as expected, because the 2005 BAPCPA was aiming to decrease the rapidly increasing bankruptcy filings, and at the same time make petitioners pay some of their debt which is realized by forcing chapter 13.

However, the only time I observe the 2007 dummy to have a significant effect is on chapter composition. The fact that the year dummies are not significant on either chapter 7 or 13 filings was probably due to many other factors that could have affected the filings. Some of these factors may have had effects on chapter 7 and chapter 13 filings in the opposite direction, which the 2005 BAPCPA was pushing. Unlike the chapter filings, chapter composition can only be affected by fewer factors, because condition on the decision of bankruptcy, which chapter to file is more subjected to personal status of a petitioner rather than external factors such as the state characteristics. Therefore, I observe a significant effect on the 2007

dummy. Because of this reason, I focus only on the effect of the 2005 BAPCPA on chapter composition in the following sections.

2.5 Effects of the Law Changes on Chapter Composition

2.5.1 Estimation Method

I examine the law changes by comparing the percentage of chapter 13 filings in states more affected by the act after 2005, with observations before 2005 and controls which are less affected states. In a regression framework, this involves estimating models of the form,

$$chap13_{it} = \delta(treat_i \times after_t) + treat_i + after_t + demo_{it}\beta + econ_{it}\gamma + c_i + d_t + u_{it}, \quad (2.2)$$

where $chap13_{it}$ is the percentage of chapter 13 filings, $treat_i$ is a dummy variable indicating whether the state is within the treatment group, $after_t$ is a dummy variable indicating the post-BAPCPA years, and c_i and d_t are the state and year fixed effects. This is the familiar difference-in-differences (DD) regression, and δ is the coefficient of interest.

2.5.2 Evaluating Changes in Homestead Exemption Rules

First, I consider the effect of the changes to homestead exemption rules on chapter composition. The most critical aspect of the DD estimation is the assignment of observations to treatments and controls. Note that the assignment of treatment group needs extreme caution, because as mentioned the 2005 BAPCPA was a federal law which theoretically should affect all the states equally.

In this case I exploit the change in the new law that prevents petitioners from strategically moving to states with more generous homestead exemption rules prior to filing. To the extent petitioners strategically move and file, I should observe a decrease in filings within the states that have a higher homestead exemption level. In addition, because the motivations of the movers are to gain benefits through chapter 7, and homestead exemption level is irrelevant to chapter 13 petitioners, an increase in the percentage of chapter 13 filings should be expected.

The criterion used to separate states into categories with less or more generous homestead exemption rules is the ratio of a state's maximum homestead exemption level to its median housing price. I use this ratio instead of the homestead exemption level alone to try to control for variation in states housing prices. The ratio emphasizes what "portion" of the typical housing value can be exempted and thus be protected under bankruptcy. For example, if a petitioner is a representative house owner in a state, where the value of his or her house is the same as his or her state's median housing price, all of his or her assets that are stored in the form of real estate property can be exempted under chapter 7. I select states with the ratio of homestead exemption level to median housing price greater than 1 to be in the treatment group. Using this selection method, the treatment group contains the states of Iowa, Nebraska, Kansas, District of Columbia, Florida, Kentucky, Arizona and Texas.

Table 2.5, column 1 reports the estimated coefficients from the regression where the only variables on the left hand side are the legislation variable, the treatment variable, intersection of the legislation and treatment variables, population and year dummies. The estimated coefficients of the legislation and treatment variables are 0.1459 with a t-ratio of 8.9 and 0.123 with a t-ratio of 1.62 respectively.

The DD coefficient is estimated to be 0.0213 with a t-ratio of 1.71. This means that the homestead exemption restrictions under the BAPCPA have an effect of a 2.13% increase on chapter 13 filings, in the treatment states post 2005. This positive and significant $\hat{\delta}$ suggests that the number of petitioners strategically move to states with generous homestead exemptions has decreased and therefore caused the percentage of chapter 13 filings in state with higher homestead exemption levels to increase.

The second column in Table 2.5 reports the result from the regression that controls state characteristics. Within the same framework as the first regression, demographic and housing variables are added into the second regression. The DD coefficient estimate is 0.0206 with a t-ratio of 1.74; coefficients of the legislation and treatment variables are not much different in

magnitude and their signs stay the same. This robustness check suggests that the treatment effect is not confounded with states demographic and economic characteristics.

2.5.3 Evaluating the Means Test

In this section, I concentrate on the effect of the "means test" on chapter composition. After the enactment of the 2005 BAPCPA, unfortunate for those petitioners whose incomes are above their states median income, they are required to take a means test. A petitioner who takes the means test either passes or fails this test, the result then determines if he or she has the right to choose which chapter to file his or her bankruptcy case under. A petitioner who fails the means test is left with only chapter 7 as his or her bankruptcy option.

Although a federal law affects all states with the same set of rules, because of the variations in states characteristics, it is reasonable to believe that states' reaction to this set of rules will differ. Therefore, I take advantage of these variations to accomplish the assignment of the treatment and control groups. Because the means test essentially abolishes or restricts some potential petitioners' right to choose chapter 7 as their bankruptcy options, it should have a larger effect on chapter composition in the states which have relatively more chapter 7 petitioners within their bankruptcy pool. Then the question is: which states can be categorized as "chapter 7" states?

Chapter 7 allows petitioners to protect future income; however, at the same time they understand that their assets are exposed to repay outstanding debt. In addition, in general the largest asset that a household possesses is its house. Therefore, a typical petitioner in a state with higher real estate values should have lower probability of filing chapter 7 than a petitioner who lives in a state with lower housing prices. For this reason, median housing value is an obvious choice of criterion to identify those "chapter 7" states. However, the down side of using this variable is that it could have its effect through other changes that are also included in the BAPCPA, such as the homestead exemption changes that are mentioned in

last section of this paper. To solve this problem, I instead use a state's percentage people with income between the state median and mean to assign the treatment and control groups.

I take this approach for two reasons. In general, for a continuous distribution, such as the income distribution, a heavier density between the median and the mean indicates two possible situations. It is either that the population above the mean has very high income which is pulling the mean income to the right of the distribution; or it could be that there are high frequencies around the mean. The first possibility indicates that the population above the mean is much richer, if this is the case, then the probability that those people possess valuable assets is higher, which would be likely to include their home value. Such individuals would be less likely to file chapter 7, therefore be less affected by the means test. In other words, under this possibility, higher percentage population between the median and the mean of the income distribution indicates that the state may be reasonably categorized as a chapter 7 state.

The higher percentage also indicates high frequencies around the mean income. If this is the case, and in addition, we believe that those with income around the mean income are relatively richer compared to other bankruptcy petitioners, then it is reasonable to conclude that this high percentage concentrated between the median and the mean categorizes a state as a chapter 7 state. This is because although every petitioner with income higher than a state's median has to take the means test, the probability of failing the test is relatively higher for those with income around the mean than those with income around the median. Therefore, the larger this percentage variable is the greater effects the means test should have.

The variable percentage of population between the median and the mean income is continuous, thus I use the median of this variable as the selection criterion to assign states into treatment and control groups. States with percentages of 13.4 or lower are selected into the control group, and the treatment group has states with percentages greater than 13.4. The states that are included in the treatment group for both years after 2005 are New

York, District of Columbia, Florida, Mississippi, Louisiana, Texas, New Mexico, Oregon and California. I also consider the 75th and the 90th percentiles of this variable to test for the robustness of this selection criterion. Table2.6 reports the results from the means test estimations. Column 1 is the result from the DD regression without any covariates; it only includes the legislation variable, the treatment variable and intersection of these two variables on the left hand side. The DD coefficient is estimated to be 0.0215 with a t-ratio of 1.74. It signifies that the percentage of chapter 13 filings was 2.15% higher in the treatment states because of the means test. This result is expected since the motivation behind the means test was to make those who have ability to repay debts file chapter 13 instead of chapter 7. However, I believe that only fraction of the 2.15% increase was due to this movement from chapter 7 to chapter 13, the other portion of this increase was because some potential chapter 7 petitioners dropped out of the bankruptcy pool.

I believe that there is a portion of petitioners who decided against filing bankruptcy because of the means test. For petitioners with income much higher than the median, passing or failing the means test is unpredictable at the time of filing. Since court may allow or dismiss certain proposed regular expenses, which can determine the amount of disposable income therefore may affect if the means test could be passed or not. For those petitioners who would only want to file chapter 7, they have to bear the risk of getting pushed into chapter 13 as a result of the means test. In addition, these petitioners cannot know whether they are only left with chapter 13 as a choice until all lawyer and court fees are applied. Therefore, it is reasonable to conclude that some of these petitioners decided against filing bankruptcy or waited to file later.

Columns 3 and 4 in Table 2.6 report results of the DD regressions with different selection criteria of the treatment group. These two regressions are to check the robustness of the results to the selection of the assignment variable. I use the selection criteria of 0.145 and 0.154 to assign treatment states in these two regressions; they are the 75th and 90th percentiles of the percentage people between the median and the mean income variable. The

DD coefficient estimates are 0.0334 and 0.0425 with t-ratios of 2.70 and 3.29, respectively. As the selection criterion changes, more or fewer states are selected into the treatment group, which, therefore, causing the estimated DD coefficients to vary accordingly. However, the signs stay the same, and the magnitudes of the estimated coefficients and standard errors change within a small range. Therefore I conclude that the result is robust to the selection criterion.

2.6 Conclusion

In this chapter, I estimate the effects of the 2005 BAPCPA on chapter composition, using data from the bankruptcy court statistics collected from the American Bankruptcy Institute and demographic, housing and economic variables collected from the U.S. Census. I evaluate the effects of two major changes under the BAPCPA: the changes to homestead exemption rules and the new means test; and test how these policies affect states chapter composition trends. The BAPCPA was recently passed in 2005, and this paper is the first to examine its effect on petitioner behaviors.

For the estimation of the changes to homestead exemption rules, I assigned treatments and controls by using the variations in states homestead exemption levels. A state will be in the treatment group if its homestead exemption level is greater than its median housing price; otherwise the state will be in the control group. I found a 2.13% increase in chapter 13 percentage if a state is in the treatment group after 2005. This result is as expected because the tightened policies on homestead exemption rules discouraged some potential chapter 7 petitioners, and also precluded many of those who would have moved to states with generous homestead exemption levels from filing.

Compared with the new homestead exemption policies, the estimation design for the means test is more difficult. The test applies to those who have income higher than the states' median income, therefore, in each state, half of the population is potentially affected. I use the variable of percentage of people in a state with income between the median and

the mean as an indicator variable to assign treatments and controls. I take this approach because this variable gives information about a state income distribution. Some states are believed to react to the means test more radically which were assigned into the treatment group. I found a 2.15% increase in percentage chapter 13 filings in the treatment states after 2005. This result is significant and is also robust to the selection criterion of the assignment variable.

To conclude, the goal for the BAPCPA was to encourage more chapter 13 filings instead of chapter 7. My findings suggest that this was achieved through different policies brought by the BAPCPA. The increase of chapter 13 percentage on an aggregate level suggests less debt is discharged through bankruptcy courts; which satisfies those lenders who had lobbied for a bankruptcy law reform. Especially as the financial crisis and recession emerge in 2008, hopefully the increasing fraction of chapter 13 can help to gain lenders confidence. The reform was also said to solve the problem of "opportunists" and the result from the estimation on homestead exemption rules validates this argument.

However, the law change may have its negative externalities as well. From estimating the effect of the means test, I observe an increase in the percentage of chapter 13; I believe that a fraction of this increase could be due to the "disappeared" chapter 7 filings. It is almost for sure that for some of these chapter 7 petitioners, the BAPCPA closed their gate to the chance of having a fresh start.

Bibliography

[1] Michelle J. White. Personal bankruptcy under the 1978 bankruptcy code: An economic analysis. *Indiana Law Journal*, 63:1–53, 1987.

[2] Richard Schellings and Allens A. Robinson. The effect of bankruptcy (homestead) exemption levels on access to credit: Evidence from a us panel. Technical report, Department of Business and Economics. Australia: Monash University, 2008.

[3] Michelle J. White and Ning Zhu. Save your home in chapter 13 bankruptcy. *Journal of Legal Studies*, 39, 2010.

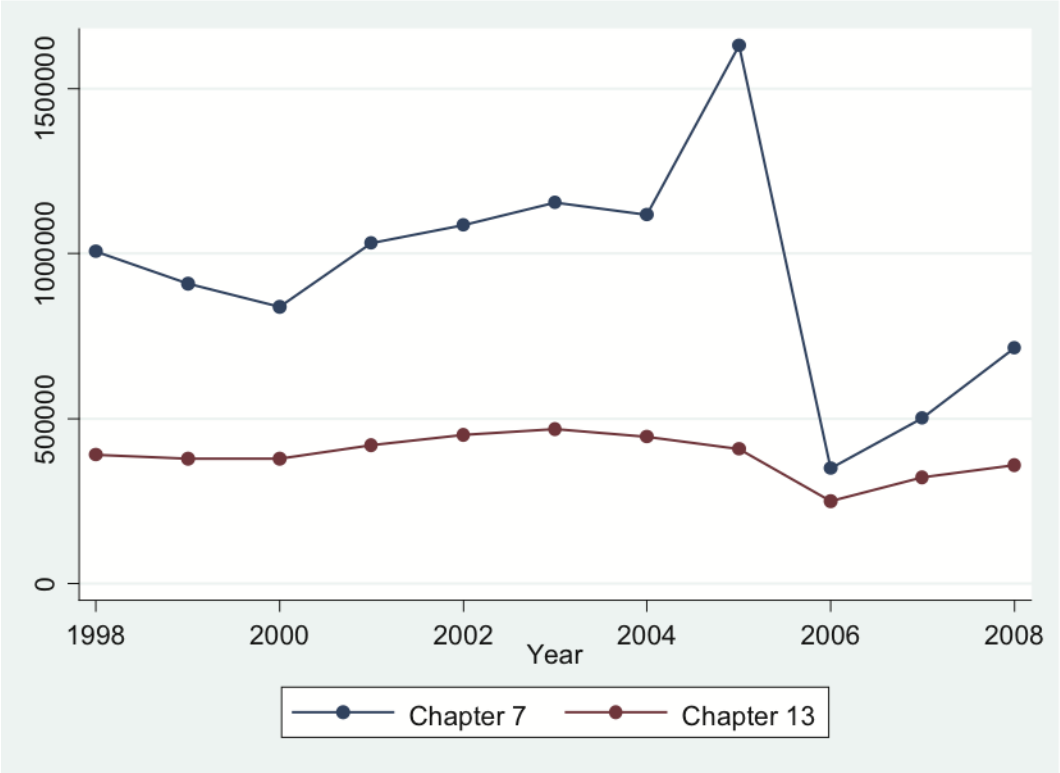


Figure 2.1: Total Consumer Bankruptcy Filings from 1998 to 2008 by Chapter.

Table 2.1: Bankruptcy Filings in 2000 and 2007 by State and by Chapter.

	2000		2007			2000		2007	
State	Chap 7	Chap 13	Chap 7	Chap 13	State	Chap 7	Chap 13	Chap 7	Chap13
AK	1,179	122	520	106	MT	2,830	365	1,489	330
AL	12,996	19,529	8,086	15,447	NC	11,040	15,599	8,384	10,714
AR	9,279	7,242	5,688	5,764	ND	1,782	59	1,010	137
AZ	16,475	3,694	8,094	2,323	NE	4,663	849	3,612	1,542
CA	109,665	28,370	50,004	18,975	NH	3,018	295	1,871	784
CO	12,870	2,315	12,240	2,431	NJ	23,207	13,373	11,960	7,097
CT	9,054	1,433	4,000	1,616	NM	5,557	960	2,889	369
DC	1,479	804	342	334	NV	10,051	3,620	6,536	4,092
DE	1,527	842	939	756	NY	45,956	11,190	27,660	11,354
FL	50,445	20,795	24,854	14,531	OH	41,437	11,266	32,731	16,636
GA	21,519	37,384	19,512	29,098	OK	15,795	2,607	6,780	1,990
HI	3,995	478	1,073	255	OR	14,396	2,378	6,666	2,451
IA	7,507	571	6,062	731	PA	29,438	13,032	17,712	11,220
ID	5,577	1,263	2,992	727	RI	4,086	297	2,095	617
IL	42,244	17,632	25,719	14,681	SC	5,592	6,213	2,320	4,814
IN	29,613	7,501	20,967	9,537	SD	1,901	71	1,091	185
KS	9,101	2,044	5,240	2,608	TN	21,265	27,278	14,583	24,440
KY	17,181	3,481	11,867	4,979	TX	31,034	28,463	17,326	23,105
LA	12,960	9,548	4,615	9,144	UT	8,771	5,968	3,597	2,681
MA	13,028	2,180	8,873	4,489	VA	26,310	9,034	11,108	7,756
MD	20,156	9,489	6,890	6,418	VI	39	8	10	5
ME	3,592	288	1,705	446	VT	1,289	132	604	226
MI	25,849	9,982	32,050	12,935	WA	23,520	6,876	10,620	4,456
MN	11,018	2,804	9,008	2,373	WI	14,444	2,716	11,592	3,840
MO	18,123	7,521	13,848	7,022	WV	7,946	421	3,848	490
MS	10,852	7,400	4,713	6,242	WY	1,908	115	629	130

Table 2.2: Description of Variables and Data Sources.

