Consumer Bankruptcy and Labor Market Policies

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Abstract

In this dissertation, we study the interaction of consumer bankruptcy and labor-market policies such as Unemployment Insurance (UI) and minimum wages (MW). Chapters 1 and 2 focus on UI. Chapter 1 uses cross-state differences in the maximum amount of UI available and county-level bankruptcy rates to estimate how UI affects consumer bankruptcy. In Chapter 2, I quantitatively evaluate how UI affects unsecured credit markets and how the welfare implications of UI depend on consumer bankruptcy. In Chapter 3, we use cross-state differences in the minimum wage (MW) and county-level consumer bankruptcy rates to estimate the effect of MW on consumer bankruptcy.

In chapter 1, I use cross-state differences in unemployment insurance (UI) and county-level consumer bankruptcy rates from 1991-2007 to estimate the effect of UI on consumer bankruptcy by exploiting policy discontinuities at the state borders. I find that Chapter 7 bankruptcy rates are significantly lower in counties belonging to states with higher UI compared to its neighboring county in the lower UI state. A 10% increase in the maximum amount of UI available decreases the bankruptcy rate by around 1.9%. The effect of UI on bankruptcy, as studied in chapter 2, is ambiguous. The result in this chapter is informative about the direction of this effect for the US data and will serve as a testable implication of the model developed in the next chapter.

In chapter 2, I quantitatively evaluate how UI affects unsecured credit markets and how the welfare implications of UI depend on consumer bankruptcy. Theoretically, higher UI benefits can reduce default risk since they imply higher income during a situation of low-income. However, they can also reduce precautionary savings, encourage borrowing and unemployment, and require more taxes, which would increase default risk. I construct a general equilibrium model of unsecured consumer credit and unemployment. The model

accounts for the cross-state negative relationship between bankruptcy rates and the maximum amount of UI available. I use the model to study changes in the UI replacement rate. For low levels of replacement rate, the model predicts that the first effect dominates, and more UI benefits reduce default risk and increase ex ante welfare. As UI increases, default risk increases, and welfare falls. Bankruptcy is a barrier for the UI to increase welfare. If bankruptcy is not available, increasing the replacement rate above the current 50% to 60% would increase welfare by 1.3% in terms of lifetime consumption; with a bankruptcy option, it reduces welfare by 3.6%.

In chapter 3, we use cross-state differences in MW and county-level consumer bankruptcy rates from 1991-2017 to estimate the effect of MW on consumer bankruptcy by exploiting policy discontinuities at the state borders. We find that Chapter 7 bankruptcy rates are significantly lower in counties belonging to states with higher MW compared to its neighboring county in the lower MW state (a 10% increase in MW decreases bankruptcy rate by around 4.4%). However, for Chapter 13, we find no statistically significant relationship. Also, the data suggest that before the 2005 Bankruptcy Reform, the effect of MW on reducing bankruptcy was almost as twice as large than for the overall period.

Keywords: consumer bankruptcy, unsecured credit, unemployment insurance, minimum wage

JEL Classification Codes: J65, K35, E21, E24, J64

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Contents

Chapter 1

Cross-State relationship between Unemployment Insurance and Consumer Bankruptcy

Abstract

I use cross-state differences in unemployment insurance (UI) and county-level consumer bankruptcy rates from 1991-2007 to estimate the effect of UI on consumer bankruptcy by exploiting policy discontinuities at the state borders. I find that Chapter 7 bankruptcy rates are significantly lower in counties belonging to states with higher UI compared to its neighboring county in the lower UI state. A 10% increase in the maximum amount of UI available decreases bankruptcy rate by around 1.9%.

1.1 Introduction

Bankruptcy filers tend to be middle- to low-income individuals whose income is mostly labor income. Sullivan et al. (2000) report that 67.5% of bankruptcy filers cite lower labor income, such as the resulting from job loss, as one of the main reasons for filing for bankruptcy. Athreya and Simpson (2006) pointed out that the bankruptcy rate among unemployed workers is four times the population counterpart, and the unemployment rate among bankruptcy filers is more than twice the population counterpart. Keys (2018) finds that households are three times more likely to file for bankruptcy in the year immediately following a job loss. These facts imply that UI will likely alter default risk by affecting labor income risk.

