Negative Effects of Personal Bankruptcy for Homeowners: Lost Homes and Reduced Credit Access

Cheryl Long[1]
Colgate University
Current version: July 11, 2005

Abstract

Using PSID data, this paper shows that homeowners who filed for bankruptcy between 1991 and 1994 are about 28 percent more likely to lose their houses within the four years after bankruptcy filing compared to similar homeowners without a bankruptcy record. Furthermore, the finding is robust when the decision to file for bankruptcy is endogenously determined. Different chapters of bankruptcy filing are also found to have different effects on the bankrupt household's later access to credit. Households that filed for liquidation bankruptcy using Chapter 7 are less likely to own a home within four years of their bankruptcy filings than those without a bankruptcy record, while those that filed for reorganization bankruptcy using Chapter 13 do not seem to suffer a lower likelihood of homeownership.

These results are consistent with the argument that the record of bankruptcy filing reduces the access to existing credit, and thus imply larger costs in bankruptcy filing for homeowners than previous studies suggest. The findings have three implications: First, the proportion of American households benefiting from bankruptcy filing may not be as high as previously predicted. Second, arguments that explain the rising bankruptcy rate by households' increasing financial distress take on more importance. Finally, the credit industry has an important role to play in curbing the growth in bankruptcy filings.

Journal of Economic Literature Classification Numbers: D1, D6, J0.
Keywords: Personal bankruptcy filing, Homeownership, Access to credit.

[1]Cheryl Long, Assistant Professor of Economics, Colgate University, Hamilton, NY 13346, Phone: (315) 228-7024, Fax: (315) 228-7033, E-mail: cxlong@mail.colgate.edu.

1. Introduction

This paper provides empirical evidence that homeowners who filed for personal bankruptcy between 1991 and 1994 are about 28 percent more likely to lose their houses after bankruptcy filing than similar homeowners without a bankruptcy record. Because the loss in homeownership is accompanied by the loss of mortgage loans captured in the house, this finding is consistent with common beliefs held by the public and testimonies given by legal practitioners that personal bankruptcy filing has a negative effect on a household's ability to borrow after bankruptcy. The paper also finds evidence that liquidation bankruptcy filed using Chapter 7 has significant negative effects on homeownership while Chapter 13 filing does not have such effects, suggesting that the credit industry imposed more severe penalty in terms of reduced access to credit on Chapter 7 bankruptcy filings.

By studying homeownership, this paper offers an indirect way of measuring how much access to mortgage loans is lost due to bankruptcy filing. A more direct approach to estimate such a loss would be to study the reduction in their mortgage loans after bankruptcy filing. But the lack of panel data providing annual information on household asset and debt makes such a direct study infeasible.[2] Given that households value the access to credit, the findings from this paper suggest that reduced access to credit serves as an additional important deterrent to households considering filing for bankruptcy. In particular, for a typical homeowner contemplating Chapter 7 filings, the loss in their

[2] Household wealth supplement data in PSID offer detailed information on households' asset and debt, but are available only every five years. Survey of Consumer Finance (SCF) is conducted triennially, but do not survey the same households over time.

access to mortgage loans can be valued at about $3,517.[3] In contrast, the national median net benefit from filing for bankruptcy is estimated in White 1998 to be $1,644 in the absence of strategic behaviors by the household to switch their forms of asset holding and $3,600 with such strategic behaviors.

These numbers suggest that the additional deterrence due to the reduction in credit access is of substantial magnitude. In fact, it nearly wipes out all the net benefit from bankruptcy filing. As a result, including the additional costs may explain why previous economic studies have predicted bankruptcy filing rates much higher than what has been observed in reality, a main criticism on the economic approach of individual cost/benefit analysis.[4] Because much fewer households will benefit from bankruptcy filing when the additional costs are included, these results also imply that factors other than strategic behaviors will gain more importance in explaining why households file for bankruptcy.[5] In addition, the increase in credit availability and its impacts on the above deterrence effect in turn may have contributed to the continuous rise in bankruptcy filing rate,

[3] The magnitude of the deterrence effect due to lost mortgage loans is estimated in Section 6.

[4] White (1998) estimated that at least 15 percent of American households will benefit from personal bankruptcy filing, while the current annual rate of bankruptcy filing is only about 1 percent. The gap between 15 percent and the average rate of about 1 percent in reality, however, exaggerates the real difference between the proportion of households who would benefit and the percentage of those who actually filed. Since one can file for liquidation bankruptcy under Chapter 7 only once every six years, the relevant number for Chapter 7 filers should be the sum of the Chapter 7 numbers over a six-year-period. Around one half and two thirds of all personal bankruptcy filers file under Chapter 7. Therefore, the percentage of households who could file and would benefit from filing according to previous studies but did not actually file for bankruptcy is slightly higher than $15\% - 1.1\% * 6 \approx 8\%$ in the past 10 years.

[5] Various explanations have been offered for why personal bankruptcy filing rate has risen continuously in the past two decades. Sullivan, Warren, and Westbrook (1989, 2000) present empirical evidence that medical expenses, loss of jobs, and rising credit card debts are among the main reasons why households file for bankruptcy. Consequently, they argue that the growing income gap and aggressive lending practices contribute to the rising bankruptcy rate. White (1987), Peterson and Aoki (1984), Shepard (1984), and Boyes and Faith (1986) argue that the 1978 Bankruptcy Reform Act (BRA) has increased exemption levels and thus made it more attractive for individuals to file for personal bankruptcy. Gross and Souleles (2002) find evidence that there has been a decline in the stigma associated with bankruptcy. Fay, Hurst, and White (2002) suggest that the rise in the bankruptcy rate over time may reflect the fact that consumers are becoming more educated about the costs and benefits of declaring bankruptcy.

implying a larger role that the credit industry can play in curbing the growth in personal bankruptcy filings.

Previous studies on personal bankruptcy have ignored the effect of bankruptcy filing on one's access to credit when estimating the benefits versus costs of bankruptcy filing, leading to estimates of the percentage of American households who may benefit from bankruptcy filing as high as 15 percent. When potential strategic behaviors are taken into consideration, the percentage reaches 31 percent.[6] The current paper suggests that such negligence is not justified because bankruptcy filing imposes serious negative effect on a household's access to credit after bankruptcy.

Specifically, this paper studies the changes in a household's homeownership after bankruptcy filing to demonstrate how the filing affects the household's access to mortgage loans. Homeownership is especially important in the American society, because it is not only an indispensable component of the American dream but also an important vehicle for household investment. Since practically every household finances its house purchase through mortgage loans, the access to mortgage is crucial to American households.[7] As a result, mortgage loans are the proper focus where one would expect to see the most important effect that a bankruptcy record has on credit access.

A study on how the access to mortgage loans changes after bankruptcy filing is also important because it highlights the effects of bankruptcy on access to secured credit. Since secured loans such as mortgage loans provide collaterals, creditors may be more willing to lend to households with bankruptcy records and thus the access to such debt

[6] See White (1998), for instance.
[7] According to the Federal Reserve Board Statistical Releases for various years, mortgage loans constitute more than 60 percent of total consumer debt.

may not see as much impact after bankruptcy filing compared to unsecured debt. Furthermore, by focusing on homeowners, this paper explores the effect of bankruptcy filing on existing loans captured in homeownership.