	Variable Name	Period, Description, source, [Mean(SD), Max, Min]
1	Percentage chapter 13	CY98-CY07, Percentage of total bankruptcy cases filed under chapter 13, Source (a),[0.25(0.16), 0.06, 0.73]
2.	Homestead Exemption Level	Non-variant, State (Maximum) homestead exemption level (in dollar), Source (c), [156607.8(282842.4), 3500, 1000000]
3	Median Housing Price	CY98-CY07, State median housing price. (in dollar), Source (b3), [161067.8(82821.14), 73315, 555400]
4	Median Household Income	CY98-CY07, State Median Household Income (in dollar), Source (b4), [43812.14(7422.5), 26704, 68059]
5	Average Household Income	CY98-CY07, State Average Household Income (in dollar), Source (d), [57570.1(9988.55), 34044, 93065]
6	Number of Self-employed Firms Logit	CY98-CY06, Log transformation of number of firms in the self-employed sector, Source (b2), [12.27(1.01), 10.34, 14.79]
7	Percentage White	CY98-CY07, Percentage people that are white (race), Source (d), [0.84(0.14), 0.22, 1]
8	Percentage Female	CY98-CY07, Percentage people that are female (sex), Source (d), [0.48(0.02), 0.43, 0.55]
9	Education Attainment	CY98-CY07, Percentage people that have bachelor degree or higher, Source (d),[0.29(0.06), 0.18, 0.53]
10	Marital Status	CY98-CY07, Percentage people that are divorced, Source (d), [.11(0.02), 0.07, 0.16]
11	Age Between 25–45 %	CY98-CY07, Percentage people that are between age 25 and 45 Source (d), [0.56(0.03), 0.46, 0.64]
12	% w/out Health Insurance	CY98-CY07, Percentage people that have no health insurance of any kind, Source (d), [0.15(0.05), 0.06, 0.31]
13	Unemployment Rate	CY98-CY07, Percentage people that are unemployed, Source (d), [0.05(0.01), 0.02, 0.10]
14	Personal Income Logit	CY98-CY07, State Personal Income Mean (in dollar), Source (d), [10.33(0.11), 9.94, 10.64]
15	State Population Logit	CY98-CY07, Log transformation of state population, Source (b1), [15.04(1.04), 13.08, 17.41]
16	Percentage with Mortgage	CY00-CY07, Percentage Households with a mortgage or trust Source (e), [0.40(0.07), 0.12, 0.54]
17	Monthly Owner Cost Logit	CY00-CY07, Log transformation of households monthly owner cost (exclude utility) Source (e), [6.88(.29), 6.18, 7.64]
18	Percentage Owner Occupied	CY00-CY07, Percentage owner occupied housing. Source (b5), [0.70(0.06), 0.4, 0.81]

(Source List: a. American Bankruptcy Institute `http://www.abiworld.org/am/template.cfm?section=Bankruptcy_Statistics1` b. U.S. Census Bureau b1: `http://www.census.gov/popest/datasets.html` b2: `http://www.census.gov/epcd/nonemployer/` b3: `http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS` b4: `http://www.census.gov/hhes/www/income/statemedfaminc.html` b5: `http://www.census.gov/hhes/www/housing/hvs/rates/index.html` c. Better Bankruptcy.Com Incorporated `http://www.betterbankruptcy.com/state_exempt.htm` d. Current Population Survey (Data from DataFerret) `http://www.census.gov/cps/` e. American Community Survey (Data from DataFerret) `http://www.census.gov/acs/www/`)

Table 2.3: Effects of Demographic and Economic Characteristics on Bankruptcy Filings and Chapter 13 Percentage, 2000–2007.

	Chapter 7 Filings	Chapter 13 Filings	Chapter 13 %
White %	29144 (23715)	1706 (9221)	-.0495 (.1878)
Female %	-9 (10)	-1 (2)	.0001** (.00002)
College Degree %	-8366 (30061)	-7741 (10692)	-.1251 (.2129)
Divorce %	-8268 (34472)	-23556* (12601)	-.5758** (.2412)
W/O Insurance %	10012 (27237)	13449 (8237)	.1018 (.1428)
Unemployment Rate	94463* (56991)	17526 (18733)	.3629 (.3489)
25–45 Age %	-8059 (20063)	-5317 (10093)	-.2271 (.2081)
Owner Occupied %	48601* (27508)	6929 (9956)	.1028 (.1972)
Log Owner Cost	-18602 (12936)	2901 (4519)	.1572* (.0889)
Log Median Housing $	-9274 (6442)	-3641* (1950)	-.0450 (.0334)
Log Population	13783 (20358)	-23608** (8022)	−.6068** (.1418)
R-Squared (Within)	0.4976	0.2767	0.6024

408 Observations. State and year fixed effects included. Robust standard errors are given in parentheses, clustered by state. **: Significant at 5% level. *: Significant at 10% level.

Table 2.4: 2003 & 2007 in Comparison.

	Chapter 7 Filings	Chapter 13 Filings	Chapter 13 %
hline Year 2007	-4610	-3428	.1018**
	(7637)	(2965)	(.0306)
White %	-7444	4980	.0729
	(59186)	(15070)	(.2385)
Female %	-.9135	-3.1160	.00004
	(21.836)	(5.0661)	(.00004)
College Degree %	130388	18761	-.8575
	(78905)	(33475)	(.4814)
Divorce %	14738	-24773	-1.2393*
	(14756)	(45585)	(.6507)
W/O Insurance %	-151855	1330	.1227
	(123897)	(41353)	(.4592)
Unemployment Rate	301149	41680	.0116
	(207584)	(72888)	(1.2266)
25–45 Age %	-34252	-19763	-.2155
	(59790)	(21006)	(.3868)
Owner Occupied %	58815	-28882	.2376
	(90594)	(36593)	(.3556)
Log Owner Cost	-32169	-1443	.2013
	(29570)	(10175)	(.1234)
Log Median Housing Value	-2926	5083	-.0162
	(13130)	(6690)	(.0782)
Log Population	79922	-31797	-.5238
	(74832)	(22888)	(.3314)
R-Squared(Within)	0.5907	0.4457	0.7993

102 observations. State and year fixed effects included. Robust standard errors are given in parentheses, clustered by state. **: Significant at 5% level. *: Significant at 10% level.

Table 2.5: Effects of Restrictions on Homestead Exemption Rules on Chapter 13 Percentage, 1998–2007.

	Regression w/o covariates	Regression with covariates
P_t	.1459**	.1547**
	(.0164)	(.0173)
Treatment	.0123	.0106
	(.0076)	(.0099)
P_t^* Treatment	.0213*	.0206*
	(.0124)	(.0119)
Log Income	N/A	-.0737
		(.0119)
Log Owner Cost	N/A	.1427*
		(.0841)
Mortgage Owner %	N/A	-.1429
		(.1055)
Divorce %	N/A	-.5445*
		(.2403)
Unemployment %	N/A	.4635
		(.3862)
Without Insurance %	N/A	-.1293
		(.1411)
College Degree %	N/A	-.1470
		(.2051)
Black %	N/A	-.1270
		(.1847)
Female %	N/A	-.2084
		(.2328)
Age 25–45 %	N/A	-.2541
		(.2136)
Log Population	-.3960**	-.5861**
	(.0852)	(.1396)
Constant	6.1543**	9.1849**
	(1.2756)	(2.5282)
R-Squared	0.5348	0.5917

510 Observations. State and year fixed effects included. Robust standard errors are given in parentheses, clustered by state. **: Significant at 5% level. *: Significant at 10% level.

Table 2.6: Effects of the Means Test on Chapter 13 Percentage, 1998–2007.

	Selection Criterion 0.134		Selection Criterion 0.145	Selection Criterion 0.154
	Regression No Covariates	Regression W/ Covariates		
P_t	.1295* (.0159)	.0975** (.0195)	.1310** (.0145)	.1322** (.0142)
Treatment	-.0066 (.0044)	-.0097* (.0053)	-.0104** (.0048)	-.0115** (.0057)
P_t^* Treatment	.0214* (.0122)	.030** (.0118)	.0334* (.0123)	.0425** (.0129)
Median Housing Value	N/A	-.0417 (.0335)	N/A	N/A
Log Owner Cost	N/A	.1518* (.088)	N/A	N/A
Mortgage %	N/A	-.1378 (.1013)	N/A	N/A
Divorce %	N/A	-.58** (.2443)	N/A	N/A
Unemployment %	N/A	.5510 (.3428)	N/A	N/A
W/O Insurance %	N/A	-.0953 (.1453)	N/A	N/A
College Degree %	N/A	-.1468 (.2105)	N/A	N/A
Black %	N/A	-.1914 (.1752)	N/A	N/A
Female %	N/A	-.1238 (.2196)	N/A	N/A
Age 25–45 %	N/A	-.2928 (.2071)	N/A	N/A
Log Population	-.3989** (.0829)	-.5765** (.1315)	-.3799** (.0832)	-.3765** (.0842)
Constant	6.2118** (1.2433)	8.7009** (1.8803)	5.9265** (1.2468)	5.8751** (1.2617)
R-Squared	0.5421	0.6063	0.5446	0.5438

510 Observations. State and year fixed effects included. Robust standard errors are given in parentheses, clustered by state. **: Significant at 5% level. *: Significant at 10% level.

Chapter 3

Data Description

3.1 Introduction

In the following chapter, I present an analysis of the effects of the BAPCPA on the behaviors of the individual petitioners, using a data collected from the petition forms of the bankruptcy cases filed in the northern district of the Georgia bankruptcy court, for the period from 2003 to 2008. This chapter provides a comprehensive description of the underlying data and the creation of the sample of petitioners that is the basis for my analysis.

I collected data on individual petitioners from their bankruptcy filings obtained through the Public Access to Court Electronic Records (PACER). PACER is a system that makes all U.S. court documents publicly available through the Internet. For each of the bankruptcy case, all documents ever submitted to the court can be found online through the PACER. Typically there are several documents for a given case, including the initial petition form, the proposed repayment plan, the credit counseling certificate, the court decision etc; the number of documents varies from case to case. However, the initial petition form is always included, because without it a case cannot be processed any further. It is also the document that provided the data for my study. However, for cases dating back to before 2003, a very high percentage of these documents are only physically stored in the court where they were filed. While PACER indicates that such documents exist, their contents cannot be accessed through the Internet. Therefore, my sample period begins in 2003.

The typical cost of access is $0.80 per page to view. However, the Judicial Conference Schedule of Fees states that "the schedule provides that the court may persons or classes of persons from the fees, in order to avoid unreasonable burdens and to promote public access

to such information", and because my purpose in collecting this court information was for academic research, I sought and was granted a waiver of PACER fees from the northern district bankruptcy court of Atlanta. I focus my attention on a single bankruptcy court to make the study feasible and tractable, since typical number of filings in the U.S. is around the millions.

3.2 Data Collection

Bankruptcy courts are state institutions. There are three in Georgia, corresponding to a southern, northern and middle district. I focused my attention on the northern district court, which processes the most cases among the three district courts. Located in Atlanta, as well as it has offices in Rome, Newnan and Gainesville, the Atlanta-office is the largest among the four offices in term of number of cases handled.

The northern district bankruptcy court currently processes about $4,000$ cases each month, more than half of the cases are chapter 7 filings. Between 2003 and 2008, total of $231,748$ cases were filed through this court, I from which randomly sampled 10% of these cases. For each sample case, I downloaded the petition form filed under that particular case.

A standard petition form contains a petition form, schedules A to J and a statement of financial affairs. In the voluntary form, petitioners report basic information such as name and address. Schedules A to J report detailed information relating to petitioners's assets, debt, monthly income and expenses. The statement of financial affairs provides answers to financial-related questions, if applicable, such as depreciation on assets, payments to creditors, past three years of annual income, etc.

The court documents are generally found as PDF files [1]. I used a JAVA program [2] to extract the file contents and write them to a spread sheet. There are two problems with this

[1]The standard voluntary petitioner form, statement of financial affairs, and schedules A-J can be found at `http://www.uscourts.gov/FormsAndFees/Forms/BankruptcyForms.aspx`.

[2]I am grateful to Yanping Huang at University of Washington, Seattle, for writing the code to the JAVA program I use to conduct my dataset.

process. First, the JAVA program could not read files that were converted to PDF format from a scanned image of the petition document. Second, because the JAVA program used the regular expression [1] to search for the patterns of characters in the PDF files, it could not be relied upon to accurately extract the contents from non-standard forms. For example, if the program was to collect the information about a petitioner's name, it read the information that is immediate after where it appears the word "name", however sometimes when the text was transformed into a PDF file, the encryption could actually appear as "namG10e", inserting "G10" to the exact word "name" for unknown reasons. Such problem would then stop the JAVA program from running. About 80% of the sampled cases were lost due to these two problems.

The pattern in which these problems occur is important for estimation the next chapter. It is reasonable to believe that the second problem was random, at least in the sense that there was nothing petitioner-specific about how the PDF files were encrypted or decrypted by the computer. However, there is a possibility that image files could be concentrated in the early years more when forms were frequently scanned. There are now less scanned files because of the availability of more sophisticated software which helps the petitioners with their filings. Nevertheless, the discarding of cases that contain scanned documents may potentially be a selection problem. However, I will argue that any systematic pattern of discarded files due to scanning is exogenous to the outcome variables, therefore should not cause the estimation results to be biased.

Table 3.1 reports the percentage of chapter 7 filings in the northern district court of Georgia, within the sample and the U.S. The chapter 7 percentages within the sample had fewer differences to the northern district court of Georgia after 2005. In 2006 the percentage was the same, whereas the largest lap was observed in 2003. This evidence again supports that discarding of files that were scanned seemed to create a bigger problem in the early years of the sample period. However, being aware of this selection problem, the analyses in

the next chapter are all conditional on chapter choice. I also limit the analyses of the effect of the BAPCPA on conditional probability of filing under each chapter.

In addition, the northern court of Georgia has a tendency of having a smaller percentage of chapter 7 filings compared to the U.S in general. According to Nelson [2]. the southeastern states have always had different patterns of filing compared to the U.S. However, within the state of Georgia, to some extent it could be due to variations in demographic and housing characteristics in Atlanta from the average U.S. cities.

Finally, to gauge the accuracy of the JAVA program, I checked the information collected by the program and compared with the actual petition forms for 5% of the total sample observations. There is 100% accuracy of the information collected by the program for the cases I have checked.

3.3 Raw Data

The empirical questions I address in chapter 4 are whether petitioners deliberately increased their potential dischargeable amount of debt to compensate for the increase costs of filings due to the BAPCPA. I also want to examine whether petitioners who filed after the BAPCPA, were with worse financial situations and if more responsible financial behaviors were observed, such as making regular monthly payments to creditors. In addition, I test if there were any side effects of the law change, such as an increase in legal costs. The analyses focus on differences in the filing profiles of the petitioners before and after the BAPCPA, conditional on chapter. Therefore, in parallel with the analyses in chapter 4, I turn to a discussion of the raw data highlighting patterns over time and by chapter. Tables 3.3 and 3.4 present the summary statistics of the major variables by year and chapter.

The most important piece of information on a bankruptcy petition form is the filer's indebtedness, which is the driving force for filing bankruptcy. There are two types of debts, secured and unsecured. Secured debts are those with collateral, such as mortgage debt; unsecured debts, such as student loans and credit card debt, are not collateralized.

Secured debts are mainly comprised of mortgage debt, although in some cases it also reflects automobile loans. Because amount of the secured debt in most of the cases equals to the value of petitioner's mortgage, it is highly correlated with the value of the real property. It is usually a percentage of the housing value, although this percentage varies across petitioners. However, ten percent of all filers in the dataset had a mortgage that exceeded the current value of their houses. Forty percent of such cases were concentrated in 2008, and coincided with the real estate shock around the end of 2007.

The average amount of secured debt under chapter 13 increased significantly since 2006; and for chapter 7 petitioners since 2007, which was more than likely to be caused by the real estate crash around 2007 instead of the 2005 BAPCPA. Since chapter 13 constitutes more petitioners seeking protection for their house, the chapter 13 petitioners were more sensitive to the real estate shock and they probably reacted faster to the shock compared to the chapter 7 petitioners.

Unlike secured debt, unsecured debt increased under both chapters starting 2005, which was possibly a reaction to the BAPCPA. However, the rise for chapter 7 petitioners was by a larger margin. In 2008, unsecured debt rose sharply, especially under chapter 7, where it was doubled. The direct cause of this was that many more petitioners with unsecured debt amount exceeding $\$100,000$ were filing in the wake of the recession of 2008

The composition of unsecured debt matters also, because it reveals the motivation behind a bankruptcy decision and is directly related to the financial benefits a petitioner receives. Petitioners report all unsecured debts in schedule F, which includes amount, the company granting the debt, and, most importantly, the category to which the debt belongs. Common categories of unsecured debt are credit card claims, medical bills and student loans.

Credit card debt looked very different under chapter 7 and 13. Chapter 7 petitioners had about twice as much credit card debt, which was probably because chapter 13 petitioners were more than likely to be house owners (White and Zhu [3]), who filed to prevent foreclosure. Therefore, they should be people with better credit history and financial management.

Credit card debt for chapter 13 petitioners increased by almost 50% in 2006 and was steady thereafter, whereas chapter 7 petitioners had an increasing average credit card debt since 2005. This change under chapter 13 was due to the means test in 2005, which pushed certain petitioners with high income to file chapter 13. Because income and credit card debt were positively correlated, the amount of credit card claims increased for chapter 13 petitioners. Another possibility is that would-be chapter 7 petitioners now filed chapter 13 because of the means test, their direct loss due to the BAPCPA was the portion of their future incomes that would be used to pay outstanding debt which could have been protected under chapter 7. Therefore, to compensate such loss, conditional on filing, the most convenient way would be charging more on their credit cards and have them be discharged through filing.

The financial crisis, which started at the end of 2007 was probably the force that pushed chapter 7 petitioners at the margin. Those who were probably still making minimal payments had to file for bankruptcy, thus the average credit card debt for chapter 7 petitioners started to rise dramatically during 2008.

Student loan also increased after 2005 for both chapters of petitioners. Student loan can be a proxy for an individual's level of education, and a highly educated petitioner who files for bankruptcy probably does not currently have a good job, but has high expected future income. Because of the BAPCPA now restricts those with high incomes to file only chapter 13, this type of petitioner will probably quickly decide to file rather than wait. Chapter 7 petitioners had larger increases of student loan and the number of petitioners with large amounts of student loan (more than 50% of the unsecured debt is associated with student loans) increased much more after 2005. This was probably due to the abolishment of "super discharge" clause under chapter 13. The super discharge clause allowed petitioners to discharge of student loans and taxes if the chapter 13 filing was voluntary, whereas none of these were dischargeable after the BAPCPA.

Medical bills are results of illness and health problems, of which are unlikely to be planned events. Petitioners who files for bankruptcy because of excessive medical debt are probably

facing exogenous shocks, which are hard to plan in advance. Therefore, I do not observe much change around and after the BAPCPA for medical bills.

Under each chapter, the court evaluates a petitioner's repayment ability by looking at two different categories that may reveal information about the petitioner's wealth: assets and income streams and expenses.