Theoretically, more generous UI can lead to either more or less bankruptcy. Higher UI benefits could reduce the use of bankruptcy since this implies higher income in a low-income state, which would represent an additional benefit for the UI. However, ex ante, higher UI benefits can encourage risk-taking, higher borrowing, and potentially, more default. The purpose of this chapter is to investigate if the US data is more informative regarding one of these two opposite effects of UI on bankruptcy. Additionally, the empirical result regarding the maximum amount of UI benefits available will serve as a testable implication of the model developed in the next chapter.

It is empirically challenging finding evidence of the relationship between UI and bankruptcy due to data limitation in terms of having a large sample of bankruptcy filers with information about employment status and UI recipiency. In this chapter, I use cross-state differences in unemployment insurance (UI) and county-level consumer bankruptcy rates from 1991-2007. The use of aggregate (county-level) data on bankruptcy poses its challenge given that the employment rate among Chapter 7 bankruptcy filers is around 73% (US Courts, 2007), i.e.,

most bankruptcy filers are employed.[1]

Also, economic shocks can affect both state-determined UI as well as bankruptcy decisions. To estimate the effect of UI on consumer bankruptcy, I use a Difference-in-Difference (DID) framework by comparing neighboring counties that belong to different states and exploiting discontinuities in the UI policy at the state borders.[2] I follow Hsu et al. (2018) and define UI generosity as the maximum amount of UI available during a given unemployment spell. I find that Chapter 7 bankruptcy rates are significantly lower in counties belonging to states with higher UI compared to its neighboring county in the lower UI state. Relative to the sample mean, a 10% increase in the maximum amount of UI available decreases the bankruptcy rate by around 1.9%.

This chapter contributes to the literature that empirically studies the relationship of labor market policy to households' financial outcomes, such as Fisher (2005), Angel and Heitzmann (2015), Hsu et al. (2018), Legal-Canisá (2019a), and Arslan et al. (2019). The result of this chapter extends and is quantitatively consistent with the results of Fisher (2005), who, based on the Panel Study of Income Dynamics (PSID), finds that a 10% increase in UI benefits reduces filing rate by 2.2%. The limitation of the PSID is that the total number of bankruptcy filers is low (196 cases). A natural question is whether this result holds at some level of aggregation. I extend this result by finding that Chapter 7 and UI are also negatively correlated when considering the total bankruptcy filings at the county-level.[3]

[1] This is not the case for mortgage defaults in which UI does not have a significant effect as showed by Hsu et al. (2018).

[2] I follow the work by Dube et al. (2010), Dube et al. (2016), Hagedorn et al. (2019), among others.

[3] Also, perhaps due to sample limitations, Fisher (2005) does not discriminate between Chapter 7 and Chapter 13 bankruptcy. At the county level, the correlation between Chapter 13 rates and UI generosity is positive. The main difference between these types of filers is that Chapter 13 filers are subject to a repayment plan and are more likely to have higher home equity. Legal-Canisá (2019b) studies the role of UI in the composition of personal bankruptcy.

1.2 Institutional Framework

Bankruptcy is a legal procedure through which borrowers can formally default on their unsecured debts. Consumer bankruptcies almost entirely fall under Chapter 7 or Chapter 13 of the US Bankruptcy Code. I focus on Chapter 7 since it represents around 70% of all consumer bankruptcies. Under this chapter, debtors obtain the full discharge of their total qualifying unsecured debts, and their current and future earnings are protected from any debt collection action.[4] Chapter 7 is a liquidation type of bankruptcy since it requires the liquidation of all nonexempt assets in order to repay lenders. However, only 5% of Chapter 7 cases yield assets that could be liquidated to repay creditors, Livshits et al. (2007).

The federal-state UI programs provide temporary income benefits to workers who lose their job. The number of workers covered by UI represents around 90% of the civilian labor force (employed plus unemployed workers).[5] These programs include Regular Unemployment Compensation (UC), the permanent Extended Benefits (EB), and the temporary Emergency Unemployment Compensation (EUC08). The EB is implemented during periods of high unemployment, and the EUC08 were extensions in benefits implemented during the Great Recession.

This chapter and the next one focus on the regular UC for two reasons. First, the theoretical trade-off that is analyzed in the next chapter focused in a steady-state environment. Second, the empirical analysis is more challenging when considering EB since this part of the policy change is in response to the unemployment rate, which in turn is the result of changes in economic underlying conditions, posing serious endogeneity concerns.