Finally, this paper also attempts to shed light on how different chapters of bankruptcy filing affect one's credit access differently. Owing the mixed anecdotal evidence, bankruptcy lawyers often give conflicting pieces of advice to their clients on which chapter to choose. Some attorneys discourage their clients from seeking bankruptcy relief under Chapter 7, citing instances where individuals with high income could not obtain mortgage loans due to the prior bankruptcy record; others steer their clients away from Chapter 13 filings, with the conviction that it has actually become easier for Chapter 7 filers to obtain new credit lines because the credit industry considers these filers as good risks who are debt free and cannot resort to Chapter 7 protection again for another six years (Braucher 1993). The current study hopes to fill in this information gap.

The omission of the deterrence effect from previous work on personal bankruptcy may be due to the scarce empirical evidence documenting the negative effects of bankruptcy filing on households' future access to credit. One exception is Musto (2005), where the author demonstrates that the removal of a Chapter 7 bankruptcy record from an individual's credit report leads to a substantial increase in the number and aggregate credit limit of bank cards offered to the individual. The current paper differs from Musto (2005) in two aspects. First, this paper studies homeowners' post-bankruptcy access to mortgage loans, a type of secured credit, while Musto (2005) studies consumers' post-bankruptcy access to bank cards, which provide unsecured credit. In addition, by

studying homeowners, this paper focuses on the effect a bankruptcy record has on existing access to credit, while Musto (2005) focuses on new access to credit.

The structure of the paper is as follows: Section 2 offers background information on the procedures and implications of bankruptcy filings. Section 3 discusses the empirical strategy for studying homeownership, and data used in the paper are described in Section 4. The main results are presented in Section 5, where I compare the changes in homeownership for two groups of households: those who filed for bankruptcy between 1991 and 1994 and those who did not file. In additional regressions, I further divide the households that filed for bankruptcy into those that filed under Chapter 7 and those that filed under Chapter 13. Section 6 concludes by discussing implications of the results. All the tables are included in the appendix. Since a household is the relevant unit in both personal bankruptcy filing and in the PSID data sets, I use a household to refer to the decision maker throughout this paper.

2. Personal Bankruptcy and Legal Implications

Conventional wisdom holds that filing for personal bankruptcy will have negative effect on a household's access to credit after bankruptcy filing. Although intuitive, the predominance of negative effects is not without controversy when mortgage loans are the subject of discussion. One may argue that since a mortgage loan is secured debt, its repayment is guaranteed in the form of a house, and as a result, the debtor's creditworthiness or ability to repay may not be as important as they are to creditors who provide unsecured debt such as bank cards.

Empirical facts, however, challenge the validity of this argument. Although secured creditors have the collateral associated with the loan and can always repossess

the property if the debtor is delinquent, there are significant costs associated with foreclosing on a home. These costs include legal fees, property expenses, and foregone interest,[8] and have been estimated to range from 30 percent to 60 percent of the outstanding loan balances.[9] Consequently, even the default risk on secured debt represents a substantial cost to creditors, and thus the negative information revealed by a bankruptcy record on the debtor's creditworthiness may lead creditors to limit the bankrupt household's access to secured loans such as mortgage loans.

The above considerations also apply to homeowners who apply for second home mortgages. The consequent reduced access to a second home mortgage may hurt such a homeowner's chance of keeping a home in times of economic difficulty. In addition, the reduced access to other forms of credit due to a bankruptcy record may also lead to the loss of homeownership when the owner faces difficulty making regular mortgage payments. When foreclosure occurs due to either of the two reasons above, the homeowner will lose their mortgage loans together with their house. Therefore, bankruptcy filing may have substantial negative implications on a household's homeownership after bankruptcy. The empirical evidence presented below provides support for this belief.

The existence and magnitude of such negative effects may also depend on the type of bankruptcy filing. Two clauses in the U.S. Codes, Chapter 7 and Chapter 13, also known as "liquidation" bankruptcy and "payment plan" bankruptcy, govern personal

[8] A more detailed list of costs incurred during a foreclosure includes transactions costs such as attorneys' fees, trustees' fees, sheriff's cost of sale, brokers' commissions, revenue stamps, and title charges, property costs such as property taxes, hazard insurance, utilities, and repairs and maintenance, and opportunity costs include the interest foregone on the investment value of the property.

[9] See Capone (1996), Clauretie and Herzon (1990), and Ciochetti (1997). The National Home Equity Mortgage Association estimates foreclosure losses at 50 percent.

bankruptcy. Under Chapter 7, the debtor surrenders any assets in excess of the exemption level, which varies across states, and in return obtains the discharge of most remaining unsecured debt. In contrast, under Chapter 13, none of the debtor's assets are forfeited, but he or she will have to complete a repayment plan lasting between three and five years before the remaining debt gets discharged.

Several reasons suggest that households who filed for Chapter 13 bankruptcy are more likely to retain their homeownership after filing. First, Chapter 13 provides protection for the homeowner's assets, including the house, whereas Chapter 7 demands the liquidation of the house if the equity in the house exceeds the exemption level. In addition, a household that filed under Chapter 13 demonstrates to creditors their willingness to honor debt obligations by making payment plans and thus may secure more access to future credit. The higher trustworthiness conveyed here is especially important given that foreclosures involve substantial costs. Bankruptcy filers who choose Chapter 7 may have one reason to hope that they will have a better chance of securing homeownership after bankruptcy filing, because they have less debt post-bankruptcy thanks to the discharge of unsecured debt and thus will have a better chance of making regular mortgage payment. But any further financial distress may jeopardize this prospect due to their reduced access to other credit.[10]

[10] There are two additional differences between the two bankruptcy procedures. First, individuals are required to wait at least six years before filing bankruptcy under Chapter 7 a second time whereas there is no such requirement for Chapter 13 filings. The net effect of this distinction, however, is not clear. The inability to file again may seem to provide some security for the creditor who extended the mortgage loans, but this rule also implies that all creditors (including creditors of unsecured debt) will now be on more equal footings with one another in the absence of bankruptcy filing. Especially since secured debt such as mortgage loans enjoys more protection even during bankruptcy procedures, it is not clear that a Chapter 7 filing and the debtor's subsequent inability to file for bankruptcy again are good news for creditors in terms of the debtor's abilities to repay mortgage. Second, a Chapter 7 bankruptcy record can remain in an individual's credit report for 10 years, while a Chapter 13 record can only be kept in one's credit report for

Nevertheless, the anecdotal evidence is mixed on whether banks are more willing to extend mortgage loans to applicants with a Chapter 13 record than to those with a Chapter 7 record (Braucher 1993). An empirical study therefore is needed to determine which chapter of bankruptcy filing causes the most damage to a household's access to mortgage loans. If the different chapter choices have different implications on mortgage access, this should influence households' decision in which chapter to choose when filing for bankruptcy.

3. Empirical Strategy

The focus of this empirical study is how a bankruptcy record affects homeownership and this section starts by outlining the other major factors that explain whether a household owns a house. Relying on the many well-developed theories that explain homeownership, I will organize the determinants of homeownership into two categories of factors, those that influence the household's desire to purchase a house as opposed to renting ("demand" factors), and those that determine whether the household can obtain the necessary fund to facilitate the purchase ("supply" factors).[11]

The household's desire to purchase a home further depends on the household's preferences and the relative cost of owning versus renting. Household demographics can be used as proxies for preferences, while the relative cost depends on the wealth and income of the household, as well as the stability of location, job, and family structure of

seven years. This difference makes the negative information on the individual's creditworthiness implied by such a record available to potential creditors for a longer period of time. But as the discussion here is limited to the effects of bankruptcy filing within four years of filing, this distinction is not as important as the other differences.