The largest component of a petitioner's asset category is the value of her real properties, of which chapter 13 petitioners always had higher values. This is likely to be because one of the major reasons that chapter 13 petitioners file is to protect their house from foreclosure (White and Zhu, [3]). In addition, according to White [4], "no-asset filings constitute nearly three-quarters of all personal bankruptcy filings and 96% of chapter 7 filings", which gives evidence that a chapter 13 petitioner possesses more assets at the time of filing, and most of them are in the form of real property. One trend that needs to be pointed out is that, after 2005, the value of total real properties grew rapidly for chapter 13 petitioners and at a much slower rate for chapter 7 petitioners until 2008. The higher increase for chapter 13 petitioners might be for couple of reasons. The means test now requires those with high enough income to file chapter 13, and high income filers possess more expensive houses. In 2008, this difference in housing values between the two chapters of petitioners decreased, which was due to an increase in the value of real property for chapter 7 petitioners. It could have happened because around 2008, effects from the financial crisis started to reflect on bankruptcy petitioners. These effects were working in the different directions as the BAPCPA, because the law reform was aiming to discourage filings, unlike the recession, which induced them.

Total personal property includes cash, such as bank deposits, and personal items, such as clothes and jewelry. The value of personal property was much smaller compared to real property; nonetheless, this variable had similar patterns as real property. However, the value of automobiles increased during the entire sample period under chapter 13, whereas under

chapter 7, this value was steady. This was again due to the means test, which now requires high income petitioners to file only under chapter 13.

Another important asset is the petitioner's equity on her real property. Before 2005, chapter 7 petitioners had much smaller percentage of housing value that was paid compared to chapter 13 petitioners; however, the gap was decreasing until 2008. The decrease in the difference was due to the passage of the BAPCPA. Generally, petitioners with higher assets receive more benefits when filing chapter 13, since assets are protected under this chapter. However the BAPCPA made chapter 13 less favorable by increasing the costs of filing and length between fillings. In addition, petitioners can no longer propose their own repayment plan. Those losses of benefits under chapter 13 might be exceeding the extra assets that could be protected under chapter 13, therefore, some petitioners with higher assets might not find chapter 13 attractive anymore. In 2008, the gap between these two chapters started to rise again, which probably was due to the financial crisis. Many more homeowners were filing under chapter 13, therefore increasing the average.

Beside the assets, the petitioner's repayment ability is determined by her income stream and expenses. Chapter 13 petitioners always had higher monthly incomes, however the gap between average incomes for these two groups of petitioners increased after 2005. This might be an effect of the means test, because according to the new rule, an individual with higher income than her state's median income may only file for chapter 13. In general, income and expenses are highly correlated. However, they might not be as correlated within this sample compared to the general population, because only necessary expenses could be proposed to the court. Chapter 13 petitioners had lower proposed monthly expenses except for 2006 and 2007. The reason that chapter 7 petitioners had lower income but did not propose less expenses was probably because of their irregular spending behaviors, such as possessing expensive houses, supporting many dependents or paying high amount of alimony.

Beside monthly income, filers also reported their annual incomes for the current and the past two years. Similarly to monthly income patterns, chapter 13 petitioners had higher

annual incomes compared to chapter 7 petitioners. However, chapter 13 petitioners also experienced higher percentage declines in annual incomes from the past two years to the filing year, which indicated that more chapter 13 petitioners were likely unemployed at the time of filing. For both chapters of petitioners, the decreases in incomes from the previous years to the filing year were smaller after the BAPCPA. This was probably caused by a decrease of petitioners who filed because of unemployment, after the BAPCPA.

Average proposed expense for chapter 13 petitioners was increasing relative to chapter 7 filers until 2008, and was surpassing in 2006 and 2007. A portion of the would-be chapter 7 petitioners were pushed to chapter 13 in 2006 and 2007 because of the means test. Not surprisingly, in 2008, both monthly income and expense for chapter 13 petitioners decreased. As the financial crisis occurred at the end of 2007, people who experienced this shock were filing to seek help, especially help on their mortgage payments. The increase of this kind of petitioner was the driving force which increased the average proposed expenses. The financial crisis had an opposite effect on the expense of petitioners, from the BAPCPA.

The proposed expenses are also separately reported under different categories, the most important of which are rent or mortgage payments, expense for operating a personal business, alimony payments and support of dependents. Almost all petitioners reported positive amounts for rent and mortgage. Again, the chapter 13 petitioners levels were higher. This was reasonable considering that chapter 13 petitioners had higher income and possessed more valuable real estate properties. Only a small percentage of petitioners reported positive expenses from operating a business, alimony payment and support for dependent. Average expense for operating a business was around $\$3,000$; alimony payment was around \$600 for both chapters of petitioners; and support for dependents was about \$200. There were not many variations across different chapters and years in these variables.

In the statement of financial affairs section, petitioners answer financial related questions. The most important ones are the current and past two years of income, monthly payments to creditors and the legal costs of filing. Monthly payments to creditors reflect a petitioner's

financial management. It is very unlikely that for a petitioner who plans ahead of filing and the sole purpose was to gain financial benefits to be making regular monthly payment to creditors. The amounts of monthly payments to creditors had large variations across years for both chapters of petitioners. However, the variations probably were not in the actual amounts, but the number of petitioners that were making this type of payments. There were sudden increases of this variable in 2004 for chapter 7 petitioners and 2005 for chapter 13 petitioners. Both of the increases could be petitioners anticipating the law change in 2005. Compared to the years before the BAPCPA, the amounts of monthly payments to creditors increased afterward, this suggests that the petitioners are more responsible nowadays. However, why monthly payments to creditors were so low in 2003 is unknown.

Legal fees does not directly reflect a petitioner's financial stands, however, it relates to the finances occurred during the filing of bankruptcy. There is a tradeoff in this variable, higher legal cost which means hiring of an experienced lawyer may potentially bring higher financial gains, however, the cost of hiring a lawyer directly decreases the total financial gains.

Chapter 7 petitioners had higher legal cost during the sample period. One reason might be complexities in how assets were calculated and exempted, since after the BAPCPA there are more restrictions on which kind of assets can be claimed under homestead. From 2003, legal cost increased for both chapters of petitioners until 2008. The increase was larger in magnitude for chapter 7 petitioners; however, percentage wise, chapter 13 had higher increases. The reason of this increase in legal cost for chapter 13 petitioners was probably due to the restrictions on how a repayment plan was proposed under chapter 13. Petitioners can no longer propose their own plan; instead the judge calculates the payment by weighing a petitioner's income and necessary expense. Therefore, having an experienced lawyer who knows what kind of expenses to propose will directly increase the possible gains of a chapter 13 petitioner.

3.4 Analysis Variables

Analyses in the next chapter use a covariate matching method, for the estimation purpose, the abovementioned variables are grouped into two categories: outcomes and matching covariates. Outcomes are those variables which we are interested in their changes before and after the BAPCPA; the matching covariates are used in the estimation to identify pairs of matches, they are similar to the control variables in a parametric regression framework. Figure 3.1 presents the plots of the means of the analysis variables by year and chapter.

Outcome variables are the percentage of total debt that is unsecured, the percentage of unsecured debt associated with credit cards, monthly income, monthly payment to creditors and the legal costs of filing. For the first two outcome variables, of which I have constructed the percentage terms instead of using the actual value of unsecured debt and credit card debt.

Both secured and unsecured debt increased, although probably due to different reasons. From the summary statistics, there was not much change in the percentage of debt that was unsecured. Under chapter 7 cases, this percentage had always been around 50% except for 2007, when it dropped to 34%; whereas for chapter 13 petitioners it had been between the 20%–25% range. For both chapters of petitioners, the percentage of unsecured debt associated with credit cards were increasing after the BAPCPA in 2006, and started to decrease thereafter. The increases were probably because of the increased costs of filing due to the BAPCPA, thus in a short term, those with low credit card debt were not filing because their financial benefits decreased. Chapter 13 petitioners had a larger decrease in the percentage credit card debt after 2006, which was probably due to the financial crisis occurred at the end of 2007. For many of those who are filing chapter 13 to protect their houses from foreclosure, it is reasonable that they may not have as much credit card debt as opposed to those who file for bankruptcy because of irresponsible spending habit.

Matching covariates include value of real estate property, value of automobile, monthly expenses, monthly income, marital status, job loss, student loan, medical bill, owning a

business, alimony payment, support for dependent and at Atlanta. Some of these variables were constructed into binary variables from the raw data.

Because the petition forms have provided income data for the past three years, I then use them to infer unemployment status. If the current year of income is less than half of any past year's income, I conclude that the petitioner has experienced a job loss. The observation will then take the value of 1, for the binary variable: job loss. In addition, all cases were filed in four different offices under the northern district bankruptcy court of Georgia; a binary variable indicates whether the case was filed in the Atlanta office is also used as matching covariate to control for location.

For estimation purpose, other matching covariates such as alimony received, expense for operating a business , supports for dependents were also constructed into binary variables. For example, if an observation reports an amount greater than 0 for alimony payment, the dummy variable indicates if the petitioner receives alimony takes the value of 1. Medical bills and student loans are also binary variables when used as matching covariates, these variables take the value of 1 if the observation has medical bills or student loans exceed 50% of the total unsecured debt.

3.5 Summary

By analyzing the aggregate summary statistics of the PACER data, there are two major findings. First, major changes for both chapters were mostly due to two events: the BAPCPA, which was an act passed directly affecting the structure of the bankruptcy system; another one was the financial crisis, which indirectly pushed many people at the margin to file for bankruptcy, thus indirectly changed the profile of a typical filer. Second, the analysis variables and how they were affected by exogenous shocks were different under the two chapters.

I found that in general, an average chapter 7 petitioner had higher debt compared to an average chapter 13 petitioner, whereas an average chapter 13 petitioner had better financial situations such as higher income and less likely be experiencing a job loss. The value of assets

is another component of a petitioner's finance, which was generally higher for an average chapter 13 petitioner.

The general trends over the sample period were increasing amount of debt, both secured and unsecured, better finances and higher asset owning, for both chapters of petitioners. For variables such as the amount of unsecured debt and the value of real property, the financial crisis seemed to have a larger effect than the BAPCPA. However, it is not to say that at the individual level, this was also the case. Because the statistics is aggregated, shocks that are sudden and have impacts on a greater scale may have more obvious effects, such as the financial crisis. On the contrary, the BAPCPA was not meant to affect the entire bankruptcy population but only those at the margin. Therefore, to better estimate the effects of the BAPCPA on petitioners, empirical estimations at the individual level are necessary, which is presented in the next chapter.

Bibliography

[1] Michael Sipser. *Introduction to the Theory of Computation.* PWS Publishing., 1998.

[2] Jon P. Nelson. Consumer bankruptcy and chapter choice: State panel evidence. *Contemporary Economic Policy*, 17(4):552–566, 1999.

[3] Michelle J. White and Ning Zhu. Save your home in chapter 13 bankruptcy. *Journal of Legal Studies*, 39, 2010.

[4] Michelle J. White. Abuse or protection? *Regulation*, 29(3):28–35, 2006.

Table 3.1: Percentage Chapter 7 of Total Fillings, 2003-2008

	Northern GA Court	Dataset Sampled	U.S. Population
2003	0.56	0.45	0.71
2004	0.58	0.49	0.72
2005	0.68	0.60	0.80
2006	0.48	0.48	0.61
2007	0.50	0.58	0.68
2008	0.55	0.53	0.67

Table 3.2: Description of Variables

Variable Name	Variable Description
Secured Claim	Total secured claim amount
Unsecured Claim	Total unsecured claim amount
Credit Card	Credit card debt claim
Medical Bill	Debts from medical bills
Student Loan	Debts from student loans
Secured Claim	Total secured claim amount
Real Property	Value of real property, adjusted for fluctuation in housing price
Real Equity	Real property value minus the outstanding secured debt
Automobile	Value of the automobile
Personal Property	Total personal property value
Monthly Income	Monthly income before deductions, adjusted by the CPI
Income 1	Current annual income
Income 2	Annual income from the past year
Income 3	Annual income from the year before past
Monthly Expense	Proposed amount of monthly expense
Rent Mortgage	Monthly rent or mortgage payment
Business Owning	Monthly expense for operating a business
Alimony Payments	Monthly alimony payments
Support Dependent	Monthly payments for supporting additional dependents
Payment to Creditors	Total monthly payment to creditors
Legal and Court Fees	Legal and court fees, including filing and lawyer costs
Marital Status	Single, Married or Divorced
Atlanta	Binary variable, indicate if filed in the Atlanta office

Table 3.3: Summary Statistics of PACER Variables of Chapter 13. Number of Observed > 0, [Mean(SD)]

Yr/VAR	Unsecured Debt	Secured Debt	Credit Card	Medical Bill	Student Loan	Monthly Income
2003	231 [13470 (18934)]	248 [83800 (119751)]	167 [4488 (10117)]	101 [1537 (6074)]	23 [1100 (6525)]	253 [2555 (1295)]
2004	197 [15676 (21238)]	204 [84546 (83066)]	144 [6007 (13264)]	87 [481 (1404)]	18 [1262 (8246)]	208 [2577 (1269)]
2005	274 [21606 (29644)]	279 [99344 (84673)]	211 [7723 (17950)]	116 [783 (2098)]	37 [2807 (11959)]	286 [2765 (1313)]
2006	264 [22754 (30909)]	273 [124897 (100148)]	215 [10537 (20179)]	113 [1065 (4147)]	42 [3242 (15401)]	280 [2936 (1393)]
2007	349 [24472 (29389)]	354 [138711 (136764)]	284 [9372 (18821)]	144 [918 (3728)]	48 [2266 (10246)]	364 [2966 (2424)]
2008	447 [31233 (41100)]	455 [133138 (114542)]	348 [11052 (21748)]	194 [1199 (4140)]	73 [4267 (15892)]	459 [2727 (1591)]
Yr/VAR	Income 1	Income 2	Income 3	Monthly Expense	Rent or Mortgage	Real Property
2003	249 [10528 (10429)]	251 [24872 (15323)]	251 [25161 (16880)]	253 [2140 (1204)]	242 [702 (419)]	151 [84197 (113965)]
2004	206 [11205 (10449)]	204 [23289 (17267)]	204 [24140 (20780)]	208 [2208 (1124)]	203 [743 (447)]	139 [90438 (100492)]
2005	274[15016(12902)]	278[26781(17182)]	280[27753(18021)]	286[2494(1181)]	276[876(485)]	184[96752(93049)]
2006	267 [21615 (20748)]	261 [33226 (24951)]	267 [32738 (25320)]	280 [3045 (5125)]	271 [931 (485)]	203 [113334 (116726)]
2007	348 [20489 (18252)]	347 [34632 (32962)]	356 [34974 (35631)]	364 [2896 (2216)]	358 [1036 (509)]	268 [120714 (131789)]
2008	448 [21697 (20760)]	454 [36703 (27279)]	446 [35759 (36447)]	459 [2693 (1528)]	438 [984 (572)]	318 [116993 (115077)]
Yr/VAR	Real Equity	Automobile Value	Personal Property	Credit Payments	Legal Cost	Atlanta
2003	145 [19248 (36298)]	253 [12308 (8435)]	253 [13819 (12889)]	35 [168 (596)]	132 [211 (405)]	[.6482 (.4784)]
2004	133 [19218 (32167)]	208 [13931 (11387)]	208 [16290 (14211)]	35 [944 (9510)]	106 [172 (387)]	[.4903 (.5011)]
2005	158 [12835 26499)]	286 [15608 (11524)]	286 [18929 (22771)]	68 [2197 (19266)]	187 [322 (970)]	[.6818 (.4665)]
2006	126 [6931 (41196)]	280 [16770 (16797)]	279 [21968 (226520]	87 [423 (1846)]	229 [320 (562)]	[.7214 (.4490)]
2007	118 [−2123 (39791)]	364 [16900 (18097)]	364 [25722 (72230)]	95 [300 (833)]	305 [372 (742)]	[.75 (.4336)]
2008	170 [1804 (35999)]	459 [18096 (21857)]	458 [23137 (24109)]	120 [320 (836)]	398, [319 (633)]	[.6688 (.4711)]

Table 3.4: Summary Statistics of PACER variables of Chapter 7. Number of Observed > 0, [Mean (SD)]

Yr/VAR	Unsecured Debt	Secured Debt	Credit Card	Medical Bill	Student Loan	Monthly Income
2003	203 [34497 (39513)]	173 [71056 (94533)]	171 [13361 (22114)]	87 [1987 (8544)]	16 [1093 (5620)]	203 [2496 (2509)]
2004	196 [32768 (33246)]	162 [66429 (79927)]	174 [11642 (15484)]	84 [1908 (7300)]	21 [1412 (5572)]	197 [2234 (1060)]
2005	419 [49937 (86213)]	344 [75149 (119515)]	371 [17733 (25995)]	201 [2853 (11411)]	53 [1984 (7418)]	423 [2277 (1257)]
2006	254 [44105 (51241)]	209 [89548 (128266)]	222 [18478 (27091)]	131 [2339 (7175)]	51 [4613 (19241)]	256 [2347 (1769)]
2007	487 [41641 (115001)]	465 [130017 (15697)]	420 [17233 (47800)]	207 [903 (2619)]	81 [2808 (10418)]	500 [2676 (2136)]
2008	516 [89938 (324590)]	451 [140341 (23912)]	440 [24579 (34087)]	255 [2263 (6637)]	71 [4632 (28169)]	516 [2197 (2298)]
Yr/VAR	Income 1	Income 2	Income 3	Monthly Expense	Rent or Mortgage	Real Property
2003	194 [12600 (13776)]	198 [26009 (23896)]	196 [25596 (25102)]	203 [2767 (2888)]	188 [656 (476)]	84 [63398 (101221)]
2004	191 [12296 (11739)]	192 [22891 (17758)]	192 [22125 (16852)]	197 [2354 (1051)]	185 [603 (383)]	90 [59899 (182121)]
2005	98 [14803 (14269)]	404 [25184 (17892)]	405 [25013 (21688)	423 [2654 (2694)]	391 [656 (479)]	168 [65015 (122916)]
2006	240 [16495 (17274)]	237 [24078 (19887)]	232 [24277 (22549)]	256 [2803 (3414)]	238 [761 (466)]	102 [69838 (109384)]
2007	470 [17867 (16101)]	479 [31607 (28427)]	481 [30686 (31466)]	500 [2820 (2008)]	485 [957 (485)]	315 [108303 (131259)]
2008	459 [18718 (34697)]	477 [29070 (33438)]	470 [28393 (42956)]	516 [2794 (2559)]	471 [859 (622)]	261 [10821 (184990)]
Yr/VAR	Real Equity	Automobile Value	Personal Property	Credit Payments	Legal Cost	Atlanta
2003	84 [8536 (17634)]	203 [14074 (11894)]	203 [18820 (27847)]	21 [126 (545)]	137 [507 (562)]	[.5123 (.5010)]
2004	90 [7671 (16684)]	197 [13150 (8900)]	197 [16168 (16642)]	30 [1109 (10696)]	147 [546 (545)]	[.6040 (.4902)]
2005	162 [4027 (20389)]	423 [13875 (16821)]	423 [17181 (30231)]	94 [844 (5342)]	345 [600 (502)]	[.6453 (.4789)]
2006	102 [251 (17192)]	256 [13925 (13606)]	256 [17124 (19563]	69 [893 (10172)]	217 [775 (642)]	[.7070 (.4560)]
2007	315 [−5202 (36420)]	500 [16425 (15294)]	500 [19686 (57619)]	161 [337 (888)]	447 [644 (780)]	[.454 (.4983)]
2008	261 [−7368 (37956]	516 [16812 (23420)]	516 [22891 (47971)]	146 [660 (4130)]	449 [993 (936)]	[.6240 (.4848)]