[4] Some debts such as alimony, student loans, and most tax debts cannot be discharged.

[5] U.S. Department of Labor: https://oui.doleta.gov/unemploy/data_summary/DataSum.asp

1.2.1 Data Sources

The empirical analysis of the relationship between unemployment insurance and Chapter 7 bankruptcy is done by considering a sample of U.S. counties from 1991-2007. In line with the theoretical framework of Section 2.3 and the empirical challenges described in sub-section 1.2.2, I focus on UI under the regular program (UC), not the extended benefits that are triggered during periods of high unemployment.[6] In what follows, I describe the sources of the main variables used in the empirical analysis.

The data on annual county-level Chapter 7 bankruptcy rates comes from US Courts records. I updated the data provided by Keys (2018). The data for state-level UI comes from different issues of the "Significant Provisions of State UI Laws" of the US Department of Labor. These publications contain records on the maximum number of weeks and the maximum weekly benefit amount (WBA) that is available under the regular UI.[7] I follow Hsu et al. (2018) by defining UI generosity in a given state as the maximum amount of benefits available during an unemployment spell (i.e., the maximum number of weeks times maximum weekly benefit amount). These reports are available twice a year, for January and July. Since the data on bankruptcy is available at an annual frequency, I use the average to compute the UI values for a given year.[8]

As shown in Table 4.1 in the appendix, under the Regular UI program most states have 26 weeks as the maximum number of weeks that UI benefits can be collected, so there is not much variation under this measure. Only 15 states changed the number of weeks available for regular benefits (see Table 4.1 in the appendix). There is more variation in terms of the

[6] For the same reason, the sample goes up to the year 2007 which excludes the Great Recession and post slow recovery.

[7] Available at https://oui.doleta.gov/unemploy/statelaws.asp

[8] This is different from Hsu et al. (2018) that use only the values contained in the July report (though it is unlikely that these small differences would make much difference).

maximum dollar amount of weekly benefits.

Data on state-level homestead exemption levels comes from Pattison (2018). The county unemployment rate comes from the Local Area Unemployment Statistics (LAUS) from the Bureau of Labor Statistics. County-level income comes from the Bureau of Economic Analysis (BEA) website.

Comparative sample statistics. For the empirical analysis of the next sub-section, I use only neighboring counties pairs that belong to different states. The total number of counties used 1,136, which represents around 36% of the total number of counties in the mainland US and contains almost one third of the population.

A concern with the bordering-counties specification is that this sample may not contain the same information as the all-counties sample. Table 1.1 shows some statistics from both samples. Both samples are quite similar in terms of the variables of interest that are later used in the empirical exercise, which mitigates the potential concern about the information cost of reducing the number of counties. As can be seen in the table, most of the variation in our measure of UI generosity comes from the maximum weekly benefit amount.

Table 1.1: Comparative sample statistics

	All counties				
	Mean	Std. Dev.	25th perc.	Median	75th perc.
Chap. 7 BK rate (%)	0.266, 0.303*	0.17	0.14	0.23	0.36
Max. num. of weeks	26.05	0.43	26.00	26.00	26.00
Max. WBA	290.71	81.95	230.50	279.50	337.00
Max. Benefits	7,580	2,188	5,993	7,280	8,775
Unemp. Rate (%)	5.74	2.72	3.90	5.20	6.90
Income	2,588,422	9,758,054	216,688	514,524	1,422,771
	Bordering counties				
Chap. 7 BK rate (%)	0.27, 0.303*	0.17	0.14	0.23	0.36
Max. num. of weeks	26.06	0.46	26.00	26.00	26.00
Max. WBA	290.95	86.48	230.00	276.00	339.00
Max. Benefits	7,592	2,326	5,980	7,202	8,827
Unemp. Rate (%)	5.74	2.65	3.90	5.20	7.00
Income	2,503,086	8,862,479	206,564	518,677	1,420,862

*First value of mean is unweighted, the second is the population weighted mean. The data on annual county-level Chapter 7 bankruptcy rates comes from US Courts records. I updated the data provided by Keys (2018). The data for state-level UI comes from different issues of the "Significant Provisions of State UI Laws" of the US Department of Labor. Data on state-level homestead exemption levels comes from Pattison (2018). The county unemployment rate comes from the Local Area Unemployment Statistics (LAUS) from the Bureau of Labor Statistics. County-level income comes from the Bureau of Economic Analysis (BEA) website.