[11] For important previous work explaining individuals' home ownership decisions, see for instance, Rosen (1979), Hendershott (1980), Linneman and Wachter (1989), Engelhardt and Mayer (1994), Engelhardt (1996a, 1996b), Haurin, Hendershott, and Wachter (1997), and Gyourko, Linneman, and Wachter (1999).

the household. Specifically, income level determines the tax benefit from owning versus renting, wealth determines the ease or difficulty for making down payment, while the stability of location, job, and family structure determines whether the family will stay in the house for long enough to reap the appreciated value and recover the hefty transaction costs during purchase and sale. Relative cost may also vary with geographic regions through state and local tax rate and housing value appreciation rate.

On the side of mortgage financing, borrowing constraints stand out as the main factor explaining homeownership. The main cause of borrowing constraint of interest in this paper is the record of bankruptcy filing. Other factors used by financial institutions to make mortgage lending decisions include household economic and financial conditions that provides information on its ability to make repayment. Household demographics are also used to provide additional information on its creditworthiness. In addition, geographic regions may shed light on the availability of credit and conditions of the regional credit market in general. In summary, the empirical measures that capture the two categories of factors listed above will include information on household demographics, economic and financial conditions, geographic locations, as well as whether the household has filed for personal bankruptcy during the time period studied. To obtain detailed information on the above variables, the empirical analysis in this paper focuses on the households interviewed in the Panel Study of Income Dynamics, (PSID).

Since I study the change in households' homeownership after the event of bankruptcy filing, the panel nature of the PSID data suggests the method of "differences-in-differences" estimation. Because only households who owned homes in 1990 are studied in the paper, the homeownership at the end of the time period indicates the

change in homeownership during the period and will be the dependent variable, while the explanatory variables will include changes in the household's demographics, economics, and finances (such as family structure, employment status, income, and wealth), certain time-invariant household characteristics that may explain homeownership (such as the gender, race, and education level of the household head), as well as whether bankruptcy has been filed during the time period.

Specifically, I estimate the following linear regression:

$$H_t = \alpha + \beta B_{t-1,t} + \gamma_1 X + \gamma_2 \Delta Z_{t-1,t} + \varepsilon$$

where H_t is a dummy variable indicating the homeownership status of a household in year t, $B_{t-1,t}$ is a dummy variable that denotes whether the household has filed for bankruptcy between year $t-1$ and year t, X is a vector of time-invariant household characteristics that affect homeownership, while $\Delta Z_{t-1,t}$ is a vector of changes in the household's economic and demographic conditions between $t-1$ and t. Our goal is to test whether a bankruptcy record has a negative effect on homeownership, i.e., whether $\beta < 0$.[12]

A legitimate concern on estimation results from the above specification is that the decision to file for bankruptcy is made endogenously. In particular, some unobserved variables that affect the probability of homeownership in the above equation may also affect the bankruptcy decision, which may lead to biased estimates for the effects of bankruptcy on homeownership. To address this issue, I will estimate the treatment effect model, with the equation of primary interest given as follows:

[12] The linear regression is more convenient since the coefficients give the magnitude of the effects. Logistic regressions give similar results, both qualitatively and quantitatively.

$$H_t = a + b_1 B_{t-1,t} + b_2 X + b_3 \Delta Z_{t-1,t} + \varepsilon ,$$

where $B_{t-1,t}$, the dummy variable indicating bankruptcy filing, is modeled as the outcome of an unobserved latent variable, $B^*_{t-1,t}$, which is determined as follows:

$$B^*_{t-1,t} = c + dZ_{t-1} + u ,$$

where Z_{t-1} is a set of variables that affect the household's bankruptcy decision between 1991 and 1994, and $B_{t-1,t}$, the observed value of $B^*_{t-1,t}$, is given as $B_{t-1,t} = 1$ if $B^*_{t-1,t} = 0$ and $B_{t-1,t} = 0$ otherwise. In addition, the two random error terms in the home-ownership and the bankruptcy equations ε and u are correlated to allow unobservable variables that affect both home-ownership and bankruptcy. One advantage of this model is that the equation of primary interest is estimated as a linear regression, which makes it convenient to interpret the magnitude of the effects.

The estimation models described above can also be used to explore whether bankrupt households are penalized differently on the housing market depending on the chapter of filing. By excluding Chapter 13 filers from the sample, comparison can be made between households that filed for bankruptcy under Chapter 7 and those that did not file for bankruptcy. Similarly, Chapter 13 filers can be contrasted with non-filers by excluding Chapter 7 filers from the sample.

4. Data

The sample studied in this paper is drawn from the households interviewed in the Panel Study of Income Dynamics (PSID) who owned homes in 1990. The PSID provides

the most comprehensive social and economic panel data set in existence, with various questions asked annually on the demographic and economic conditions of all members of the interviewed household including family composition, income, and homeownership. This main data set (referred to as the core family data hereafter) is further supplemented by special surveys conducted to inquire more detailed data in different aspects periodically. Two special surveys used in this study are the PSID survey conducted in 1996 that added numerous questions on whether and when the interviewed households had filed for personal bankruptcy previously, and the PSID Wealth supplementary survey conducted in 1989 and 1994 that collect extensive information on household's wealth holding.

The construction of the sample starts with the households interviewed in the 1996 survey. Among the 8517 households interviewed, 525 households reported previous bankruptcy filings, among which 31 reported multiple filings and the majority of reported filings took place between 1989 and 1996. Table 1 presents the frequency of reported filings and their occurrence over time. The concentration of reported bankruptcy filings in recent years reflects both the rising filing rate in the past two decades, as well as the fact that individuals interviewed were asked to recall information on events that have occurred in the past, sometimes more than a decade ago.

The recall nature of the bankruptcy survey implies that events that have happened far back in history are more prone to memory errors, and it thus calls for the study's focus on bankruptcy filings reported to have occurred in more recent years. Since wealth related information is considered important in determining a household's ability to make both down payment and mortgage payment for a house, I choose to study the time period

defined by the latest two years prior to the bankruptcy survey for which wealth information is available and as a result focus on the households who are interviewed in the PSID surveys for 1989, 1994, and 1996.[13]

Specifically, the 1989 and 1994 PSID core family data set and the wealth supplements are linked to the 1996 bankruptcy data file. For these households, therefore, information is available for their 1989 and 1994 demographic, economic, and financial conditions, which may explain homeownership. Due to time lags between making the decision to purchase a home and becoming a homeowner, the status of homeownership most likely will reflects the household's economic, demographic, and geographic conditions in the previous year. Therefore, homeownership information is obtained from 1990 and 1995 PSID core family data sets.[14]

Finally, the focus of the study is on households that own their homes in 1990. Among these home-owners, those that filed for bankruptcy in 1991, 1992, 1993 or 1994 will be compared with the others who did not file for bankruptcy between 1991 and 1994. Because households who filed for bankruptcy in other years (before 1991 or between 1995 and 1996) may differ from the households who have never filed for bankruptcy, they are excluded from the sample. To minimize complications due to multiple filings, I also delete from the sample those households that filed for bankruptcy more than once. After these exclusions as well as deletion of observations with missing information, the

[13] Studying households reporting bankruptcy filings after this time period will introduce additional missing information on bankruptcy filing. Among those interviewed in the 1999 PSID surveys, for example, the bankruptcy records of some households are not observed because they have filed for personal bankruptcy between 1996 and 1999. As a result, it will be impossible to disentangle the effect of a bankruptcy record on these households.