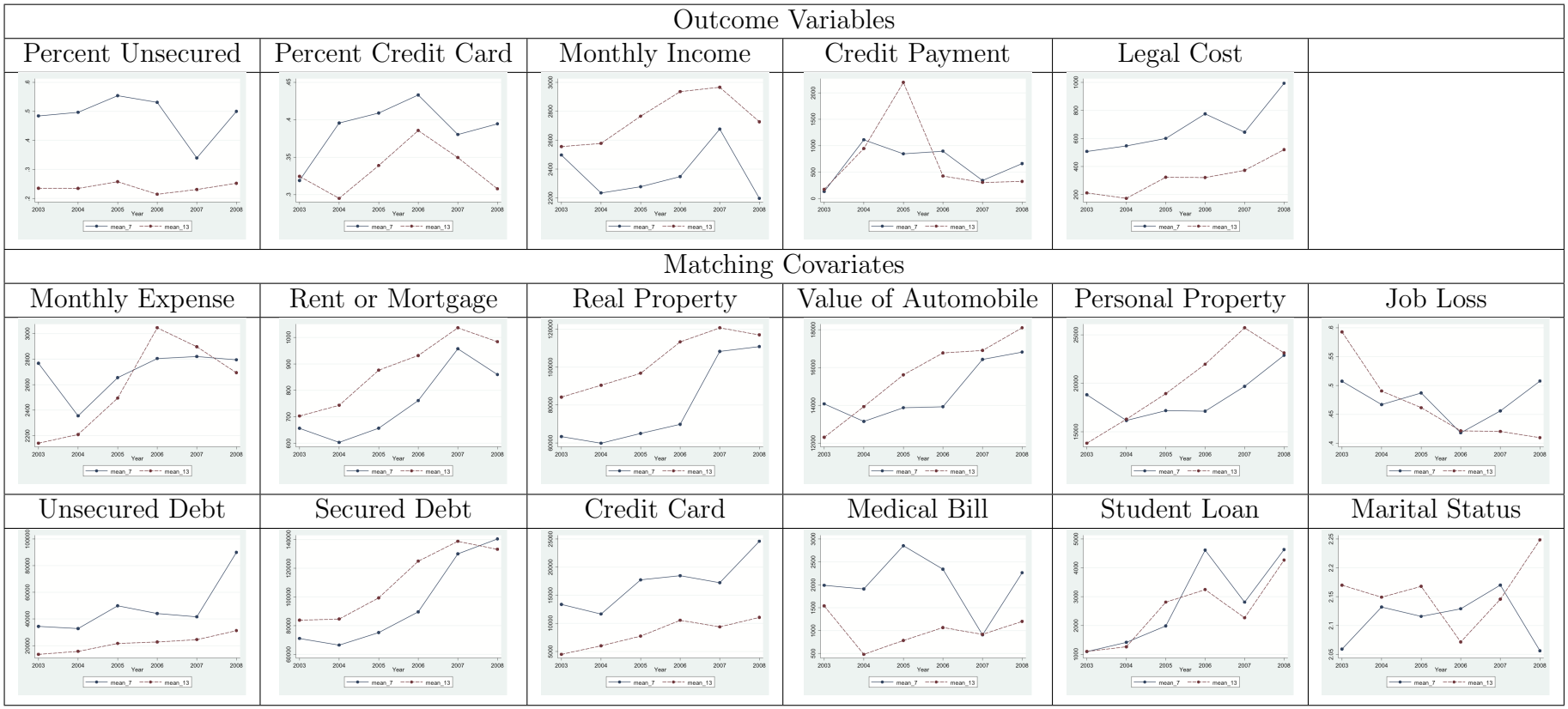


Figure 3.1: Means of the PACER Variables, by Year by Chapter.

Chapter 4

The Effects of the 2005 BAPCPA on Petitioner Characteristics: Evidence from PACER Data

4.1 Introduction

The Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) was the first major bankruptcy reform since the bankruptcy code of 1978. The ever increasing number of filings and discharged debt through bankruptcy courts triggered the passage of this law. Credit card and loan companies lobbied for a stricter bankruptcy reform, while the policy makers argued for stricter rules to prevent "opportunists" from abusing the bankruptcy system.

Two broad goals of the BAPCPA were to reduce filings and shift the composition of filings toward chapter 13. The legislation includes a number of important provisions in support of these goals, two of the most important of which are restrictions on the homestead exemption and a means test. Homestead exemptions had been easy to claim under chapter 7, which allowed petitioners to protect most of their assets from being used to repay outstanding debts. After the BAPCPA, the homestead exemption is still available, but now restrictions make hiding assets in a residence form of homestead harder to implement. Under the BAPCPA, petitioner must use the homestead exemption in the state she is originally from; and if a home is purchased within 2.5 years prior to filing chapter 7, the homestead exemption is capped at $\$125,000$. In addition, any additional equity converted from a nonexempt asset

(by paying down a mortgage) within 3.5 years prior to filing Chapter 7, cannot be exempted anymore.

The means test essentially abolishes petitioners' freedom to choose between chapters. After the enactment of the act, petitioners whose incomes are higher than their states median income are required to take a means test. The test calculates a petitioner's disposable income to his ability to pay debt. If a petitioner's annual income exceeds \$166.67 after deducting necessary living costs, she is required to file under chapter 13 or not filing at all, chapter 7 is no longer an option.

I examined the effects of these homestead exemption restrictions and the means test using a state level data in the chapter 2 of the dissertation. I examined the law changes by comparing the percentage of chapter 13 filings in states that were more sensitive to the different provisions of the act after 2005, with states that were less sensitive before 2005. "Sensitive" states were defined as those with generous homestead exemptions and larger percentages of population with incomes less than the states' average. By this difference-in-difference treatment effect estimation method, I find increased percentages of chapter 13 filings at state level due to these two provisions.

There are other provisions under the BAPCPA that increased the filing costs of bankruptcy. For chapter 7 petitioners, the filing cost increased from \$600 to \$2,500 and from \$1,600 to \$3,500 for chapter 13 cases. The required length between two filings also increased, from 6 to 8 years for chapter 7 filers and from 6 months to 2 years for chapter 13 petitioners. For original chapter 13 petitioners, there are also changes in the BAPCPA to preclude these potential chapter 13 petitioners from filing at all, the most important of which is the right to propose their repayment plans. Courts now require that petitioners use 100% of their disposable income in the future five years to repay any outstanding debt. The disposable income amount is now calculated by the court using a standard rule. In addition, the "super discharge" clause is now abolished. The super discharge option had been used to attract more voluntary chapter 13 filings before the BAPCPA; it allowed the discharge

of certain types of debts which were not dischargeable through filing consumer bankruptcy, such as student loans.

Overall, the BAPCPA raised both the direct and indirect cost of filing. Potential behavioral responses included would be petitioners changing their debt profiles and deciding against filing. Some likely increased their unsecured debt, especially the types of unsecured debt that mostly easy to discharge, to compensate for the increased costs of filing. Others may have reacted to the increased costs by not filing. Therefore, post-BAPCPA petitioners should tend to have worse financial situations and file more likely because of adverse shocks. In addition, there may be unintended side effects of the BAPCPA, such as a higher likelihood of hiring a bankruptcy lawyer.

In this chapter, I examine these above-mentioned effects of the BAPCPA on petitioner behaviors before and after the enactment of this reform, using a unique dataset on individual petitioners covering the period from 2003 to 2008, and non-parametric matching methods. I employ matching estimations because there is no naturally designed control group for identifying the treatment effect. I match the pre-BAPCPA petitioners on their personal characteristics to post-BAPCPA petitioners and compare their percentages of total debt that is unsecured, percentage of unsecured debt associated with credit card, monthly income, monthly payments to creditors and their legal costs.

My findings can be summarized as follows. For both chapters, unsecured debt as percentage of total debt and credit card debt as percentage of total unsecured debt increased after the BAPCPA. For chapter 13 petitioners, the effects were 5.56 and 7.53 percentage points; for chapter 7 petitioners, effects were 7.95 and 9.45 percentage points. Monthly income of petitioners decreased after the BAPCPA for both chapters. The decreases were \$273 and \$317 for chapter 13 and chapter 7 petitioners, respectively. Thus, after the reform, a typical filer's ability to pay was worse, consistent with the goals of the law change. In addition, the legal costs associated with bankruptcy on average, increased an average of \$235 for chapter 13 petitioners and \$114 for chapter 7 petitioners after the BAPCPA. Finally, monthly pay-

ments to creditors at the time of filing increased after the BAPCPA. I observe about $220 more in monthly payments to creditors under chapter 7 cases, and a $900 increase for chapter 13 petitioners. However, the increase for chapter 13 petitioners was not significant.

In section 4.2, I will briefly describe the dataset I use in this chapter. Section 4.3 will be a short survey on matching estimations. Sections 4.4 and, 4.5 discuss matching implementation and the results. Section 4.6 concludes.

4.2 Data Description

My analyses are based on a sample of about $4,000$ petitioners who filed for bankruptcy between 2003 and 2008. The data were collected from online bankruptcy petition forms through the Public Access to Court Electronic Records (PACER.) U.S. law requires that all documentation submitted to any court be available for public view. However, only recently and gradually have these documents become accessible as electronic files through the Internet.

I downloaded case numbers filed in the northern district bankruptcy court of Georgia from 2003 to 2008, and randomly selected 10% of these cases to construct my sample. I used a JAVA program to read the contents of the petition forms into spreadsheet. Some files were discarded because the JAVA program was not able to read them. This occurred for one of two reasons: either the petition form was in an image format which could not be read, or completed differently from others. The JAVA program uses the regular expression[1] to search for the patterns of characters in the petition forms, so when the form is written differently, such as in the ordering of words and tables, the program stops functioning. The final sample contains $3,945$ observations, $2,095$ chapter 7 filers and $1,850$ chapter 13 filers. Table 4.1 reports the number of observations by year and chapter. The number of chapter 7 cases rose sharply in 2005 and dropped in 2006 as potential bankruptcy candidates rushed to file under the old bankruptcy rules. Also, total filings increased in 2007 and again in 2008 in the wake of the financial crisis.

From each petition form, I obtain information on debts, assets and financial status. Personal information includes only a debtor's name and address; other personal information such as race, age and education are not reported on the petition forms. Table 4.2 lists the variables used in estimation and their definitions.

Table 4.3 presents the means and standard deviations of the outcome variables and the matching covariates, by year. The main empirical questions of this paper are whether petitioners increase their potential financial gains as reactions to the increased costs of filing; holding petitioners filing for the similar levels of debt before and after the BAPCPA, how their financial status such as income and financial management such as monthly payments to creditors change, and whether there are any external effects of the law change, such as increased legal cost. Therefore, outcome variables of interest are percentage of total debt that is unsecured, percentage of unsecured debt associated with credit cards, monthly income, monthly payment to creditors and legal cost.

Beside the outcome variables, there are variables used as matching covariates. The debt-related variables are the major focus of my analyses. The petition form provides information on total secured debt, total unsecured debts and all components of unsecured debt such as credit card debt, medical claims and student loan claims. Variables related to assets and financial statuses are used as matching covariates as well, the forms report monthly income and monthly expenses. Asset variables include the current value of real estate, value of automobile and total value of personal property.

The form also provides income data for the past three years, which I use to infer unemployment status. Therefore, if the current year of income is less than half of any past year's income, I conclude that the petitioner experienced a job loss. In addition, cases were filed in four different offices under the northern district bankruptcy court of Georgia, thus a binary variable which indicates whether the case was filed in the Atlanta office is also used as matching covariate to control for the petitioner's location.

Other matching covariates are receive alimony, owning a business and supports for dependents. However, only a small percentage of observations reporting values greater than 0 for these variables. Therefore, for estimation purposes, I use these data as indicator variables. For example, if an observation reports an amount greater than 0 for alimony, the dummy variable indicates if the petitioner receives alimony takes the value of 1.

The legitimacy of the matching procedure depends on the value of these variables from the treatment and control groups overlapping. For every variable, observations from before and after the BAPCPA should have a common support. To test the assumption, I constructed the kernel densities of these variables for before and after the BAPCPA. These are displayed in Appendix A. For most of the variables, the kernel densities from before and after the act largely overlap with each other. I will address this matter more in depth in section 4.3.2.

4.3 Introduction to Matching Estimation

In this paper I employ a covariate matching as the estimation method to analyze the PACER dataset. Matching estimation is a popular choice in the recent literature on treatment effect analysis and program evaluation. Imbens and Wooldridge [2] summarized its advantages compared to traditional parametric estimations. The first and most important advantage is that, matching does not require of any prior functional form assumptions or distribution. Second, because of the unique set up of such estimation, the causal effect could be more clearly distinguished. Third, Imbens and Wooldridge suggested that by using this framework it is easy to separate modeling from the assignment mechanism. They gave an example of the labor market analysis of program participation to earnings, where we could first model earnings conditional on individual characteristics without the enrollment, then model with the outcome with enrollment, again conditional on individual characteristics, and finally model the probability of enrollment given earnings under both treatment arms. Lastly, this framework only requires assumptions on the observables which are the matching covariates, instead of unobservables, which are typically the error terms in parametric regressions.

4.3.1 The Matching Estimators

Matching Estimator for the ATE

Fisher [3] first introduced the idea of a matching estimator by developing a framework trying to estimate treatment effects. The basic idea of matching is straightforward: for each individual who receives the treatment, there will be one or several matched individuals from the "control" group; their observed differences in the outcomes are the estimated treatment effects. Averaging across all pairs of matches results the average treatment effect (ATE). Formally, define as

$$Y_i = Y_i(D_i) = \begin{cases} Y_i(0) & \text{if } D_i = 0, \\ Y_i(1) & \text{if } D_i = 1. \end{cases} \tag{4.1}$$

where D is a binary variable equal to 1 if an individual i is exposed to the treatment, Y_i is the outcome of each individual, with value $Y_i(0)$ for individuals who did not receive any treatment, and $Y_i(1)$ for those who get treated. Empirically, we are interested in the average of the differences between all $Y_i(0)$ and $Y_i(1)$, which is the matching estimator of the ATE, and can be expressed as

$$\sigma^{\text{pop}} = E[Y(1) - Y(0)] \tag{4.2}$$

$$\sigma^{\text{sample}} = \frac{1}{N}\sum_{i=1}^{N}[Y_i(1) - Y_i(0)] \tag{4.3}$$

The process of matching individuals from control and treatment groups is critical to all matching estimators. The ideal is that there are counterparts to the treated individuals in term of age, sex, education and all other personal characteristics, with the only difference being the treatment status. In practice, individuals from the control and treatment groups are matched on the basis of covariates. For example, I examine the differences in the debt profiles of petitioners who filed before and after the BAPCPA. Bankruptcy petitioners observed from before and after the BAPCPA who had very similar values of real property, automobile, monthly income, monthly expense, employment history, location, debt profile and marital status will be matched.

The ATT Estimator

For policy purposes, we are often interested in the average treatment effect on the treated (ATT). The ATT is calculated similarly to the ATE, only the average is now taken among all individuals who receive the treatment.

$$\sigma^{\text{pop, att}} = E[Y(1) - Y(0)|D = 1] \tag{4.4}$$

$$\sigma^{\text{sample, att}} = \frac{1}{N} \sum_{i|D=1} [Y_i(1) - Y_i(0)] \tag{4.5}$$

The ATT estimator is important because sometimes we only care about how the targeted audiences react to the experiment, not the entire population. In the case of my analyses, my only interest is the effects of the new policy on those who are and will be affected, thus I will focus on the ATT estimator in the following sections of the paper.

4.3.2 Assumptions and Properties

Non-Confoundedness

Ideally, for each treated individual observed, we can find her non treated counterpart in the data. However, treatment status should be randomly assigned conditional on the matching covariates Z. Because if this was not the case, we are permitting individuals to select themselves into the treatment based on an expected value of the outcome Y_1 or Y_0; then the estimation result will be inconsistent. This assumption is similar to the strict exogeneity restriction in a linear regression model. Formally, the condition can be expressed as follows,

$$(Y_0 , Y_1) \perp D \mid Z \tag{4.6}$$

which says Y_0 and Y_1 outcomes are independent of the treatment conditioned on the covariates Z. In my analyses, petitioners who filed for bankruptcy after 2005 were affected by the new policy, whereas those who filed before 2005 were not. It is likely that cases filed close to October 17, 2005 may have self selected into the treatment group, because those who would have filed after the enactment date rushed to file beforehand to exploit the old

rules. Including such individuals in the matching estimation will result in inconsistency. The estimated difference between individuals who file just before the enactment date and their counterparts from the post-BAPCPA period will reflect differences in their personal characteristics but not just the effect of the new law. Thus, to avoid the selection problem, I exclude observations close to the enactment date in my empirical analysis.