1.2.2 Empirical Analysis

I proceed to study the empirical relationship between UI and bankruptcy rates. I show that the bankruptcy rate is significantly negatively correlated with UI generosity. I run two regressions of the Chapter 7 county bankruptcy rate on UI benefits from 1991-2007. Using all counties and exploiting the variation in UI policy across states represents a daunting task since states are different in many dimensions and these relative differences evolve differently

over time. Using all counties then pose severe challenges to the estimation of the effect of policy difference on the outcomes of interest. As discussed in Dube et al. (2010), using all counties raises an endogeneity concern since UI policy is determined at the state level and may well depend on state economic or political conditions that can also influence bankruptcy.

I addressed this concern by considering a sample of neighboring counties that belong to different states and exploit the discontinuity of UI policy at the border (see for example Dube et al. (2010) and Hagedorn et al. (2019)). Neighboring counties constitute better control groups under the assumption that the state-level shock does not stop at the border and affect county-pairs symmetrically. Also, since the policy is determined at the state level, it is regarded as exogenous from the county-pair perspective.

I follow Hsu et al. (2018) and define UI generosity as the total amount of benefits that is available under the regular UI program during a given unemployment spell (in particular, $\log(\#\text{ of weeks} \times \max \text{WBA})$). Consistent with the steady-state equilibrium model developed in the next section, I focus only on the regular UI program since the extended benefits are available only during periods of high unemployment (which in turns worsen the endogeneity concern).

As explained in Dube et al. (2010), considering all counties can be misleading since states are very different in terms of observables and unobservables both in levels and how they evolve over time. Using county fixed effects controls for any heterogeneity as long as it is constant over time. However, changes in underlying state conditions can influence both UI and bankruptcy; a regression using all counties would erroneously attribute changes in bankruptcy to changes in UI because it omits controlling for such underlying changes.

To control for changes in underlying state-level conditions that may drive both UI and bankruptcy, I examine the difference in UI generosity between bordering counties that belong to different states with different levels of UI (since UI is determined at the state level). I

refer to such counties as county-pairs (see for example Dube et al. (2010) and Hagedorn et al. (2019)). The basic idea is that state-level changes in underlying conditions do not stop at the border and affect neighboring counties symmetrically. Also, bordering counties are similar in terms of geography, climate, labor market conditions, routes, etc., so it is more plausible that unobserved heterogeneity between contiguous counties evolves similarly, making them a better control group. Then, the discontinuity of the UI policy at the border can be exploited to identify if differences in UI across county-pairs are associated with differences in bankruptcy rates. The identifying assumption for the border-discontinuity specification is that, conditional on covariates and county fixed effects, within pair differences in the generosity of UI are uncorrelated with the differences in the residual bankruptcy rate in either county, i.e., shocks affect the counties on the two sides of the state border similarly. For this exercise, I estimate the following Difference-in-Difference (DID) type regression:

$$BK_{cpt} = \alpha + \eta \ln(\max UI_{s(c)t}) + \phi_c + \tau_{pt} + X_{ct} + \varepsilon_{cpt} \tag{1.1}$$

Here BK_{cpt} represents the Chapter 7 bankruptcy percentage rate in county c belonging to pair p at time t. $\ln(\max UI_{s(c)t})$ represents the measure of UI generosity for county c that belongs to state s. The term ϕ_c represents a county fixed effect that controls for observables/unobservables characteristics that are constant over time. The variables τ_{pt} is a pair-specific time fixed effect that controls for changes in state-level underlying conditions, which is a key element in the identifying assumption of this setup.[9] To control for time-varying differences that are observed, X_{ct} includes county-level unemployment rate and

[9]More specifically, the comparison is between bordering counties at a given point in time in which county-level variables were demeaned by their average.

income as well as other relevant state policies such as home exception and minimum wages. Controlling for these policies are relevant to address potential simultaneous treatment effect that is a concern in DID specifications.

Standard errors are two-way clustered at the state level and at the border segment.[10] First, UI is constant across counties within a state. Second, each county is repeated as many times as it can be paired with a neighboring county in the other state. As explained in Dube et al. (2010), the presence of a single county in more than one pair induces a mechanical correlation across county-pairs and potentially across the entire border segment. In addition, all standard errors are corrected for heteroskedasticity. Column 2 in Table 1.2 shows the regression results.