[14] Using home ownership information for 1989 and 1994 gives qualitatively similar results.

resultant sample includes 3471 households, among which 57 filed for bankruptcy in the time period defined above.[15]

Table 2 presents the summary statistics for the sample studied in the paper using the 1989 sampling weights. It can be seen from the table that the households who filed for bankruptcy at any point in time between 1991 and 1994 are different from the other households in many aspects. They tend to have younger and less educated household heads as well as more people in the household, and are more likely to experience a divorce during these years. They also have more debt but less wealth on average.[16] Although all the households in the sample owned their house in 1990, households that filed for bankruptcy are less likely to own a house in 1995. During this time period, 51.7 percent of the original homeowners with a bankruptcy record lost their homes, while the proportion of all homeowners who lost their homeownership by 1995 was only 13.5 percent. All the above differences are significant at the conventional level.

5. Results

5.1. Effects of Bankruptcy Filing on Homeownership

The pattern observed in Table 2 regarding the change in homeownership between 1990 and 1995 only provides preliminary evidence on the effects of bankruptcy filing, because the differences might be due to the various differences between households who have filed for bankruptcy and those who have not, such as differences in demographic,

[15] The annual bankruptcy filing rate for the PSID sample is about 50 percent lower than the actual bankruptcy filing rate in the U.S. See, for instance, Fay, Hurst, and White (2002). The effects of the under-reporting will be discussed at the end of Section 5.1.

[16] Housing value and mortgage are not included in the calculations of debt or wealth throughout the paper to avoid endogeneity.

economic and financial changes. To control for these factors, regressions are conducted using the specifications described in Section 3, with the estimation results presented in Tables 3-1 and 3-2. Sampling weights provided by the PSID are used in all estimations conducted in the paper.

Column 1 in Table 3-1 presents results from the base regression. The results suggest that a household that filed for bankruptcy between 1991 and 1994 is less likely to own a house in 1995 and the effect is large with a magnitude of about 28 percent. In addition to the significant negative effect of a bankruptcy record, several other factors are also found to have significant effects on homeownership, consistent with previous findings (Kofi and Hurst 2002). Households that have female household heads and that experienced marital changes (marriage or divorce) or unemployment are more likely to lose homeownership, while higher education, higher labor income, and larger family size tend to increase the likelihood of homeownership. The age of the household head also has a significant positive effect on the household's homeownership in 1995. Similar to the effect of bankruptcy record, the effects of gender, employment status, education, and income are probably due to their influence on mortgage loan availability. The effects of family structure changes, on the other hand, can be explained by the consequent changes in the household's demand for housing. Finally, the age effect can be due to its impact on either the supply or the demand of the mortgage loans.

Column 2 further controls for state fixed effects to capture the geographic variations in the taxation benefits of owning a house and the appreciation rate of housing values as well as potential regional differences that lead to variations in preferences for housing. All the significant effects summarized above remain. In summary, bankruptcy

filing is shown so far to have a robust negative effect on a household's ability to obtain or maintain homeownership. In addition, the effect is economically important with a magnitude of about 28 percent.

This result very much resonates with the general view among legal practitioners in the consumer bankruptcy field, who argue that the fear of losing access to mortgage loan is indeed an important explanation for why consumers in deep financial distress still hesitate to file for bankruptcy (Braucher 1993). More important, these estimates are robust with the bankruptcy filing decision endogenously determined. Following the specification in Section 3, I estimate a treatment effect model, where the bankruptcy decision is endogenously determined and both homeownership and bankruptcy are allowed to be affected by unobserved variables that are potentially correlated. The same group of explanatory variables from Table 3-1 is included in the equation determining homeownership, which is of primary interest to the current study.

For the decision of bankruptcy filing, three theories guide the choice of explanatory variables. First, legal scholars tend to believe that bankruptcy filings result from short-term financial hardship or family difficulties (Sullivan, Warren, and Westbrook, 1989, 2000). Variables such as the employment status, disability status, and labor income level of the household head as well as the size of the household are included to account for this explanation. Second, economists have found evidence that consumers conduct cost-benefit analysis when deciding whether to file for bankruptcy (White 1987, Peterson and Aoki 1984, Shepard 1984, Boyes and Faith 1986, and Fay, Hurst, and White 2002). To test this theory, the difference between their unsecured debt and the amount of their asset that exceeds the exemption level is computed as the benefit that each

household can obtain from bankruptcy filing and included in the regression.[17] In addition, the availability of information regarding bankruptcy filing as well as the stigma effect related to bankruptcy are believed to influence bankruptcy decisions (Gross and Souleles 2002, Fay, Hurst, and White 2002). The geometric mean of bankruptcy filing rate for each state is included to capture these effects. Finally, demographic information of the household head such as gender, rate, age category, education, and marital status is also included in the regression.

Table 3-2 provides estimation results from the treatment effect model. As shown in Column 1, bankruptcy filing still has an independent negative effect on homeownership, even after controlling for unobserved factors that may increase both the probability of bankruptcy and the likelihood of losing a house, and the magnitude of the effect is very similar to that in the previous estimations. All the other significant results are also obtained with effects of very similar magnitude, which is not surprising given that the estimated correlation coefficient of the two error terms is not significantly different.

The factors that significantly affect the probability of bankruptcy filing include age, education, and income. Specifically, younger household heads tend to have higher probability of bankruptcy filing, while higher education and higher income both decrease the likelihood of bankruptcy filing. In addition, being disabled and having a higher potential benefit from filing (defined as the difference between unsecured debt and the amount of asset exceeding the exemption level) both tend to increase the likelihood of filing, but are only significant at 20 percent level. These results are largely in line with

[17] For states that allow the usage of the federal exemption level, the higher level between the state and the federal exemptions is applied.

previous findings (White 1987, Peterson and Aoki 1984, Shepard 1984, Boyes and Faith 1986, and Fay, Hurst, and White 2002). Column 2 adds state dummies to control for regional variations in determining homeownership. All the results remain similar, qualitatively and quantitatively.

One important limitation of this study is the small number of bankrupt filings reported in the PSID data. Because the bankruptcy filing rate is under-reported by about 50 percent, the "non-bankrupt" group studied in the sample most likely include some households that have actually filed for bankruptcy during the period studied but failed to report the filings. This limitation is due to the lack of other data sources that provide bankruptcy filing information on the household level. However, such under-reporting tends to obscure the differences between "bankrupt" group and "non-bankrupt" group as categorized in the current study and thus leads to underestimated effects of bankruptcy filing. The observed significant effect of bankruptcy filing on homeownership based on this data set, therefore, highlights the importance of such differences.

5.2. Effects of Chapter Choice

Next, I study the differences between Chapter 7 and Chapter 13 filings in their effects on a homeowner's access to mortgage loans after bankruptcy filing. As discussed in Section 2, Chapter 7 and Chapter 13 bankruptcy filings have different implications on how the bankruptcy filing affects the bankruptcy filer's access to credit after bankruptcy filing, but we will provide empirical evidence on which chapter has more adverse effects on the post-bankruptcy access to credit.