Non confoundedness requires that the treatment does not help to predict the value of the outcome conditional on the matching covariates. Therefore, if I were to test the effect of the BAPCPA on petitioners' real property value, thus having the real property value as the outcome variable Y, before or after the BAPCPA as the treatment variable D, and match on the same set of covariates Z, this covariate matching estimation would violate the non confoundedness assumption. This is because during the post-BAPCPA period, there is also the presence of a real estate shock which decreased the average value of real estate in the U.S. Therefore, in this case, the treatment variable is not independent to the outcome variable.

Overlapping

In addition to non-confoundedness, an "overlapping" condition must hold for the matching estimator to be consistent. The condition requires that

$$0 < \Pr(\mathrm{D} = 1 \mid \mathrm{Z}) < 1 \tag{4.7}$$

which says that individuals sharing similar personal characteristics either receive the treatment or not with probability between 0 and 1. Therefore, for each individual in the dataset, there is a counterpart on the other side of the treatment who overlaps with her in terms of Z. This assumption ensures that for each individual who receives the treatment, we can find at least one match for her in the control group. Appendix A provides figures which overlap the kernel densities of the matching covariates from before and after the BAPCPA.

Asymptotic Normality and Variance Estimation

Abadie and Imbens [4] introduced three assumptions for establishing the asymptotic properties of the matching estimator. First assumption requires that common support region S_p needs to provide compact and convex support of Z, with non-zero probability density, which means that if we draw a line between any two points on S_p, any other points on this line will be within S_p, examples would be Poisson and Chi-squared distributions. The second assumption requires that the proportion of treated and controlled observations should represent the true population. Lastly, it requires a "simple set of weak smoothness restrictions on the conditional distribution of Y given Z". Altogether the matching estimator is asymptotically normal. In particular, they prove that

$$(V^E + V^{\sigma(Z)})^{1/2}\sqrt{N}(\sigma_M^{\text{sample}} - \text{Bias}_{\text{M}}^{\text{sample}} - \sigma) \xrightarrow{\text{d}} \text{N}(0,1) \tag{4.8}$$

where V^E is the conditional variance and $V^{\sigma(Z)}$ is the marginal variance. σ_M^{sample} is the conditional bias, and σ is the matching estimator of the population. Using central limit theorem and the law of large numbers, the probability distribution of the bias term: $\sigma_M^{\text{sample}} - \text{Bias}_{\text{M}}^{\text{sample}} - \sigma$ in the second set of parentheses goes to 0. Abadie and Imbens also point out that for sufficient low rank conditions, the bias term can be ignored, and proved that when $k = 1$ or $r > k/2$, the bias term vanishes. (Details of the proofs are given in the Appendix of Abadie and Imbens [4].) As Abadie and Imbens [5] point out, in practice, this bias term is correlated with the difference in the matched units and their matches, when the matching of the covariates is not exact. In practice, we would like to remove the bias term by adopting the bias-adjusted estimator that adjusts for this difference.

Following the equation 4.8 above, the asymptotic variance of the matching estimator becomes,

$$\begin{aligned} \hat{V} &= \frac{1}{N}\sum_{i=1}^{N}(\hat{Y}_i(1) - \hat{Y}_i(0) - \hat{\sigma}_M^{\text{sm}})^2 \\ &+ \frac{1}{N}\sum_{i=1}^{N}[(\frac{K_M(i)}{M}) + (\frac{2M-1}{M})(\frac{K_M(i)}{M})]\hat{\sigma}^2(Z_i, D_i), \end{aligned} \tag{4.9}$$

where M is the number of matches for each treated, K is the dimension of the matching covariates. Similarly, estimated conditional variance takes the form of,

$$\begin{aligned}\hat{V}^t &= \frac{1}{N_1}\sum_{D_i=1}^{N}(Y_1 - \hat{Y}_i(0) - \hat{\sigma}_M^{\text{sm}})^2 \\ &+ \frac{1}{N_1}\sum_{i=1}^{N}(1-D_i)(\frac{K_M(i)(K_M(i)-1)}{M^2})\hat{\sigma}^2(Z_i, D_i),\end{aligned} \tag{4.10}$$

where $\hat{V}^t$ is the estimated variance conditional on being in the treatment group, the second term vanishes if $D_i = 1$; when the observation is from the treated.

Assumptions when Estimating ATT

As noted above, I am more interested in the ATT estimator, which is consistent under weaker assumptions than the ATE matching estimator. Instead of non-confoundedness, the ATT matching estimator only requires the outcome of Y_0 be uncorrelated or independent of the treatment:

$$E(Y_0 \mid Z, D = 1) = (\ Y_0 \mid Z,\ D = 0\ ) = E(Y_0|Z) \tag{4.11}$$

In addition, the overlapping assumption is also weaker, requiring only that $Pr(D = 1|Z) < 1$. Assuming these two weaker assumptions hold, the ATT estimator can be written as

$$\begin{aligned}\Delta_{TT} &= E(Y_1 - Y_0|D = 1) \\ &= E(Y_1|D = 1) - E_{Z|D=1}[E_Y(Y|D = 1, Z)] \\ &= E(Y_1|D = 1) - E_{Z|D=1}[E_Y(D = 0, Z)]\end{aligned} \tag{4.12}$$

In other words, the value of D, be 1 or 0, does not help to predict of Y_0 condition on Z. If equation (4.12) holds true, it excludes the probability that individuals select themselves into the treatment, conditional on the expected value of Y_0. However, note that this assumption does not restrict individuals from selecting into the treatment based on their expected value of Y_1, but it does require that the participation decision be conditional on those unobserved

determinants of Y_1 , but not Y_0 (Todd [6]). In this study it is reasonable to believe that most of the individuals observed after 2005 did not intentionally wait to file after the passage of the law.

4.3.3 Extensions of the simple Matching Estimator

Propensity-Score Matching

Traditional matching can suffer from the curse of dimensionality because the calculations increase in complexity as the number of matching covariates increases. An alternative is to match on a propensity score, which is an individual's probability of being assigned to the treatment based on a set of covariates. Introduced by Rosenbaum and Rubin [7], propensity score matching solves the dimensionality problem by combining a linear regression with the matching technique therefore decrease the calculation complexity. They show that for random variables Y, Z and D, that

$$E(D|Y, Pr(D = 1|Z)) = E(E(D|Y, Z)|Y, Pr(D = 1|Z) \tag{4.13}$$

Because we have $E(D|Y, Z) = E(D|Z)$,

$$E(D|Y, Pr(D = 1|Z)) = E(D|Pr(D = 1, Z)) \tag{4.14}$$

Since Y_0 is independent of the probability of that $D = 1$, when the matching on covariates Z is valid, so is matching on the $Pr(D = 1)$ conditional on Z. However, it requires the estimation of propensity score to be available.

The implementation of the propensity score matching is straightforward. The propensity score is the fitted value from a logit or probit regression of regressing the treatment variable on the same set of matching covariates Z. The propensity score matching estimator takes the form,

$$\hat{\sigma}_M = \frac{1}{n_i} \sum_{i \in I_1 \cap S_p} [Y_{1i} - \hat{E}(Y_{oi}|D = i, P_i)] \tag{4.15}$$

where

$$\hat{E}(Y_{oi}|D=i,P_i)=\sum_{j\in I_o}W(i,j)Y_{oj} \tag{4.16}$$

and S_p is the region of common support for both participants and non-participants. The region of common support can be estimated as,

$$\hat{S}_p=[P:\hat{f}(P|D=1)>0 \text{ and } \hat{f}(P|D=0)>C_q] \tag{4.17}$$

where $f(P|D=1)$ is the standard non-parametric density estimator and C_q is the density cut off level [6].

Cross-Sectional Matching Estimator

$$C(P_i)=\min_j||P_i-P_j||, \quad j\in I_o \tag{4.18}$$

The idea of the classic matching estimator, also called the nearest-neighbor matching estimator is straightforward. Individuals from the treated and controlled groups with the smallest difference between their propensity score will be matched together. However, the downside of such estimator is that it does not allow any observation from the controlled group to be used more than once; *i.e.*, there is no allowance for replacement. Thus, such estimator's outcome significantly depends on the initial ordering of treatment observations. Which control observation will be matched to a treatment observation depends on where in the "queue" the treatment individual stands. Sometimes a better match will be chosen for treatment observations that came earlier.

To solve the problem, Cochran and Rubin [8] proposed the idea of a "caliper" matching estimator, where they imposed a restriction on how far the "distance" between two matched pair can be. Although caliper matching estimator eliminates "forced" bad matching pairs, what should be the imposed distance between a pair of match is critical in this setting.

Dehejia and Wahba [9] introduced the stratified or interval matching estimator. With this approach, pairs of matches with distances not significantly different from each other are

grouped into the same interval. The ATE will then be weighted across all the intervals by their distance functions. The Dehejia and Wahba procedure takes into the consideration that some of the matches are not as "strong" as others in predicting the outcome.

Heckman et al. [10] generalized the kernel matching estimator. Kernel matching is similar to interval matching, except that the weight is defined within many matches from the control group to one treatment variable. Thus, a treated individual will be matched to more than one individual who did not receive the treatment, with the differences in outcomes between the treated individual and the others weighted using the kernel.

$$G(.) = \frac{G(\frac{P_j - P_i}{a_n})}{\sum_{k \in I_0} G(\frac{P_k - P_i}{a_n})} \tag{4.19}$$

Consequently, the kernel matching estimator takes the form,

$$\hat{\sigma}_{\text{kernel}} = \frac{1}{n_1} \sum_{i \in I_1} [Y_{1i} - \frac{\sum_{j \in I_0} Y_{0j} G(\frac{P_j - P_i}{a_n})}{\sum_{k \in I_0} G(\frac{P_k - P_i}{a_n})}] \tag{4.20}$$

where a_n is the bandwidth parameter of choice. The difference in the outcome variable between the treated individual i and its matched individual j, is now weighted by the relative distance in propensity score between individual i and j to individual i and its other matches.

In the context of the PACER data, kernel matching implies comparing two pairs of matched petitioners, and if the two petitioners from the same pair are more similar in terms of estimated propensity score based on Z than the other two matched petitioners, then the difference in Y between former pair will carry more weight when calculating the average treatment effect. Basically, this procedure gives less weight to bad "matches".

In addition, for all kernel density estimations, the choice of bandwidth is also critical. Bandwidth is the smooth parameter for all kernel estimations. Therefore, a small bandwidth usually creates larger variance whereas a larger value of the bandwidth can sufficiently decrease the variance, however, increases the bias. In the context of this paper, bandwidth is bounded between 0 and 1 because the propensity score is the probability of receiving the treatment. Choosing a bandwidth is similar to choosing the number of matches for covariate

matching; there is no definitive answer, which is often a criticism of matching estimators. STATA's default choice of bandwidth for kernel matching estimator is 0.06.

4.3.4 Implementation of the Matching Estimator

For this paper, I choose covariate matching instead of propensity score matching for couple of reasons. Heckman et al. [11] suggested that the most obvious advantage of propensity-score matching was its simplicity in estimation. They also pointed out that propensity-score matching performs more efficiently in small samples when the dimensionality was large. However, neither concern arises in this paper. Also, Heckman et al. [11] showed that propensity-score matching did not necessarily reduce the asymptotic bias and variances of the estimators. Moreover, Zhao [12],argues that Monte Carlo experiments do not clearly favor one method over the other. Overall, the weight of the evidence argues for covariate matching in my study.

In addition, as I have mentioned in section 4.3.2, for a simple covariate matching estimator, there is a bias term when the matching is not exact. Thus, I employed the bias-adjusted estimating for the analyses of this paper.

Because the non-parametric matching literature is still relatively young, the guidelines for choosing the optimal covariates to match the treated and controlled observations on are limited. However, there are two common guidelines that can apply to most of the matching estimations. First, any available covariates that help identify the likelihood of two individuals should be included. Second, variables that are not independent of the outcome variable should be excluded from the list in order to avoid endogeneity problem.

4.4 Using Matching to Estimate the Effects of the BAPCPA

In section 4.3, I have introduced the reasons why a non-parametric framework may work better compared to a parametric regression, suggested by Imbens and Woodrige (2009). Their first and fourth reasons are why I choose to use a non-parametric matching to estimate

the effects of the BAPCPA here. First, matching requires fewer assumptions compared to regression. An alternative to matching is using a regression with a treatment dummy on the right-hand side to capture the effect of the BAPCPA on the changes in the outcome variable. Simply using coefficient of the treatment dummy to capture the effects of the law may result in bias. More importantly, because in treatment effect analyses, the treatment variable is very likely to be correlated with the error term, therefore the coefficient of the treatment dummy may be biased. However, in the matching framework, there is no requirement that the treatment variable be uncorrelated with an error term. It only requires that the treatment variable is independent to the values of the outcomes conditional on the matching covariates, to avoid the possibility of selection into the treatment. Because the treatment in the analyses of this paper is the post-BAPCPA period, the non-confoundedness assumption is much easier to assume, compared to the exogeneity assumption for a simple regression.

Second, because the treatment variable is often binary, to assume a linear functional form may be a misspecification of the model. Fortunately, as mentioned earlier, the matching estimation does not require assumptions about functional form or error distributions, as in the case of an OLS regression. Thus makes covariate matching a better estimation choice compared to an OLS regression. However, results obtained from simple regression estimations will also be reported, for the sake of comparison.

In section 4.3.2, I introduced two required assumptions under a simple matching: non confoundedness and overlapping. To assure that these two assumptions hold for the following estimations, I first exclude observations from 2005 to prevent confoundedness problem. Also, I check for the overlapping of the matching covariates from the treatment and control groups by comparing their kernel densities (Appendix A).

T-ratios robust to heteroskedasty are reported. In STATA, robust standard errors are calculated by performing a second round of matching process, with observations in the same treatment arm. My main results are based on 4 matches, however, I check for the robustness to the number of matches. In Appendix B, I reported results for $1, 2, 8$ and 16 matches; the

differences between results estimated using different number of matches are only within a very small percentage. For example, estimates for the effect of the BAPCPA on the percentage total debt that is unsecured are all around 5 percentage points, only when the number of matches is increased to 16, the estimates is about 4 percentage points. Thus I conclude that the results are robust to the number of matches. Finally, each petitioner response is investigated by chapter, so that all estimated effects are conditional on chapter choice.

4.4.1 Debt Structure

Fay et al. [13] argue that households' bankruptcy decisions are correlated with the total financial gains they receive from filing. According to Fay et al. financial gains are calculated as

$$\text{FinBen} = \max[\text{D} - \max(\text{W} - \text{E}, 0), 0] \tag{4.21}$$

where D is the total amount of discharged debt, W is the petitioner's wealth or income, and E is the property exemption level. The term $W - E$ is the generalized amount that the petitioner pays out through bankruptcy, including any cost of filing. The BAPCPA caused $W - E$ to rise, thus reducing financial benefits. For the same financial benefits to remain constant, a new level of D is needed. Thus after the BAPCPA, the discharged debt for a typical filer increased.

There are two types of debt in bankruptcy cases: secured and unsecured. Secured debt is borrowed with collateral to secure lending, whereas unsecured debt is based on credibility of a borrower. Therefore, any potential dischargeable debt will be generated from unsecured debt.

The major categories of unsecured debts include credit card claims, student loans and medical bills. Student loans are not dischargeable through bankruptcy, which means that although there is no collateral, the lender, which typically is the federal government, still has the legal right to collect this type of debt from petitioners after the bankruptcy case is

closed. Medical bills are a different form of unsecured debt. It is usually the result of personal illness, which is likely to be exogeneous to the bankruptcy decision.

Therefore, to test whether potential amount of dischargeable debt increases, I estimate changes in the percentage of total debt that is unsecured debt and the percentage unsecured debt that is associated with credit cards. Formally, I am testing two hypotheses:

$$H_1 \quad : \quad \Delta(\frac{\text{Unsecured Debt}}{\text{Total Debt}}) = 0 \tag{4.22}$$

$$H_2 \quad : \quad \Delta(\frac{\text{Credit Card Debt}}{\text{Unsecured Debt}}) = 0 \tag{4.23}$$

In both cases, the alternative hypothesis is that the percentage change is positive.

4.4.2 Ability to Pay

To estimate the effect of the BAPCPA on changes in petitioner types, I focus on changes in two variables: monthly income and monthly payments to creditors. Monthly income captures the ability to dispose of financial obligations and the need for financial help. In this case, I match only on secured and unsecured debt and percentage of unsecured debt associated with credit cards. The idea is to estimate, for those who seek the same level of potential dischargeable debt, how are personal characteristics of the petitioners change. In other words, I predict that the characteristics of petitioners with similar indebtedness before and after the BAPCPA are different. Because other covariates, such as rent and mortgage or the value of real estate, all at some levels correlate with the characteristics of a petitioner, which if included as matching covariates, would violate the non confoundedness assumption. Thus are excluded from this particular matching estimation.

Regular payments to creditors and the amounts of these payments reflect a petitioner's willingness to maintain her creditability. An opportunist who is planning to file for bankruptcy would likely to refrain from making regular monthly payments, because each payment will decrease the total financial gains from filing. On the other hand, those who unexpectedly experienced a financial shock and decided to file for bankruptcy probably were

still making timely payments beforehand. Therefore, I predict that monthly payments to creditors increase after the BAPCPA to reflect the increase of petitioners that are financially responsible however experiencing adverse shocks. To summarize, the two hypotheses are:

$$H_3 \ : \ \Delta(\text{Monthly Income}) = 0 \tag{4.24}$$

$$H_4 \ : \ \Delta(\text{Monthly Payments to Creditors}) = 0 \tag{4.25}$$

The alternative hypothesis for H3 is that the change in monthly income is negative; and the alternative hypothesis for H4 is that the change in monthly payments to creditors is positive.

4.4.3 Legal Cost

The new provision of the BAPCPA probably increased the complexity of filing. For example, the new means test requires the checking of a petitioner's disposable income to determine if the petitioner passes the test or not. Disposable income is calculated using a petitioner's monthly income minus her proposed expenses. However, whether the proposed expenses are necessary is a decision of the judge. Therefore, knowing which type of expenses to propose and which are the right bankruptcy courts or offices to file is now important for at least some petitioners, which means that after the BAPCPA, more results are due to objective decisions instead of subjective standards.