Table 1.2: The effect of UI on Chapter 7 consumer bankruptcy (1991-2007)

	Chapter 7 bankruptcy rate
	Bordering counties
$\ln(\max UI_{s(c)t})$	-0.06015**
	(0.026)
$Unempl.rate_{c,t}$	Y
$\log(income_{c,t})$	Y
Other state policies	Y
County FE	Y
Pair-specific time FE	Y
N. Obs.	35,226

$\ln(\max UI_{s(c)t})$ = ln(max # of weeks × max. WBA). Standard errors are in parentheses and two-way clustered at the state and border segment. All monetary values are in 2017 dollars. Other state policies includes home exemptions and minimum wage. Significance levels: *10%, **5%, ***1%.

For the bordering counties considered, there is a statistically significant negative correlation between UI benefits on Chapter 7 bankruptcy rates. In particular, a 10% increase in the

[10] A border segment is defined as the set of all counties on both sides of a border between two states.

generosity of UI decreases Chapter 7 bankruptcy rate by 1.9% for an average base rate of 0.303% bankruptcy rate per habitant.

A common concern in this methodology is the spillover associated with the fact that workers in the low UI benefit state can commute to the higher UI benefit state (the effect of the policy is not concentrated on one side of the border). However, for the problem addressed in this paper this is not a concern since a worker receives the UI benefit from the state where she/he was laid off but has to file for bankruptcy in the state of residence. Assuming it is true that higher UI reduces the probability of filing for bankruptcy; if some workers from the relatively-low UI state are commuting to the high UI state, this may also reduce bankruptcy filings in the lower UI state which would actually attenuate the differences in bankruptcy across county-pairs. Also, me measure of UI used here is the cap, which is only binding for a certain group many of them with relatively high earnings (which are less likely to file for bankruptcy).

1.3 Conclusion

This chapter shows that for the US, a more generous UI in terms of the maximum amount available is associated with a lower bankruptcy rate. It is empirically challenging finding evidence of the relationship between UI and bankruptcy due to data limitation in terms of having a large sample of bankruptcy filers with information about employment status and UI recipiency. In this chapter, I use cross-state differences in unemployment insurance (UI) and county-level consumer bankruptcy rates from 1991-2007. The use of aggregate (county-level) data on bankruptcy poses its challenges endogeneity concerns and the fact that the employment rate among Chapter 7 bankruptcy filers is around 73% (US Courts, 2007), i.e.,

most bankruptcy filers are employed.[11]

Still, I find that Chapter 7 bankruptcy rates are significantly lower in counties belonging to states with higher UI compared to its neighboring county in the lower UI state. Relative to the sample mean, a 10% increase in the maximum amount of UI available decreases bankruptcy rate by around 1.9%. This result extends and is quantitatively consistent with the results of Fisher (2005), who, based on the PSID containing a small number of bankruptcy filers, finds that a 10% increase in UI benefits reduces filing rate by 2.2%.

The result in this chapter is suggestive of a potential additional benefit of a more generous UI system. In the next chapter, I address this issue in the context of an equilibrium model that replicates the semi-elasticity of bankruptcy with respect to the maximum UI estimated in this chapter.

[11]This is not the case for mortgage defaults in which UI does not have a significant effect as showed by Hsu et al. (2018).

Chapter 2

Unemployment Insurance with Consumer Bankruptcy

Abstract

I quantitatively evaluate how unemployment insurance (UI) affects unsecured credit markets and how the welfare implications of UI depend on consumer bankruptcy. Theoretically, higher UI benefits can reduce default risk since they imply higher income during a situation of low-income. However, they can also reduce precautionary savings, encourage borrowing and unemployment, and require more taxes, which would increase default risk. I construct a general equilibrium model of unsecured consumer credit and unemployment. The model accounts for the cross-state negative relationship between bankruptcy rates and the maximum amount of UI available. I use the model to study changes in the UI replacement rate. For low levels of replacement rate, the model predicts that the first effect dominates, and more UI benefits reduce default risk and increase ex ante welfare. As UI increases, default risk increases, and welfare falls. Bankruptcy is a barrier for the UI to increase welfare. If bankruptcy is not available, increasing the replacement rate above the current 50% to 60% would increase welfare by 1.3% in terms of lifetime consumption; with a bankruptcy option, it reduces welfare by 3.6%.