Tables 4-1 and 4-2 present results from the basic model and the treatment effect model with the same specifications as those in Tables 3-1 and 3-2, except that each

estimation is conducted using two separate samples, one excluding Chapter 13 filers and the other excluding Chapter 7 filers. When bankruptcy decision is considered as exogenous, both samples give results that are very similar to those presented in both Table 3-1 and Table 3-2, as shown in Table 4-1. But when the bankruptcy decision is allowed to be endogenously determined, different results are obtained for the two samples. While the results using the sample of Chapter 7 filers and non-filers remain similar to those previously presented, both qualitatively and quantitatively, the results from the sample including Chapter 13 filers and non-filing homeowners change substantially.

In particular, when bankruptcy filing is endogenously determined, only Chapter 7 bankruptcy is shown to have a significant and negative effect on homeownership, but the effect on homeownership of Chapter 13 bankruptcy, although still negative, is no longer significant at the conventional level. The reason for the different results is that the error term in the homeownership equation and that in the bankruptcy equation have a significant negative correlation in the sample including Chapter 13 filers and non-filers, and therefore the size of the bankruptcy effect is biased upward if the homeownership equation is estimated alone. But for the sample with Chapter 7 filers and non-filers, the two error terms are not significantly correlated, leading to similar results from both the basic model and the treatment effect model.

These results are consistent with the arguments given in Section 2. First of all, Chapter 7 bankruptcy is the type of bankruptcy filing that may entail the liquidation of the filer's house and other real properties. In addition, the filers may experience more difficulty in getting other credit in case of further financial distress and thus are more

likely to experience housing foreclosure due to missed payments. It is worth emphasizing that the loss of a house during Chapter 7 bankruptcy proceedings not only implies the forfeiture of the homeowner's equity value in the house that is in excess of the exemption level but also leads to the loss of existing mortgage loans, which are captured in the house to be liquidated. Similarly, the loss of homeownership during foreclosure also leads to loss in existing mortgage loans. Given that homeownership is practically impossible without the access to mortgage loans, a household that loses its house through Chapter 7 bankruptcy will have to regain access to mortgage loans in order to establish new homeownership. Therefore, the failure of such households to establish homeownership till 1995 suggests that their loss of access to mortgage loans has persisted for at least the period studied.

Other differences between the two samples include the following: First, benefit from bankruptcy filing is very close to having a positive and significant effect in determining bankruptcy filing decision for the sample including Chapter 7 filers and non-filers, but for the sample including Chapter 13 filers and non-filers, benefit from filing has a negative sign and is not at all significant. Given that the benefit is computed as the difference between the amount of dischargeable debt and the amount of unsecured debt and that Chapter 13 does not result in the automatic discharge of the bulk of the debt, it is not surprising that only Chapter 7 filing tends to be affected by the level of benefit. Second, being white decreases while being disabled increase the probability of filing for Chapter 13. In addition, being married or being employed tends to increase the probability of filing for Chapter 13. But none of the above factors has a significant effect on the probability of filing for Chapter 7. The results on marital and employment status

may appear surprising at first but actually match our expectation, because the court's approval of a Chapter 13 filing requires a repayment plan regarding how the remaining debt will be paid off in a three- to five-year period. Presumably, married couples are more willing to file for Chapter 13 by making repayment plans in order to keep their properties, while people without jobs are less likely to get a court to confirm a repayment plan for a Chapter 13 filing and thus less likely to file for Chapter 13.

6. Conclusion

Both testimonies by practitioners and anecdotal evidence suggest that a bankruptcy record will have negative effects on one's ability to borrow in the future. Yet there is very scant empirical evidence showing the existence or magnitude of such effects. The lack of such evidence may have hindered the ongoing debate on why the rate of personal bankruptcy filing has been rising in the past two decades and how effective the proposed bankruptcy law reform will be in lowering the bankruptcy rate, which is intended to make bankruptcy filing much more difficult.

The empirical findings made in this paper show that bankruptcy filing reduces a household's likelihood of retaining its homeownership by close to 30 percent. This decrease in homeownership probability can in turn be translated into a dollar amount that measures the reduction in the household's consumer surplus, using the formula $\mu x k / \rho$. In the formula, μ is the proportion of mortgage loans a homeowner loses due to a bankruptcy filing, x is the median amount of mortgage loans for American homeowners, and ρ is the discount rate. Finally, k is a lower bound estimate of the household's utility gains per dollar of mortgage loan, computed as $k = r/(2e_P)$, where r is the effective

annual interest rate paid on their mortgage loans by a typical American homeowner and e_P is the price elasticity of the demand for mortgage loans.[18]

As estimated above, $\mu=0.28$. For the discount rate, I choose the value $\rho=0.1$. For the other parameters, I use the Survey of Consumer Finances 1989-2001 data to obtain the following estimates: x=25,000 and r=16.3 percent.[19] For the price elasticity of the demand for mortgage, I use the estimate of 1 obtained in Gary-Bobo and Larribeau (2004).[20] The median utility loss for an American homeowner is thus \$5,705

$\left(= \frac{0.28 * 25000 * 0.163}{2 * 1 * 0.1} \right)$. This estimate assumes that the loss in credit access due to bankruptcy filing is permanent. If one believes that a household with a bankruptcy record regains full access to credit once the record is deleted from the credit report after ten years, then the utility loss needs to be adjusted downward by multiplying an adjustment factor equal to $a=1-(1/1.10)^{10} = 0.6165$, which brings the number to \$3,517.[21]

Given that the benefit from filing for bankruptcy for a typical household is estimated at \$1,644 without strategic behaviors and \$3,600 with strategic behaviors (White1998), the reduction in mortgage loans represents a large deterrence effect and should be included in the analysis of personal bankruptcy filing. Taking into consideration of this deterrence effect will substantially reduce the number of U.S. households with positive net benefit from bankruptcy filing that is previously given in the

[18] See Laffont 1988, p141.
[19] The price of mortgage loans is the effective annual interest rate computed as $r=(1+i)^{12}-1$, where *i = per period payment / loan amount * (number of payments per year/12)*, is the effective monthly interest rate. For any mortgage loan with longer than 10 years term, the equation used to compute *i* above gives the approximate solution to the following equation: *loan amount = monthly payment * [(1-1/(1+i)^N)/i],* where *N* is the number of monthly payments, and thus provides the approximate effective monthly interest rate.
[20] The estimates obtained in Gary-Bobo and Larribeau (2004) are for mortgage loans in Britain. Similar estimates for the U.S. are not available.
[21] For empirical evidence demonstrating such recovery after bankruptcy filing in access to non-secure credit such as bank cards, see Musto (2005).

literature. As a result, the size of the pool of potential bankrupts, will shrink substantially, which help reconcile the discrepancy between predicted bankruptcy rate in previous studies and the actual bankruptcy rate observed. On the one hand, these results suggest that the danger of a tripling rate of personal bankruptcy filing might have been overstated.[22] On the other hand, however, explanations that focus on households' financial difficulties gain more importance in accounting for the rising rate of bankruptcy filing, implying that the continuous growth in personal bankruptcy filings might be more difficult to combat.

In addition, given the importance of access to credit to American households, alternative solutions might be available to the problem of rising bankruptcy rate including the tightening of credit availability to those who have filed for bankruptcy previously. Several studies examine the evolution of the credit industry's lending practices over the past two decades and link it to the rising bankruptcy rate. Staten (1993) presents evidence that a significant fraction of households who have filed for bankruptcy recently have obtained new lines of credit, implying the credit industry is relaxing its penalty imposed on the filers in the form of reduced access to credit. Ausubel (1997) and Ellis (1998) provide an alternative argument relating the ever more aggressive credit lending practices to rising bankruptcy rate. Specifically, the over-extension of credit naturally lowers the average creditworthiness of all the debtors and thus leads to higher default rate and bankruptcy rate. If the credit industry has been employing ever more aggressive credit lending practices as argued in the previous studies, it may also have contributed to the rising bankruptcy rate by making an increasing amount of credit including mortgage

[22] See Footnote 3.

loans available to households with a bankruptcy record. Therefore, the credit industry may have a more important role to play in solving the problem than previously believed.