As a result of the substantially increased complexity after the BAPCPA, knowledge of an experienced bankruptcy lawyer may be more c the BAPCPA, which leads to the following hypothesis:

$$H_5 \ : \ \Delta(\text{Legal Cost}) = 0 \tag{4.26}$$

4.5 Results

Tables 4.4 - 4.8 report the estimated treatment effects and t-ratios for each outcome, by chapter. Columns 2- 4 report results for chapter 13 petitioners and 5-7 present the results for chapter 7 petitioners. Column 2 reports the results from the bias adjusted covariate

matching. Columns 3 and 6 give the coefficients of the BAPCPA indicator from a simple OLS regression method. Columns 4 and 7 repeat the matching procedure, but with observations from 2008 excluded to check the robustness of the results to onset of the financial crisis.

Results obtained from regression estimations are also reported as comparisons to the results obtained from matching. Qualitatively, all results from both estimation methods are consistent. However, quantitatively, compared to the covariate matching, using a simple regression method reports a smaller coefficient of the treatment dummy, although not always significantly. There are two possible explanations for the quantitatively differences.

First, recall that in section 3, one of the disadvantages of a parametric regression compared to a non parametric matching suggested by Imbens and Woodridge [2] is that for the OLS estimator to be unbiased there cannot be omitted variables that are correlated with the explanatory variables. However, this might not be the case for the OLS regressions here. Personal characteristics such as age and occupation may be correlated with during which period the petitioner filed for bankruptcy, however they are not observed in this dataset, thus causing potential bias in the estimated coefficient of the treatment dummy. Note that when there is a large difference in the magnitude of the estimates between the covariate matching and regression estimation, the estimated coefficient for the treatment dummy in the OLS regression is always insignificant.

Another explanation of the difference between the matching and the regression is suggested by Angrist and Pischke [14]. Characterizing OLS regression as a matching estimator, they point out that the matching put most of the weight on observations whose covariates were more than likely to be in the treatment group, whereas the regression puts most of the weight on observations whose covariates were equally likely to be either in the treatment or control groups. For example, in this paper, there is a noticeable difference between matching and regression on the estimated effects of the BAPCPA on the percentage debt that is unsecured. This could have happened because petitioners who are more than likely to file after the BAPCPA most likely to possess higher value of real property. Also, the changes brought

by the BAPCPA such as homestead exemption restrictions significantly reduce petitioners financial gains, so they are more likely to file strategically after the BAPCPA, such as planning the filing ahead of time and create more dischargeable debt in order to receive more benefits. Matching puts more weights on these petitioners, whereas the regression puts more weights on those who experience an adverse shock such as unemployment and illness, who are less likely to have different debt profiles from before and after the BAPCPA. Therefore, the matching has a larger estimated effect on the debt profile due to the BAPCPA.

4.5.1 Debt Structure

Table 4.4 reports the estimated effect of the BAPCPA on percentage of total debt that is unsecured. Covariate matching produces an estimated change of 5.56 percentage points with a t-statistic of 4.69, for chapter 13 petitioners. For chapter 7 petitioners, covariate matching produces an estimated change of 7.95 percentage points with a t-statistic of 4.02. Thus results for both chapters of petitioners are significant. Average total debt during the pre-BAPCPA period was $\$98,746$ and $\$102,375$, under chapter 13 and chapter 7, respectively. Therefore, the percentage-point effects translate into dollar increases of $\$5,530$ and $\$7,678$, respectively.

Table 4.5 reports the estimated effect of the BAPCPA on percentage of unsecured debt that is associated with credit cards. For chapter 13 petitioners, covariate matching produces an estimated increase of 7.53 percentage points with a t-statistic of 3.11. For Chapter 7 petitioners, the estimated increase is 9.45 percentage points with a t-statistic of 2.97. Both estimates are significant. For average total unsecured debt during the pre-BAPCPA period was $\$14,573$ and $\$33,633$ under chapter 13 and chapter 7 cases, respectively. Therefore, translated into dollar amounts, the estimated increases are about $\$1,097$ and $\$3,178$, respectively.

These increases are as expected because as the costs of filing increase, petitioners seek higher dischargeable debt through filing in order to receive similar amount of financial gains as if the BAPCPA was not in place. Since chapter 13 petitioners may need to use their

future income to pay any debt that is occurred, whereas chapter 7 petitioners may not be as responsible for any unsecured debt they created if they possess little asset. Therefore, larger effect of the BAPCPA on the percentage of total debt that is unsecured is observed for the chapter 7 petitioners.

Comparing the matching results to those obtained from regression, they are qualitatively the same, but regression estimates are smaller in magnitude. Also I have mentioned in Section 4.5, this may be caused by unobserved factors in the error terms correlating with the treatment dummy or how matching and regression weight observations differently. The estimated results are also qualitatively consistent with results from the estimation exclusive of the 2008 observations, for the estimation on the percentage total debt that is unsecured, results using the dataset exclusive of the 2008 observations are smaller in magnitudes. However, I argue that this does not suggest confoundedness in the estimates with the 2008 financial crisis. If that is the case, the estimates using the dataset exclusive of the 2008 observations should be greater in magnitudes, because the financial crisis caused many of those who file because of deprecation in housing value.

4.5.2 Ability to pay

Table 4.6 reports the matching results of the BAPCPA on filers' average monthly income. For chapter 13 petitioners, estimated change is $-\$273$ with a t-statistics of -3.24. For chapter 7 petitioners, the estimated change is $-\$1,128$ with a t-statistics of -8.61. To have a sense of this amount of change in term of percentages, average monthly incomes were $\$2,566$ and $\$2,365$, under chapter 13 and chapter 7 cases, respectively, during the pre-BAPCPA period. Therefore, the estimated percentage changes due to the BAPCPA are about 11% and 48%, respectively.

The decreased amount in monthly income for chapter 7 petitioners is unreasonably large and does not seem realistic. One reason that might have caused this was probably the 2008 financial crisis. Many job losses occurred during 2008 and a percentage of those people filed

for bankruptcy, and should easily pass the means test to file under chapter 7. Therefore, we observe the substantial decrease in monthly income from chapter 7 filers. Column 7 reports change in monthly income using data exclusive of 2008 observations. The result is $317 decrease in monthly income, which is about 13% decrease.

Table 4.7 reports the estimated effect of the BAPCPA on filers' monthly payments to creditors. Covariate matching reports an estimated change of $905 with a t-statistic of 1.01, for chapter 13 petitioners; and an estimated change of $220 with a t-statistic of 2.07, for chapter 7 petitioners. Average monthly payments to creditors were $556 and $618 before the BAPCPA. Therefore, the dolloar amount effects translate into percentage increases of 163% and 36% for chapter 13 and chapter 7 petitioners, respectively.

The result for chapter 7 petitioners are as expected. The increased payments to creditors reflect the responsiveness of petitioners, and we observe more petitioners with such characteristics after the BAPCPA. However, the estimated change in monthly payments to creditors is not significant under chapter 13 cases, and the regression estimation also reports a result that is qualitatively different. These results may suggest that the BAPCPA does not have significant effects on monthly payments to creditors for chapter 13 petitioners. White and Zhu [15] suggested that the major reason of chapter 13 filings is to protect housing against being foreclosed. Therefore, it is reasonable to believe that before the BAPCPA, chapter 13 petitioners were more responsible compared to chapter 7 filers. Therefore this estimated effect of the BAPCPA on monthly payments to creditors for chapter 13 filers is not significant.

4.5.3 Legal Cost

Table 4.8 reports the estimated effect of the BAPCPA on filers' legal costs of filing. Covariate matching reports the estimated change of $235 with a t-statistic of 2.81, for chapter 13 petitioners; whereas for chapter 7 petitioners, estimated change was an increase of $114 with a t-statistic of 2.87. Average legal costs during the pre-BPACPA period were $192 and $527;

therefore, the estimated dollar amount effects translate into percentage increases of 122% and 22% for chapter 13 and chapter 7 petitioners, respectively.

Results are as expected, because of a more complicated filing system, hiring lawyers becomes necessary in many cases. The increase in legal fees under chapter 13 is substantial; however, it is reasonable because from self filing to hiring a bankruptcy lawyer legal cost can rise from a few hundreds to a few thousands of dollars. In addition, the larger effect observed for chapter 13 petitioners is probably because that chapter 13 petitioners can no longer propose their own repayment plans after the BAPCPA. Therefore, strategies in filing are very important because it directly links to what is the percentage of the future five years of income that will be used to pay outstanding debts.

Estimation results for both chapters of petitioners are qualitatively and quantitatively similar with results using a regression method, or using a dataset exclusive of the 2008 observations. These consistencies suggest that the matching results are robust to the regression method and not confounded with the 2008 financial crisis.

4.6 Conclusion

In this paper, I estimate the effects of the BAPCPA on petitioner behaviors. This is the first study to do so. Specifically, I match the pre-BAPCPA petitioners to the post-BAPCPA petitioners on their personal characteristics and compare their percentages of total debt that is unsecured, percentage of unsecured debt associated with credit cards, monthly income, monthly payments to creditors and their legal costs.

I construct a dataset on bankruptcy petitioners who filed in the northern district bankruptcy court of Georgia, from 2003 to 2008. I employ a covariate matching estimation method to analyze the effects of the law. I find increases on percentages of debt that can potentially be discharged. Estimated increases on percentage total debt that is unsecured are 5.56 percentage points and 7.95 percentage points for chapter 13 and chapter 7 petitioners, respectively. The percentage of unsecured debt associated with credit cards increased 7.53

percentage points and 9.45 percentage points for chapter 13 and chapter 7 petitioners, respectively. I also find decreases on petitioners' monthly incomes of $273 and $317 for chapter 13 and chapter 7 petitioners. Both chapters of petitioners had higher monthly payments to creditors after the BAPCPA, the increases were $905 and $220 for chapter 13 and chapter 7 petitioners respectively; however, this estimated effect was only significant for chapter 7 petitioners. Lastly, I find that legal cost increased substantially after the BAPCPA was enacted, especially for chapter 13 petitioners, their legal costs increased by $235 after the BAPCPA. The estimated increase for chapter 7 petitioners was $114.

These findings suggest two main actions taken by the petitioners after the BAPCPA was enacted. First, those who filed for bankruptcy after the 2005, are more likely to increase the potential financial benefits they can receive from bankruptcy to compensate the increased cost. In addition, petitioners nowadays rely more heavily on bankruptcy lawyers to help them to gain higher financial benefits. Finally, I have also observed changes in the types of petitioners, which suggest that there were also potential petitioners who made decisions against bankruptcy filing because of the increased cost and standards of filing due to the BAPCPA.

Therefore, the BAPCPA was effective at some level in the sense of discouraging those who do not badly need the help from a bankruptcy court. However, for those with intention of abusing the system, the BAPCPA still leave room for them to achieve such goals. A law that directly speaks to the level of total dischargeable debt may help prevent opportunistic behaviors.

Because the dataset I use in this chapter is limited to only bankruptcy petitioners, therefore, effects of the BAPCPA on decision of filing can not be tested. In the future, possibility combining the PACER dataset with a dataset such as Survey of Consumer Finances may allow us to estimate such effects. In addition, the dataset is also limited to the bankruptcy petitioners in Georgia. Expanding this dataset to include all states may enable us to test the effects of the BAPCPA at the national level.

Bibliography

[1] Michael Sipser. *Introduction to the Theory of Computation.* PWS Publishing., 1998.

[2] Guido W. Imbens and Jeffrey M. Wooldridge. Recent developments in the econometrics of program evaluation. *Journal of Economic Literature*, 47(1):5–86, 2009.

[3] R.A. Fisher. *Design of Experiments.* New York: Hafner, 1935.

[4] Alberto Abadie and Guido W. Imbens. Large sample properties of matching estimators for average treatment effects. *Econometrica*, 74(1):235–267, 2006.

[5] Alberto Abadie and Guido W. Imbens. Simple and bias-corrected matching estimators. Technical report, Department of Economics, UC Berkeley., 2002.

[6] Petra E. Todd. Matching estimators. In *The New Palgrave Dictionary of Economics, Second Edition.* Palgrave Macmillan, 2006.

[7] Paul Rosenbaum and Donald Rubin. The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70:41–55, 2003.

[8] W. Cochran and Donald Rubin. Controlling bias in observational studies. *Sankyha*, 35:417–446, 1973.

[9] Rajeev Dehejia and Sadek Wahba. Causal effects in nonexperimental studies: Reevaluating the evaluation of training programs. *Journal of the American Statistical Association*, 94(448):1053–1062, 1999.

[10] James Heckman, Hidehiko Ichimura, Jeffrey Smith, and Petra Todd. Sources of selection bias in evaluating social programs: An interpretation of conventional measures and evidence on the effectiveness of matching as a program evaluation method. *Proceedings of the National Academy of Sciences*, 93(23):13416–13420, 1996.

[11] James Heckman, Hidehiko Ichimura, and Petra Todd. Matching as econometric evaluation estimator. *The Review of Economic Studies*, 65(2):261–294, 2008.

[12] Zhong Zhao. Using matching to estimate treatment effects: Data requirements, matching metrics and monte carlo evidence. *The Review of Economics and Statistics*, 86(1):91–107, 2004.

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

[14] Joshua Angrist and Jorn-Steffen Pischke. *Mostly Harmless Econometrics.* New Jersey: Princeton University Press, 2008.

[15] Michelle J. White. Bankruptcy reform and credit cards. *Journal of Economic Perspectives*, 21(4):175–199, 2007.

Table 4.1: Number of Observations by Chapter by Year

	Chapter 7	Chapter 13
2003	203	253
2004	197	208
2005	423	286
2006	256	281
2007	500	364
2008	516	459

Table 4.2: Description of Variables

Variable Name	Variable Description
Percent Unsecured	Unsecured debt divided by total debt
Percent Credit Card	Credit card debt divided by total unsecured debt
Monthly Income	Monthly income before deductions, adjusted by the CPI
Payment to Creditors	Total monthly payment to creditors
Legal costs	Legal and court fees, including filing and lawyer costs
Secured Claim	Total secured claim amount
Unsecured Claim	Total unsecured claim amount
Credit Card	Credit card debt claim
Medical Bill	Debts from medical bills
Student Loan	Debts from student loans
Monthly Expense	Proposed amount of monthly expense
Rent or Mortgage	Monthly rent or mortgage payment
Real Property	Value of real property, adjusted for fluctuation in housing price
Real Equity	Real property value minus the outstanding secured debt
Automobile	Value of the automobile
Personal Property	Total personal property value
Job Loss	If the current annual income is 50% less than past two years
Marital Status	Single, Married or Divorced
Business Owning	If the petitioner has expense for running a business
Alimony Received	If the petitioner receives alimony payments
Support Dependent	If the petitioners pay support to other dependents
Atlanta	Binary variable, indicate if filed in the Atlanta office

Table 4.3: Summary Statistics of Analysis Variables.

Number of Observations > 0, [Mean (SD)]

Outcome Variables						
Yr/Name	Percent Unsecured	Percent Credit Card	Monthly Income	Payment to Creditors	Legal Costs	
2003	434 [.3459(.3206)]	359 [.3757(.7354)]	456 [2530(1900)]	56 [150(573)]	269 [342(503)]	
2004	394 [.3622(.3305)]	329 [.3595(.3920)]	405 [2420(1188)]	65 [1024(10092)]	253 [354(506)]	
2005	694 [.4342(.3533)]	597 [.3879(.3751)]	709 [2492(1303)]	162 [1390(12918)]	532 [488(740)]	
2006	518 [.3656(.3416)]	453 [.5315(.3538)]	536 [2661(1605)]	156 [647(7152)]	446 [537(642)]	
2007	837 [.2935(.2987)]	732 [.3750(.3555)]	864 [2799(2266)]	256 [321(865)]	752 [529(775)]	
2008	963 [.3833(.3163)]	800 [.3642(.3601)]	975 [2449(2009)]	266 [500(3062)]	847 [770(2431)]	
Matching Covariates						
Yr/Name	Unsecured Claim	Secured Claim	Credit Card	Medical Bill	Student Loan	Monthly Expense
2003	434 [78127(109316)]	421 [78127(109316)]	338 [8438(17126)]	188 [1737(7273)]	39 [1097(6132)]	456 [2419(2145)]
2004	393 [75734(81957)]	366 [75734(81957)]	318 [8748(14643)]	171 [1175(5232)]	39 [1335(7065)]	405 [2279(1090)]
2005	693 [84909(107429)]	623 [84909(107429)]	582 [13695(23594)]	317 [2018(8967)]	90 [2316(9515)]	709 [2589(2212)]
2006	518 [108014(15691)]	482 [108014(15691)]	437 [14330(24040)]	244 [1675(5826)]	93 [3897(17339)]	536 [2929(4390)]
2007	836 [133680(148776)]	819 [133680(148776)]	704 [13921(38539)]	351 [910(3132)]	129 [2580(10343)]	864 [2852(2097)]
2008	963 [136950(190830)]	906 [136950(190830)]	788 [18212(29706)]	449 [1762(5625)]	144 [4460(23203)]	975 [2746(2136)]

To Be Continued on the Next Page ...