2.1 Introduction

Labor income is the main source of income for most households, which makes labor market risks the main source of income risk. Labor market policies such as unemployment insurance (UI) reduce the exposure to such a risk. It is widely recognized that UI protects workers from sharp consumption drops resulting from job loss, but the moral hazard in terms of work incentives limits its value. Far less appreciated is the fact that households more likely vulnerable to labor risk are also the main users of unsecured credit markets.[1] Bankruptcy filers tend to be middle- to low-income individuals whose income is mostly labor income. Sullivan et al. (2000) report that 67.5% of bankruptcy filers cite lower labor income as one of the main reasons for filing for bankruptcy.[2] Athreya and Simpson (2006) pointed out that the bankruptcy rate among unemployed workers is four times the population counterpart, and the unemployment rate among bankruptcy filers is more than twice the population counterpart. Keys (2018) finds that households are three times more likely to file for bankruptcy in the year immediately following a job loss. These facts imply that UI will likely alter default risk by affecting labor income risk.

The transfer provided by the UI may be more valuable than the transfer implied by bankruptcy. Consumer bankruptcy enables borrowers to enjoy higher consumption during adverse events such as job loss. However, bankruptcy can also be seen as an expensive transfer between (relatively low income) borrowers: ex ante, higher interest rates are paid on loans to compensate lenders for those few that default ex post. UI transfers resources from the larger and higher-income group of employed workers to the smaller and lower-income

[1] Around 40% of the US households hold credit card debts.

[2] The focus of this paper is labor income risk. Other sources of risk, such as unexpected health expenditures, can influence bankruptcy decisions. However, Dobkin et al. (2018) find evidence that hospital admissions are responsible for only 4% to 6% percent of bankruptcies. Also, as discussed by Athreya et al. (2012), it seems unlikely that bankruptcy is the best way to deal with such events; perhaps it should be considered in the context of public health policy, such as Medicaid.

group of unemployed (with relative higher marginal utility of consumption), which may make the UI transfer more valuable for borrowers.[3] Higher UI benefits can reduce default risk since they imply higher income during a situation of low-income, but they can also reduce precautionary savings, encourage borrowing and unemployment, and require more taxes, which would increase default risk. In this paper, I quantitatively evaluate which of these effects dominates. From a positive perspective, what is the effect of UI on unsecured credit, i.e., default risk, bankruptcy rate, interest rate, and debt? From a normative, how do the welfare implications of UI depend on consumer bankruptcy?

I then construct a lifecycle incomplete market model of heterogeneous agents based on Aiyagari (1994), extended to include unsecured consumer credit, a frictional labor market, and UI. Labor frictions are modeled using a Diamond-Mortensen-Pissarides (DMP) search and matching framework. Combining an unsecured credit model with a frictional labor market model allows us to study the joint decision of borrowing, default, and labor supply while taking into account the general equilibrium effects of policy changes on these markets.[4] This combination is not trivial, since it implies taking into account the lifecycle properties of borrowing and default with the high frequency of unemployment episodes and duration of UI benefits.[5] Since earnings are endogenous in the model, the labor productivity stochastic process is such that when simulating a sample of workers over their lifecycle, the estimated earning process in the simulated data matches the same estimated process obtained using the PSID.

[3]The estimated annual average amount of unsecured debt discharged under Chapter 7 of the US Bankruptcy Code is around 0.92% of GDP (or $135 Bn., US Courts, BAPCPA Reports 2007-2016), which almost double the total expenditure on unemployment insurance benefits of 0.5% of GDP (BEA, 2007-2016).

[4]In the model, default happens only through bankruptcy decisions, so the two terms will be used interchangeably.

[5]Lifecycle considerations are relevant for welfare purposes given that, for example, bankruptcy is mostly concentrated among young individuals, and they are more interested in borrowing against expected future higher income.

I validate the model by evaluating its predictions for different values of the maximum UI available that correspond to the rage of values across states. The model quantitatively replicates the negative relationship between bankruptcy and maximum UI available. In the data, the change in the bankruptcy rate corresponding to the maximum amount available is negative and statistically significant but very small. The model explains the small magnitude is because the cap is binding for prime-age middle- to high-earnings workers (relatively less likely to borrow and default). The negative correlation is because a higher cap improves expected income for a fraction of borrowers, which allows them to refinance their loans at lower interest rates (since default risk is lower). However, for levels beyond the current levels, excessive borrowing would translate into higher bankruptcy rates.