Finally, the paper also presents the first empirical results contrasting the effects of Chapter 7 and Chapter 13 filings. The distinction between Chapter 7 and Chapter 13 is important because Chapter 7 bankruptcy cases are overwhelmingly of the no-asset variety, implying minimal recovery of credit for creditors, while Chapter 13 debtors typically promise to repay more than half of the debt owned (Sullivan, Warren, and Westbrook 1989). Since creditors have an interest in increasing the proportion of bankruptcy filings that fall into the category of Chapter 13, one mechanism they can use to achieve this goal is to provide Chapter 13 filers with better access to future credit compared to Chapter 7 filers. The findings presented here suggest that, to some extent, this mechanism is already implemented in reality.

References

Ausubel, L. M. 1997. Credit card default, credit card profit and bankruptcy. *American Bankruptcy Law Journal* 71 (Spring): 249-270.

Boyes, W. J. and R. L. Faith. 1986. Some effects of the bankruptcy reform act of 1978. *Journal of Law and Economics* 19:139–149.

Braucher, J. 1993. Lawyers and consumer bankruptcy: One code, many cultures. *American Bankruptcy Law Journal* 67.

Brueckner, J. 1986. The down payment constraint and housing tenure choice: A simplified exposition. *Regional Science and Urban Economics* 16.

Capone, C. A. 1996. "Providing Alternatives to Mortgage Foreclosure: A Report to Congress." Washington, D.C.: United States Department of Housing and Urban Development.

Ciochetti, B.A. 1997. Loss Characteristics of Commercial Mortgage Foreclosure. *Real Estate Finance* Spring, 53-69.

Clauretie, T. M. and T. Herzog. 1990. The effect of state foreclosure laws on loan losses: Evidence from the mortgage insurance industry. *Journal of Money, Credit and Banking 22*(2), 221–233.

Culhane, M. and M. White. 1999. Taking the new consumer bankruptcy model for a test drive: Means-testing real chapter 7 debtors. *American Bankruptcy Institute Law Review* 7 (Spring): 27-78.

Domowitz, I. and R. L. Sartain. 1999. Determinants of the consumer bankruptcy decision. *Journal of Finance* 54:1241–77.

Ellis, D. 1998. The effect of consumer interest rate deregulation on credit card volumes, charge-offs, and the personal bankruptcy rate. *Bank Trends* 98.

Engelhardt, Gary. 1996a. House Prices and Home Owner Saving Behavior. *Regional Science and Urban Economics* 26: 313-336.

Engelhardt, Gary. 1996b. Consumption, Down Payments, and Liquidity Constraints. *Journal of Money, Credit and Banking* 255-271.

Fay, S., E. Hurst, and M. J. White. 2002. The household bankruptcy decision. *American Economic Review* pages 706–18.

Gary-Bobo, R. J., and S. Larribeau. 2004. ''A structural econometric model of price discrimination in the French mortgage lending industry." *International Journal of Industrial Organization* 22(1): 101–34.

Gross, D. B. and N. S. Souleles. 2002. An empirical analysis of delinquency and personal bankruptcy. *Review of Financial Studies* 15 (Spring): 319–347.

Gyourko, Joseph, Peter Linneman, and Susan Wachter. 1999. Analyzing the Relationship Among Race, Wealth and Home Ownership by Age Over Time. *Journal of Housing Economics* 8(2): 63-89.

Haurin, Donald R., Patric H. Hendershott, and Susan M. Wachter 1997. Borrowing Constraints and the Tenure Choice of Young Households. *Journal of Housing Research* 8(2): 137-154.

Hendershott, P. 1980. Real user costs and the demand for single family housing. *Brookings Papers on Economic Activity* 2.

Henderson, V. and Y. Ioannides 1993. A model of housing tenure choice. *American Economic Review* 73.

Jappelli, T. 1990. Who is credit constrained in the U.S. economy. *The Quarterly Journal of Economics* 105: 219–234.

Kofi, K. and E. Hurst 2002. The transition to home ownership and the black-white wealth gap. *Review of Economics and Statistics* 84.

Laffont, J. 1988. *Fundamentals of Public Economics*. Cambridge, MA: The MIT Press.

Musto, D. 2003. What happens when information leaves a market? Evidence from post-bankruptcy consumers. *Journal of Business*: forthcoming.

Pence, K.M. 2003. Foreclosing on opportunity: State laws and mortgage credit. Presented at the Allied Social Science Association Conference in the American Real Estate and Urban Economics Association Session, January.

Peterson, R. L. and K. Aoki. 1984. Bankruptcy filings before and after implementation of the bankruptcy reform law. *Journal of Economics and Business* 36:95–105.

Poterba, J. 1991. House price dynamics: The role of tax policy and demography. *Brookings Papers on Economic Activity* 2.

Rosen, Harvey. 1979. Housing decisions and the U.S. income tax: An econometric analysis. *Journal of Public Economics* 11(2): 1-23.

Shepard, L. 1984. Personal failures and the bankruptcy reform act of 1978. *Journal of Law and Economics* 27:419–437.

Staten, M. 1993. The impact of post-bankruptcy credit on the number of personal bankruptcies. Working Paper No. 58, Credit Research Center, Krannert Graduate School of Management, Purdue University.

Sullivan, T., E. Warren, and J. Westbrook. 1989. *As We Forgive Our Debtors*. New York: Oxford University Press.

Sullivan, T., E. Warren, and J. Westbrook. 2000. *The Fragile Middle Class*. New Haven and London: Yale University Press.

Warren, E., and A. W. Tyagi. 2003. *The Two-Income Gap*. New York: Basic Books.

Weiss, Y. 1978. Capital gains, discriminatory taxes, and the choice between renting and owning a house. *Journal of Public Economics* 10.

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

White, M. J. 1998. Why it pays to file for bankruptcy: A critical look at incentives under U.S. bankruptcy laws and a proposal for change. *University of Chicago Law Review* 65:685–732.

Appendix A: Tables

Table 1. Number and Year of Bankruptcy Filings

	Frequency
A. Number of Bankruptcy Filings	
0	7792
1	494
2	31
B. Year of Bankruptcy Filing	
1919-1969	13
1970-1979	45
1980-1989	181
1990	41
1991	48
1992	40
1993	42
1994	41
1995	50
1996	12

Notes: The statistics for this table are from the 1996 PSID core family data set.