Table 4.3 – Continue from the Previous Page						
Yr/Name	Rent or Mortgage	Real Property	Real Equity	Automobile Value	Personal Property	Job Loss
2003	430 [682(445)]	235 [74938(108853)]	235 [14479(29936)]	456 [13094(10148)]	456 [16046(21035)]	[.55(.49)]
2004	388 [675(423)]	229 [75583(93165)]	229 [13601(26431)]	405 [13551(10248)]	404 [16231(15423)]	[.47(.50)]
2005	667 [745(493)]	352 [77817(112842)]	341 [7580(23434)]	709 [14574(14927)]	709 [17886(27463)]	[.47(.49)]
2006	509 [850(483)]	305 [92560(115244)]	305 [3741(32203)]	536 [15411(15407)]	534 [19655(21351)]	[.41(.49)]
2007	843 [990(496)]	583 [113532(131549)]	583 [−3905(37885)]	864 [16625(16524)]	864 [22229(64211)]	[.44(.49)]
2008	909 [918(602)]	579 [113726(155984)]	579 [−3049(37311)]	975 [17416(22695)]	974 [23007(38602)]	[.46(.49)]
Yr/Name	Marital Status	Business Owning	Alimony Received	Support Dependent	Atlanta	
2003	$M : 111D : 179S : 166$	[.0394.(.1949)]	[.0482.(.2145)]	[.0811(.2733)]	[.5877(.4927)]	
2004	$M : 90D : 168S : 147$	[.0197(.1393)]	[.0641(.2454)]	[.0691(.2539)]	[.5456(.4985)]	
2005	$M : 162D : 288S : 259$	[.0296(.1696)]	[.0409(.1982)]	[.0789(.2699)]	[.6601(.4740)]	
2006	$M : 123D : 237S : 176$	[.0429(.2028)]	[.0373(.1897)]	[.0727(.2599)]	[.7145(.4520)]	
2007	$M : 197D : 352S : 325$	[.0439(.2051)]	[.0034(.0588)]	[.0706(.2563)]	[.5787(.4940)]	
2008	$M : 181D : 450S : 334$	[.0676(.2513)]	[.0297(.1699)]	[.0697(.2548)]	[.6451(.4787)]	

Table 4.4: Effect of the BAPCPA on Percentage of Total Debt that is Unsecured.

	Chapter 13			Chapter 7		
	Matching	W/O 2008	Regression	Matching	W/O 2008	Regression
Coefficient	.0556	.0444	.0296	.0795	.0398	.0247
T-Statistics	4.69**	3.50**	2.25**	4.02**	1.91*	1.43

Matching covariates includes: owning business, receive alimony, have dependent, large medical bill, job loss, large student loan, filed in Atlanta, marital status, average monthly expense, average monthly income, rent or mortgage, property value and value of automobile. **: Significance at 5% level. *: Significant at 10% level.

Table 4.5: Effect of the BAPCPA on Percentage of Unsecured Debt that is Associated with Credit Cards.

	Chapter 13			Chapter 7		
	Matching	W/O 2008	Regression	Matching	W/O 2008	Regression
Coefficient	.0753	.0959	.0219	.0945	.1118	.1011
T-Statistics	3.11**	3.61**	1.03	2.97**	2.86**	1.95*

Matching covariates includes: owning business, receive alimony, have dependent, large medical bill, job loss, large student loan, filed in Atlanta, marital status, total secured claim, average monthly expense, average monthly income, rent or mortgage, property value and value of automobile. **: Significance at 5% level. *: Significant at 10% level.

Table 4.6: Effect of the BAPCPA on Monthly Income.

	Chapter 13			Chapter 7		
	Matching	W/O 2008	Regression	Matching	W/O 2008	Regression
Coefficient	−272.99	−135.47	−10.01	−1128.25	−217.29	−159.86
T-Statistics	−3.24**	−1.46	−0.11	−8.61**	−2.99**	−1.26

Matching covariates includes: total unsecured debt, total secured debt and percentage unsecured debt associate with credit card claims. **: Significance at 5% level. *: Significant at 10% level.

Table 4.7: Effect of the BAPCPA on Monthly Payments to Creditors.

	Chapter 13			Chapter 7		
	Matching	W/O 2008	Regression	Matching	W/O 2008	Regression
Coefficient	905.83	929.98	−336.06	219.63	99.64	195.99
T-Statistics	1.01	.90	−0.88	2.07**	1.86**	1.52

Matching covariates includes: owning business, receive alimony, have dependent, job loss, large student loan, filed in Atlanta, marital status, average monthly expense, average monthly income, rent or mortgage, property value and value of automobile. **: Significance at 5% level. *: Significant at 10% level.

Table 4.8: Effect of the BAPCPA on Legal Costs of Bankruptcy.

	Chapter 13			Chapter 7		
	Matching	W/O 2008	Regression	Matching	W/O 2008	Regression
Coefficient	235.11	145.32	211.89	114.43	155.14	244.61
T-Statistics	2.81**	3.86**	2.63**	2.87**	3.40**	6.27**

Matching covariates includes: owning business, receive alimony, have dependent, large medical bill, job loss, large student loan, filed in Atlanta, marital status., total secured claim, unsecured claim, credit card percentage, average monthly expense, average monthly income, rent or mortgage, property value and value of automobile. **: Significance at 5% level. *: Significant at 10% level.

Chapter 5

Conclusions and Future Research

5.1 Summary of Findings

In this dissertation, I examined effects of the BAPCPA on chapter composition trends at state level and the behavior of individual bankruptcy petitioners.

In chapter 2, I focus on two major provisions under the BAPCPA: restrictions on the homestead exemption and the means test, using state-level data covering the period of 1998 to 2007, I find that the restrictions on the homestead exemptions increased the percentage of chapter 13 filings by 2.13 percentage points in the states with generous homestead exemptions after the BAPCPA. I also find a 2.14 percentage-point increase on the percentage of chapter 13 filings due to the means test after the BAPCPA in the states that have a larger population share with incomes below the state average. These results suggest the effectiveness of the BAPCPA in promoting more chapter 13 filings was achieved through these provisions. In addition, after the BAPCPA, the larger changes on chapter composition in the states with more generous homestead exemptions suggest that opportunistic moves to those states to file have dropped. This is the first time to have empirical evidence of such opportunism.

In chapter 3, I describe the PACER dataset I collected from the northern district bankruptcy court in Georgia. This dataset contains bankruptcy related information on petitioners that filed for bankruptcy in Georgia from 2003 to 2008. From the aggregate summary statistics, I find that chapter 7 petitioners had higher level of debt compared to chapter 13 petitioners, whereas chapter 13 petitioners were under better financial situations such as having higher incomes and possesing more assets. These evidences support the idea that majority of the chapter 13 petitioners were filing to protect their houses from foreclosure.

In chapter 3, I also find increasing trends of debt, in particular unsecured debt and credit card debt, consistent with the predictions that after the BAPCPA, there would be more potentially dischargeable debt generated by petitioners to compensate the increased costs of filing. At the same time, the financial crisis, which started around the end of 2007 also played a role. The financial crisis in many ways affected the profile of an average bankruptcy filer in the opposite direction as the BAPCPA. From the aggregate level, the financial crisis attracted more filings, whereas the BAPCPA was passed to discourage filings. Moreover, after the BAPCPA, the average bankruptcy petitioners should be in worse financial shape because some of the potential petitioners with minor financial stress were not filing anymore. However, the financial crisis attracted many petitioners who might have reasonably high living standards, who filed to protect their houses from foreclosure, thus increased the average income, average expense and the average real property value of an average petitioner. Because of this reason, I also report estimation results exclusive of the 2008 observations for robustness check.

In chapter 4 of the dissertation, using the same PACER dataset from chapter 3, I estimated effects of the BAPCPA on the profiles of petitioners using a non-parametric matching estimation method. I find that after the BAPCPA, the percentage total debt that was unsecured increased by 5.56 and 7.95 percentage points, for chapter 13 and chapter 7 petitioners respectively. The percentage of unsecured debt associated with credit cards increased by 7.53 and 9.45 percentage points for chapter 13 and chapter 7 petitioners, respectively. The petitioners also possessed less monthly incomes after the BAPCPA, chapter 13 and chapter 7 petitioners on average had $273 and $217 decreases in monthly incomes, respectively. I also find an increase on monthly payments to creditors; however, the result was only significant for chapter 7 petitioners, of which the increase was $220. Lastly, legal costs, mainly the lawyer fees increased for both chapters of petitioners, the increases were $234 and $114 for chapter 13 and chapter 7 petitioners respectively.

The empirical analyses of this dissertation show real effects of the BAPCPA from both the aggregate and the individual petitioner levels. Overall, they suggest that the BAPCPA was effective in promoting chapter 13 filings and excluding those with manageable financial stress from filing, were achieved. However, the empirical results also suggest that while the BAPCPA increased the standards of filing for consumer bankruptcy, those who sought financial gains still had strategies which allowed them to receive similar benefits as from the pre-BAPCPA period.

The BAPCPA was a milestone in bankruptcy law reforms. However it can still be improved in many ways. For example, the total allowance of discharged amount of debt through each filing can be directly linked to each petitioner's total level of debt, or imposing restrictions on future expenditures of those who files for bankruptcy. Both of these alternatives set constraints on petitioners, which would prevent them from abusing the bankruptcy system.

Finally, the legal fees of bankruptcy increased due to the complexity of the bankruptcy law after the BAPCPA. It shows that the bankruptcy law in the U.S. allows more variations across individual petitioners, which is why the lawyers and the judges certainly play more important roles.

5.2 Directions for Future Research

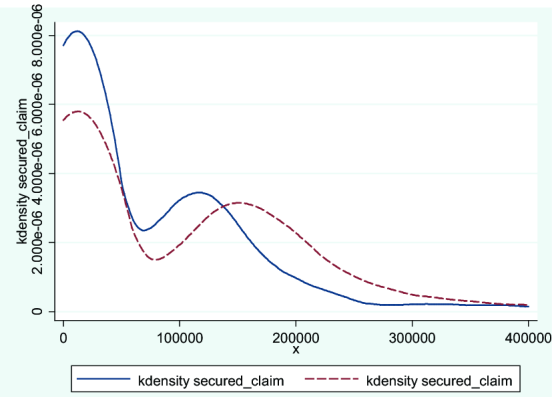
Although the PACER dataset I use in this dissertation allows the empirical estimation of the effects brought by the BAPCPA, on the level of individual petitioners, its impact on the filing decision cannot be examined because there are no non-bankrupt individuals contained in this dataset.

Therefore, it is natural to combine the PACER dataset I use in this dissertation to the Survey of Consumer Finances (SCF), which contains non-bankrupt households, thus the combined dataset will be able to allow estimations of the effects of the BAPCPA on households' bankruptcy decision. The SCF 2007 is a very suitable choice for three reasons.

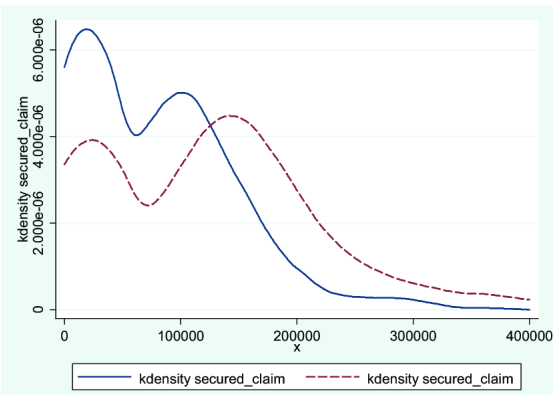
First of all, for the 2007 SCF data, those who took the survey needed to answer the question of if they "ever filed for bankruptcy", if the answer is yes and in which year, I can then be certain that both bankrupt and non-bankrupt households can be categorized within the dataset. Second, the SCF data provides very detailed financial information of their participants; therefore, most of the variables from the PACER dataset can be matched with the SCF data.Third, the 2007 SCF data contains the years from 2004 to 2007, which includes 2005 in between, thus is very convenient for the future empirical research on the effects of the BAPCPA.

Appendix A

Kernel Densities of Analysis Variables

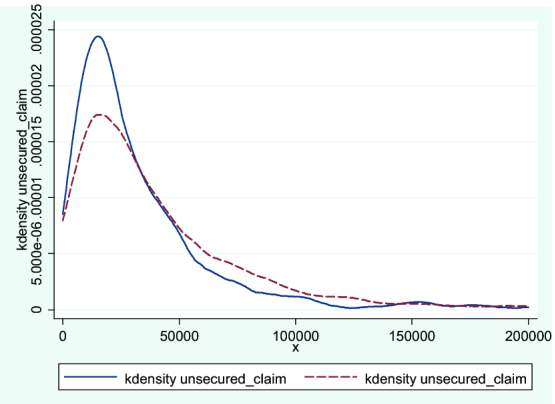


(a) Chapter 7

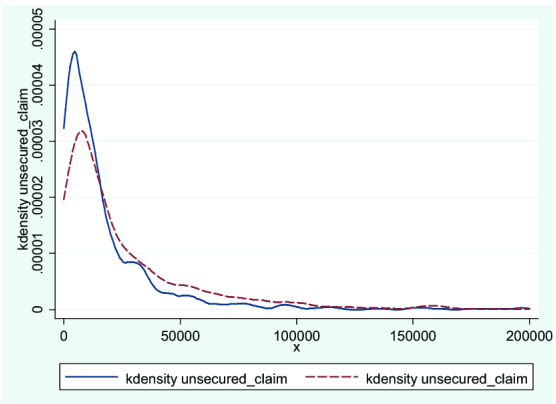


(b) Chapter 13

Figure A.1: Kernel Densities of Total Secured Debt.

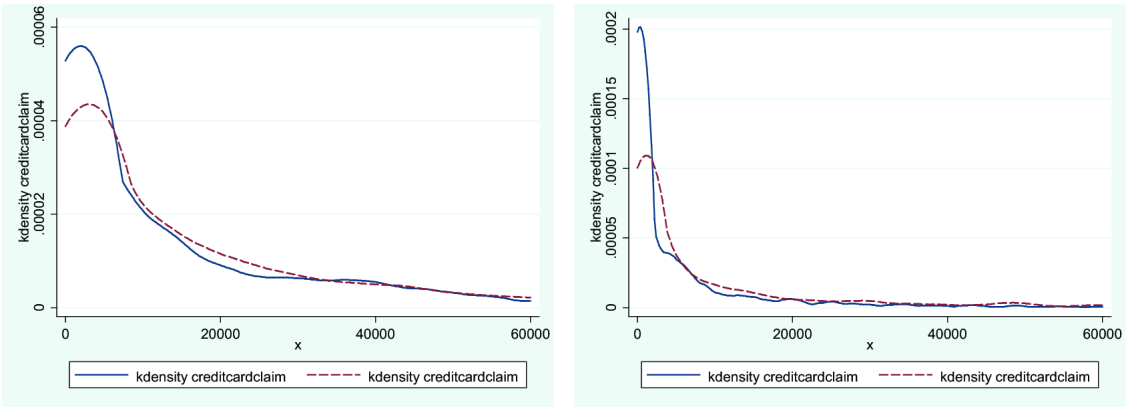


(a) Chapter 7



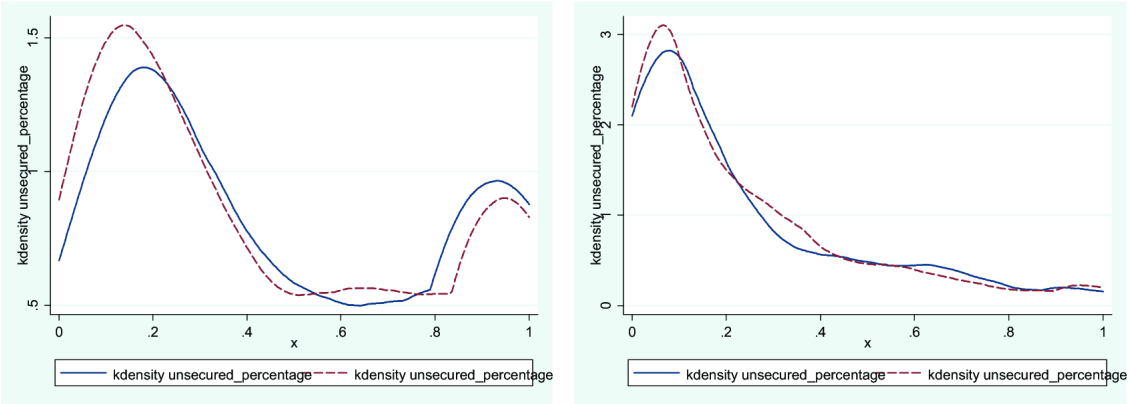
(b) Chapter 13

Figure A.2: Kernel Densities of Total Unsecured Debt.



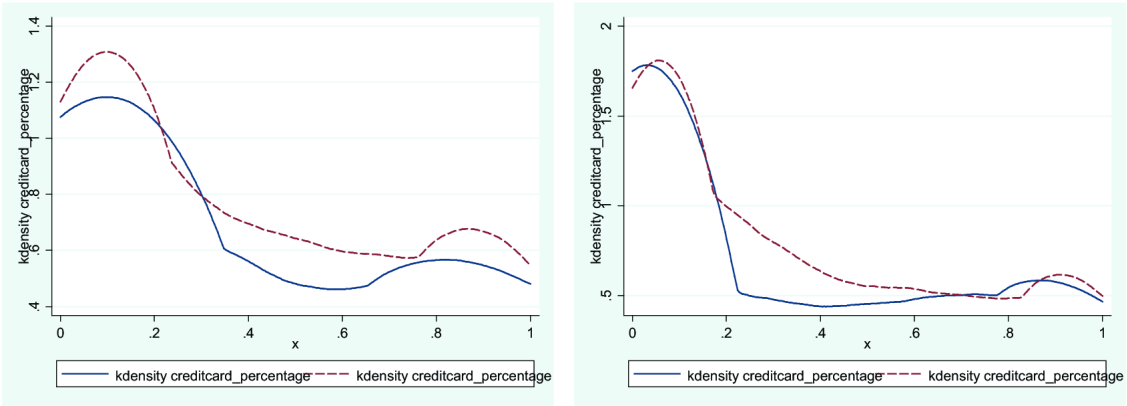
(a) Chapter 7 (b) Chapter 13

Figure A.3: Kernel Densities of Credit Card Claim.



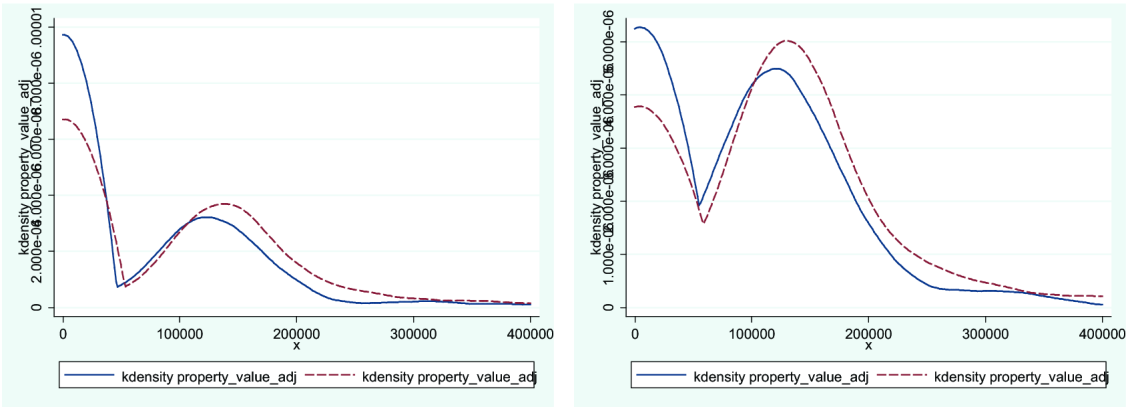
(a) Chapter 7 (b) Chapter 13

Figure A.4: Kernel Densities of Percentage Debt that is Unsecured.