Table 2. Mean Characteristics of PSID homeowners (1989-1995)

Variable	Mean			Adj. Wald test
	Overall (N=3471)	Non-bankrupt households (N=3414)	Bankrupt households (N=57)	
Demographics (1989)				
Female	0.176	0.175	0.267	0.81
Married	0.740	0.741	0.636	1.18
White	0.900	0.900	0.860	0.77
Age	50.274	50.398	38.134	59.93**
Education	12.841	12.852	11.752	5.74*
Household size	2.861	2.855	3.461	5.41*
Finances (1989)				
Debt (excl. mortgage)	2445.455	2409.814	5925.509	2.04
Wealth (excl. housing)	109893.2	109911.4	19332.44	61.48**
Demographic and Economic Changes (1989-1994)				
Got married	0.035	0.034	0.099	1.24
Got divorced	0.128	0.127	0.284	3.28+
Household size change	-0.359	-0.356	-0.654	0.89
Became unemployed	0.033	0.032	0.107	1.59
Labor income change	-3326.086	-3360.356	20.449	0.62
Debt change (excl. mortgage)	1901.34	1936.017	-1484.99	1.47
Wealth change (excl. housing)	-3866.207	-3846.103	-5829.472	1.08
Homeownership (1995)				
1995 ownership	0.865	0.869	0.483	16.76**

Notes: All the statistics are computed using the 1989 sampling weight provided in the PSID. The 'Adj. Wald test' column contains the test result for survey data of whether the mean of a variable is the same for households with or without bankruptcy record.
+ significant at 10%; * significant at 5%; ** significant at 1%

Table 3-1: Effects of 1991-1994 Bankruptcy Filing on 1995 Homeownership

	(1)	(2)
Filed for bankruptcy (1991-1994)	-0.277	-0.278
	(3.49)**	(3.59)**
Female household head	-0.076	-0.071
	(3.73)**	(3.55)**
White household head	-0.017	-0.022
	(0.70)	(0.85)
Household head age less than 25	-0.063	-0.073
	(1.29)	(1.45)
Household head age between 25 and 34	-0.103	-0.102
	(4.45)**	(4.37)**
Household head age between 35 and 44	-0.070	-0.066
	(3.24)**	(3.07)**
Household head age between 45 and 54	-0.044	-0.041
	(1.82)+	(1.69)+
Household head age between 55 and 64	0.006	0.007
	(0.29)	(0.33)
Household head years of schooling	0.012	0.013
	(5.15)**	(5.53)**
Household head getting married (1989-1994)	-0.191	-0.197
	(3.92)**	(4.01)**
Household head getting divorced (1989-1994)	-0.213	-0.210
	(6.97)**	(6.93)**
Change in household size (1989-1994)	0.062	0.061
	(7.48)**	(7.54)**
Change in household head labor income (1989-1994)	5.20e-07	5.12e-07
	(1.88)+	(1.87)+
Household head unemployed in 1994	-0.173	-0.188
	(2.69)**	(2.98)**
Household head disabled in 1994	-0.103	-0.109
	(1.46)	(1.61)
Change in household wealth (1989-1994)	4.86e-10	-1.67e-09
	(0.03)	(0.12)
Change in household debt (1989-1994)	4.40e-08	5.43e-08
	(0.80)	(0.81)
State dummies	No	Yes
Intercept	0.849	0.897
	(23.25)**	(21.72)**
Observations	3471	3471
R-squared	0.18	0.20

Notes: All the estimations use the sampling weight provided in the PSID. Absolute value of robust t-statistic is provided in parenthesis.
+ significant at 10%; * significant at 5%; ** significant at 1%

Table 3-2: Effects of 1991-1994 Bankruptcy Filing on 1995 Homeownership (with the bankruptcy decision made endogenously)

Home-ownership regression	(1)	(2)
Filed for bankruptcy (1991-1994)	-0.257	-0.256
	(2.66)**	(2.71)**
Female household head	-0.079	-0.076
	(3.91)**	(3.80)**
White household head	-0.020	0.061
	(0.83)	(0.33)
Household head age less than 25	-0.071	-0.082
	(1.43)	(1.62)
Household head age between 25 and 34	-0.103	-0.103
	(4.48)**	(4.43)**
Household head age between 35 and 44	-0.067	-0.064
	(3.12)**	(2.98)**
Household head age between 45 and 54	-0.046	-0.044
	(1.89)	(1.80)
Household head age between 55 and 64	0.011	0.012
	(0.54)	(0.59)
Household head years of schooling	0.011	-0.085
	(4.97)**	(5.39)**
Household head getting married (1989-1994)	-0.179	-0.186
	(3.73)**	(3.88)**
Household head getting divorced (1989-1994)	-0.207	-0.204
	(6.84)**	(6.85)**
Change in household size (1989-1994)	0.061	0.060
	(7.36)**	(7.46)**
Change in household head labor income (1989-1994)	7.09e-07	7.06e-07
	(2.42)*	(2.55)*
Household head unemployed in 1994	-0.182	-0.200
	(2.79)**	(3.15)**
Household head disabled in 1994	-0.107	-0.109
	(1.51)	(1.62)
Change in household wealth (1989-1994)	2.77e-09	5.83e-10
	(0.17)	(0.04)
Change in household debt (1989-1994)	4.21e-08	5.17e-08
	(0.73)	(0.77)
Intercept	0.858	0.904
	(23.74)**	(22.66)**
State dummies	No	Yes

Bankruptcy equation		
State average bankruptcy rate (1987-1989)	28,580.047	29,409.252
	(0.43)	(0.45)
Benefit from bankruptcy filing (1989)	2.46e-07	2.47e-07
	(1.17)	(1.17)
Female household head	0.201	0.204
	(0.63)	(0.64)
White household head	0.061	-0.025
	(0.33)	(0.98)
Household head age (1989)	-0.040	-0.040
	(5.28)**	(5.28)**
Household head age squares (1989)	-0.323	-0.326
	(1.28)	(1.29)
Household head year of schooling	-0.085	0.012
	(2.32)*	(2.31)*
Household head married (1989)	-0.056	-0.054
	(0.19)	(0.18)
Household size (1989)	0.086	0.085
	(1.59)	(1.57)
Household head average labor income (1984-1989)	-1.74e-05	-1.74e-05
	(2.27)*	(2.28)*
Household head employed (1989)	0.289	0.292
	(0.98)	(0.99)
Household head disabled (1989)	0.800	0.806
	(1.49)	(1.49)
Constant	0.187	0.181
	(0.31)	(0.30)
ρ	0.033	0.040
	(0.34)	(0.54)
Observations	3449	3449

Notes: All the estimations use the sampling weight provided in the PSID. Absolute value of robust z-statistic is provided in parenthesis, except for ρ, where the number in parentheses is the chi-square statistic for the Wald test of dependent equations ($\rho = 0$).

$^{+}$ significant at 10%; * significant at 5%; ** significant at 1%

Table 4-1: Chapter Choice and the Effects of 1991-1994 Bankruptcy Filing on 1990-1995 Homeownership

	Sample= Chapter 7 filers and non-filers		Sample= Chapter 13 filers and non-filers	
	(1)	(2)	(3)	(4)
Filed for bankruptcy (1991-1994)	-0.284	-0.286	-0.308	-0.296
	(3.32)**	(3.42)**	(2.26)*	(2.24)*
Female household head	-0.076	-0.072	-0.075	-0.072
	(3.76)**	(3.58)**	(3.66)**	(3.55)**
White household head	-0.016	-0.021	-0.018	-0.022
	(0.64)	(0.80)	(0.74)	(0.82)
Household head age less than 25	-0.065	-0.076	-0.075	-0.085
	(1.33)	(1.49)	(1.56)	(1.71)+
Household head age between 25 and 34	-0.104	-0.104	-0.100	-0.101
	(4.53)**	(4.43)**	(4.34)**	(4.29)**
Household head age between 35 and 44	-0.069	-0.065	-0.070	-0.066
	(3.19)**	(3.01)**	(3.22)**	(3.05)**
Household head age between 45 and 54	-0.044	-0.041	-0.043	-0.040
	(1.82)	(1.69)	(1.79)	(1.66)+
Household head age between 55 and 64	0.006	0.007	0.007	0.008
	(0.29)	(0.34)	(0.34)	(0.38)
Household head years of schooling	0.012	0.013	0.011	0.013
	(5.12)**	(5.46)**	(5.00)**	(5.36)**
Household head getting married (1989-1994)	-0.191	-0.197	-0.194	-0.202
	(3.91)**	(4.00)**	(3.90)**	(4.01)**
Household head getting divorced (1989-1994)	-0.214	-0.210	-0.213	-0.210
	(6.99)**	(6.94)**	(6.94)**	(6.91)**
Change in household size (1989-1994)	0.062	0.061	0.061	0.061
	(7.50)**	(7.57)**	(7.37)**	(7.40)**
Change in household head labor income (89-94)	5.26e-07	5.21e-07	5.02e-07	5.02e-07
	(1.90)+	(1.90)+	(1.82)+	(1.83)+
Household head unemployed in 1994	-0.171	-0.186	-0.173	-0.187
	(2.66)**	(2.94)**	(2.70)**	(2.97)**
Household head disabled in 1994	-0.103	-0.109	-0.107	-0.112
	(1.46)	(1.60)	(1.52)	(1.63)
Change in household wealth (1989-1994)	1.14e-11	-1.83e-09	4.42e-10	-1.92-e09
	(0.00)	(0.13)	(0.03)	(0.13)
Change in household debt (1989-1994)	4.40e-08	5.45e-08	4.03e-08	5.05e-08
	(0.80)	(0.81)	(0.74)	(0.76)
State dummies	No	Yes	No	Yes
Intercept	0.849	0.897	0.854	0.901
	(23.22)**	(21.81)**	(23.43)**	(21.83)**
Observations	3449	3449	3444	3444
R-squared	0.18	0.20	0.17	0.19

Notes: All the estimations use the sampling weight provided in the PSID. Absolute value of robust t-statistic is provided in parenthesis.

+ significant at 10%; * significant at 5%; ** significant at 1%

Table 4-2: Chapter Choice and the Effects of 1991-1994 Bankruptcy Filing on 1990-1995 Homeownership (with bankruptcy decision made endogenously)

	Sample= Chapter 7 filers and non-filers		Sample= Chapter 13 filers and non-filers	
Home-ownership equation	(1)	(2)	(3)	(4)
Filed for bankruptcy (1991-1994)	-0.274	-0.270	-0.219	-0.205
	(2.45)*	(2.49)*	(1.38)	(1.37)
Female household head	-0.080	-0.077	-0.078	-0.076
	(3.94)**	(3.83)**	(3.83)**	(3.79)**
White household head	-0.018	-0.024	-0.021	-0.024
	(0.76)	(1.21)	(0.86)	(0.94)
Household head age less than 25	-0.073	-0.085	-0.084	-0.095
	(1.46)	(1.66)+	(1.72)+	(1.90)+
Household head age between 25 and 34	-0.104	-0.104	-0.100	-0.101
	(4.53)**	(4.48)**	(4.36)**	(4.34)**
Household head age between 35 and 44	-0.066	-0.062	-0.067	-0.063
	(3.06)**	(2.92)**	(3.09)**	(2.96)**
Household head age between 45 and 54	-0.046	-0.044	-0.045	-0.043
	(1.89)+	(1.80)+	(1.86)+	(1.77)+
Household head age between 55 and 64	0.011	0.012	0.012	0.013
	(0.55)	(0.60)	(0.60)	(0.64)
Household head years of schooling	0.011	0.012	0.011	0.012
	(4.93)**	(5.32)**	(4.82)**	(5.22)**
Household head getting married (1989-1994)	-0.179	-0.186	-0.181	-0.190
	(3.72)**	(3.87)**	(3.70)**	(3.87)**
Household head getting divorced (1989-1994)	-0.208	-0.204	-0.208	-0.205
	(6.87)**	(6.87)**	(6.82)**	(6.84)**
Change in household size (1989-1994)	0.061	0.061	0.060	0.060
	(7.37)**	(7.49)**	(7.23)**	(7.29)**
Change in household head labor income (1989-1994)	7.16e-07	7.14e-07	6.87e-07	6.95e-07
	(2.45)*	(2.58)**	(2.33)*	(2.49)*
Household head unemployed in 1994	-0.181	-0.199	-0.183	-0.199
	(2.76)**	(3.12)**	(2.80)**	(3.14)**
Household head disabled in 1994	-0.107	-0.109	-0.112	-0.113
	(1.50)	(1.62)	(1.58)	(1.66)+
Change in household wealth (1989-1994)	2.31e-09	4.15e-10	2.75e-09	3.54e-10
	(0.15)	(0.03)	(0.17)	(0.02)
Change in household debt (1989-1994)	4.22e-08	5.19e-08	3.82e-08	4.77e-08
	(0.73)	(0.77)	(0.66)	(0.71)
Intercept	0.858	0.905	0.863	0.909
	(23.71)**	(52.41)**	(23.92)**	(22.75)**
State dummies	No	Yes	No	Yes

Bankruptcy equation				
State average bankruptcy rate (1987-1989)	27,019.069	27,331.415	-25,814.117	-24,209.376
	(0.40)	(0.41)	(0.21)	(0.20)
Benefit from bankruptcy filing (1989)	3.34e-07	3.35e-07	-5.70e-08	-5.73e-08
	(1.57)	(1.56)	(0.53)	(0.54)
Female household head	0.222	0.226	0.235	0.238
	(0.67)	(0.68)	(0.65)	(0.66)
White household head	0.295	0.298	-0.489	-0.491
	(1.20)	(0.92)	(2.41)*	(2.42)*
Household head age (1989)	-0.039	-0.039	-0.035	-0.035
	(4.84)**	(4.84)**	(3.17)**	(3.17)**
Household head age squares (1989)	-0.415	-0.421	0.171	0.170
	(1.44)	(1.45)	(0.51)	(0.50)
Household head year of schooling	-0.088	-0.088	-0.074	-0.074
	(2.20)*	(2.19)*	(3.09)**	(3.08)**
Household head married (1989)	-0.124	-0.120	0.724	0.723
	(0.39)	(0.38)	(2.28)*	(2.29)*
Household size (1989)	0.086	0.086	0.051	0.051
	(1.45)	(1.42)	(0.81)	(0.82)
Household head average labor income (1984-1989)	-1.60e-05	-1.60e-05	-8.60e-06	-8.53e-06
	(1.96)*	(1.97)*	(0.79)	(0.78)
Household head employed (1989)	0.250	0.257	0.534	0.540
	(0.79)	(0.81)	(1.85)+	(1.87)+
Household head disabled (1989)	0.857	0.867	1.771	1.781
	(1.57)	(1.58)	(3.17)**	(3.18)**
Constant	-0.002	-0.013	-1.134	-1.145
	(0.00)	(0.02)	(1.22)	(1.24)
ρ	-0.020	-0.034	-0.112	-0.114
	(0.08)	(0.27)	(3.32)+	(4.00)*
Observations	3427	3427	3423	3423

Notes: All the estimations use the sampling weight provided in the PSID. Absolute value of robust z-statistic is provided in parenthesis, except for ρ, where the number in parentheses is the chi-square statistic for the Wald test of dependent equations ($\rho = 0$).

+ significant at 10%; * significant at 5%; ** significant at 1%