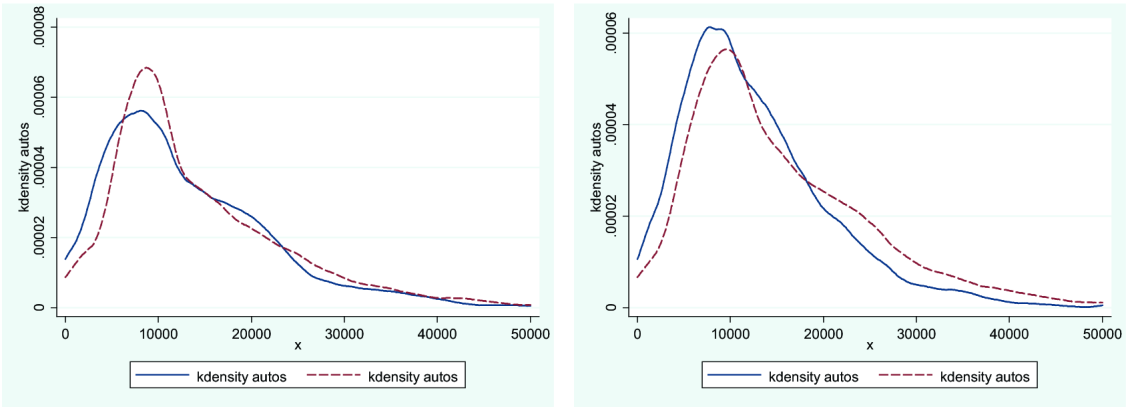
(a) Chapter 7 (b) Chapter 13

Figure A.5: Kernel Densities of Percentage Unsecured Debt associates with Credit Cards.



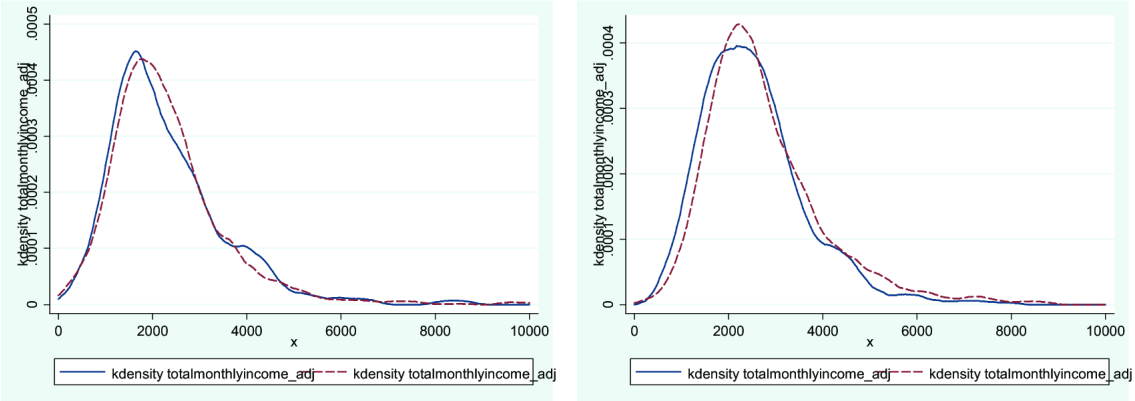
(a) Chapter 7 (b) Chapter 13

Figure A.6: Kernel Densities of Value of Real Property.



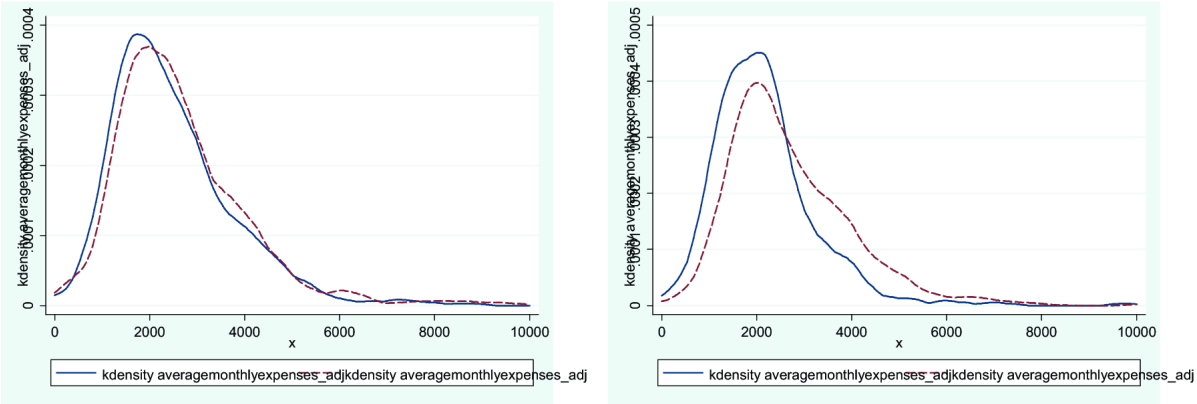
(a) Chapter 7 (b) Chapter 13

Figure A.7: Kernel Densities of Value of Automobile.



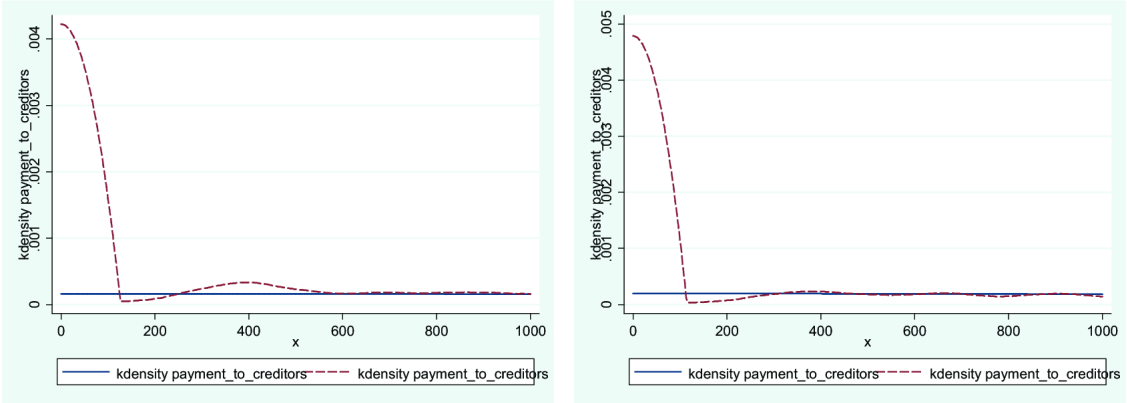
(a) Chapter 7 (b) Chapter 13

Figure A.8: Kernel Densities of Monthly Income.



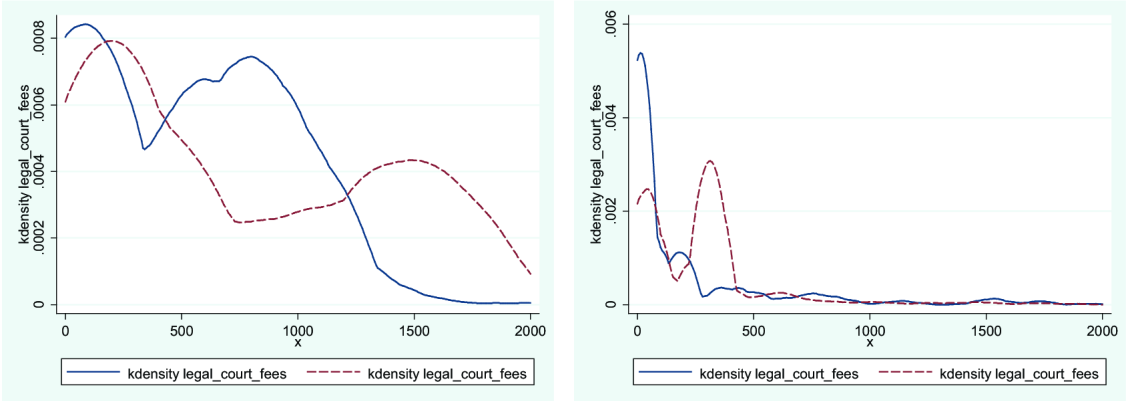
(a) Chapter 7 (b) Chapter 13

Figure A.9: Kernel Densities of Monthly Expenses.



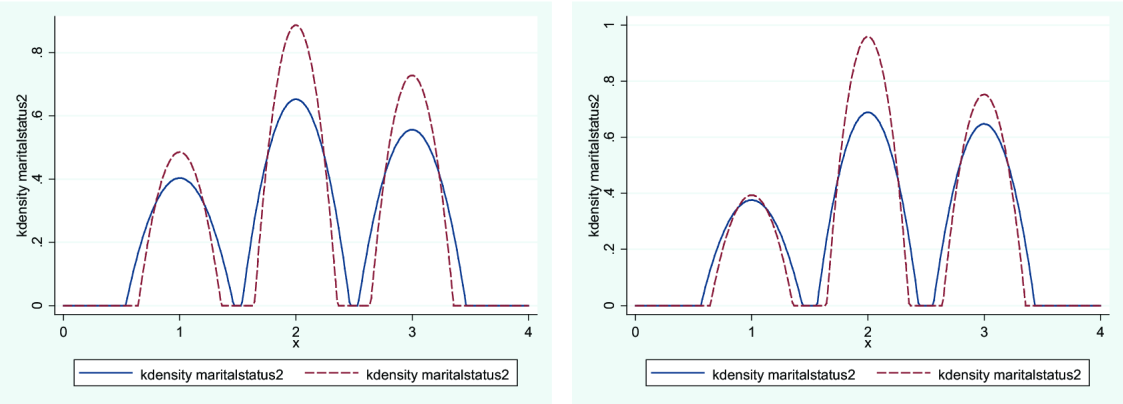
(a) Chapter 7 (b) Chapter 13

Figure A.10: Kernel Densities of Monthly Payment to Creditors.



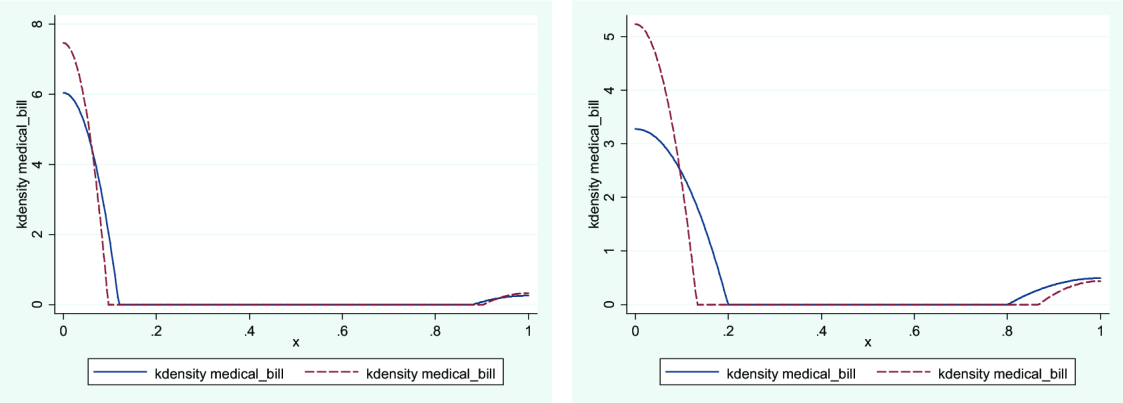
(a) Chapter 7 (b) Chapter 13

Figure A.11: Kernel Densities of Legal Costs.



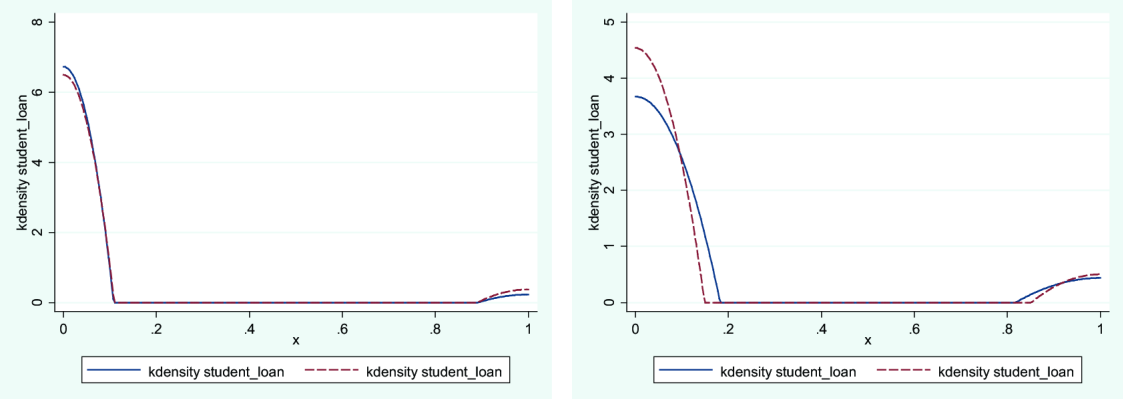
(a) Chapter 7 (b) Chapter 13

Figure A.12: Kernel Densities of Marital Status.



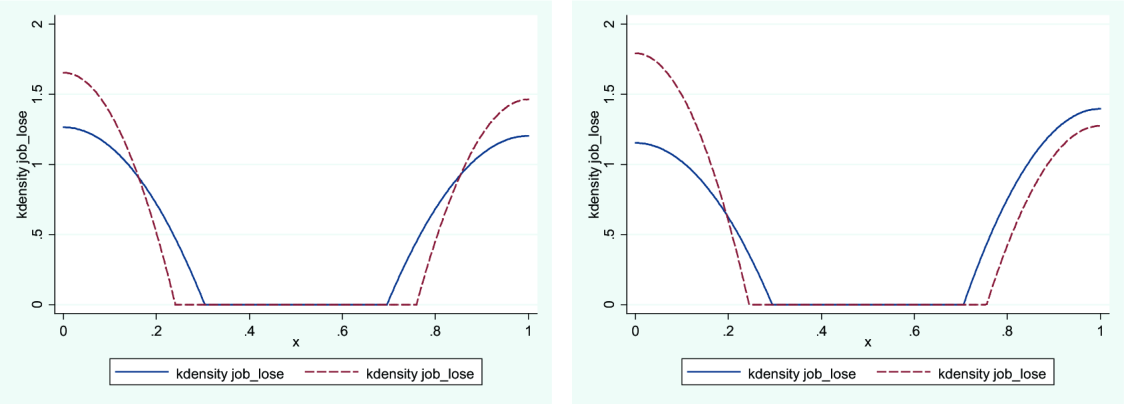
(a) Chapter 7 (b) Chapter 13

Figure A.13: Kernel Densities of Large Medical Bill.



(a) Chapter 7 (b) Chapter 13

Figure A.14: Kernel Densities of Student Loan.



(a) Chapter 7 (b) Chapter 13

Figure A.15: Kernel Densities of Job Loss.

Appendix B

Robustness Check of Number of Matches Used in the Corvariate Matching Estimations

Table B.1: Estimating the Effect of the BAPCPA on Percentage of Unsecured Debt out of Total Debt that is Unsecured, using Different Number of Matches.

Chapter 13					
# of matches	4	1	2	8	16
Coefficient	.0556	.0474	.0501	.0519	.0444
T-Statistics	4.69**	4.22**	4.38**	4.23**	3.38**
Chapter 7					
Coefficient	.0795	.0627	.0707	.0914	.0962
T-Statistics	4.02**	2.86**	3.53**	4.76**	5.10**

Table B.2: Estimating the Effect of the BAPCPA on Percentage of Unsecured Debt that is Associated with Credit Cards, Using Different Number of Matches.

Chapter 13					
# of matches	4	1	2	8	16
Coefficient	.0753	.0769	.0723	.0742	.0536
T-Statistics	3.11**	2.57**	2.86**	3.17**	2.32**
Chapter 7					
Coefficient	.0945	.0782	.0826	.0867	.0717
T-Statistics	2.97**	2.33**	2.71*	3.07**	2.75**

Table B.3: Estimating the Effect of the BAPCPA on Monthly Income, Using Different Number of Matches.

Chapter 13					
# of matches	4	1	2	8	16
Coefficient	−272.99	−362.32	−282.49	−277.35	−258.95
T-Statistics	−3.24**	−3.39**	−2.93**	−3.69**	−3.60**
Chapter 7					
Coefficient	−1128.25	−1398.02	−1305	−1012.85	−861.28
T-Statistics	−8.61**	−3.29**	−5.61**	−10.69**	−10.10**

Table B.4: Estimating the Effect of the BAPCPA on Monthly Payment to Creditors, Using Different Number of Matches.

Chapter 13					
# of matches	4	1	2	8	16
Coefficient	905.83	1031.25	1391.31	1137.73	1242.63
T-Statistics	1.01	5.10**	3.03**	1.28	1.31
Chapter 7					
Coefficient	219.63	118.21	191.85	225.58	213.52
T-Statistics	2.07**	1.25	1.81*	2.20**	1.94*

Table B.5: Estimating the Effect of the BAPCPA on the Legal Cost of Bankruptcy, Using Different Number of Matches.

Chapter 13					
# of matches	4	1	2	8	16
Coefficient	235.11	229.61	252.61	237.26	237.35
T-Statistics	2.81**	2.92**	3.86**	2.99**	3.03**
Chapter 7					
Coefficient	114.43	256.36	271.96	266.26	262.95
T-Statistics	2.87**	5.98**	6.48**	7.09**	7.06*