The focus of the policy experiments in this paper is the replacement rate component of the UI formula.[6] This focus is because replacement rates are more relevant to the fraction of the population that is more likely to use unsecured credit markets and bankruptcy. With bankruptcy, borrowing is costly and more for low-income young households that are more likely willing to borrow but at the same time pose higher default risk. UI can alleviate the credit distortions of bankruptcy but in a limited way. In particular, when considering replacement rates from 35% to 60%, the steady-state bankruptcy rate monotonically falls (from 1.7% to 1.1%) if the UI cap is kept. However, the overall mean-debt to mean-income ratio first increases when the replacement rate goes from 35% to 50% and then falls. Initially, a more generous UI reduces default risk and allows more debt (UI and credit access complement each other). As the replacement rate increases, more workers hit the cap, and unemployment risk and taxes increase. These effects translate into higher interest rates for loans and lower debt-to-income ratios (so higher UI can crowd out credit access). Thus,

[6] In simple terms, the replacement rate is the fraction of earning that is given as UI benefit. According to the US Department of Labor most states target a 50% replacement rate.

the fall in bankruptcy rate beyond 50% is more the result of credit tightening. Increasing the replacement rate for all qualifying unemployed (i.e., without the UI cap), implies higher borrowing and more bankruptcy beyond the benchmark 50% replacement rate.

For low levels of UI, the consumption smoothing benefits of increasing UI dominate, and overall ex ante welfare increases with the replacement rate. For higher levels of UI, the distortions created by extending UI spill over into the unsecured credit markets and reduce welfare. Bankruptcy is a barrier for the UI to increase welfare beyond current levels. Under the benchmark case, increasing the replacement rate above the current 50% (to even beyond 60%) would increase welfare if bankruptcy is not considered, but with a bankruptcy option, it reduces welfare. The ability of UI to increase welfare is even more limited if we consider that all qualifying unemployed will receive the increase in benefits (i.e., not considering a cap on UI benefits).

The results above contrast with Chetty (2008) that the optimal UI benefit level exceeds 50% replacement rate and that this result is robust since it does not require structural estimation of primitives. Chetty (2008) acknowledges that an important caveat to his policy conclusion is that it does not consider other types of policy instruments to resolve credit and insurance market failures. Chetty (2008)'s result have been so influential, and even nowadays, is still commonly found in this literature.[7]

I also find that the availability of bankruptcy has nontrivial labor market consequences. The overall employment rate is 3.1 percentage points lower without bankruptcy. The biggest effect is on young workers. The reader should think of this exercise as a scenario in which the government can ideally enforce debt repayments. This result, on its own, is exciting and motivates further study. However, it is out of the scope of this paper, and I leave it to future research. For this paper, what is of interest is that higher interest rates, when

[7] See Schmieder and von Wachter (2016) for a recent survey.

default is possible, restrict individuals to use credit markets to smooth consumption and cause primarily young or low-productive workers to reject fewer offers in order to consume more. This result would imply lower moral hazard concerns of UI for this group.

The literature on consumer bankruptcy, as explained in Livshits et al. (2007), stresses that default implies a trade-off between the benefits of smoothing consumption across income states (by not repaying debt obligations) versus the cost of smoothing consumption over time (from paying higher interest rates).[8] Moreover, the lifecycle profile of earnings quantitatively matter for the implications of this trade-off on consumption smoothing and welfare. For UI, the trade-off is between the consumption smoothing benefit and the moral hazard. When agents face idiosyncratic uninsurable unemployment shock, there is a role for UI for increasing welfare by transferring resources from the larger and higher-income group of employed workers to the smaller and lower-income group of unemployed with higher marginal utility of consumption. This benefit of the UI can be limited in the presence of a moral hazard.[9]

The main contribution of this paper is to study how the trade-offs of UI interact with bankruptcy over the lifecycle in general equilibrium with the relevant labor income risks and details of UI. The model prediction is consistent with the cross-state differences in UI and county bankruptcy rates, which allows us to use the model as a laboratory for policy counterfactuals. The lifecycle framework matter, as explained by Livshits et al. (2007), and the general equilibrium setup accounts for changes in risks resulting from policy changes. The explicit focus on UI is important because it partially ensures the relatively transitory shock of

[8] I build on the quantitative literature on personal bankruptcy such as Athreya (2002), Chatterjee et al. (2007), and Livshits et al. (2007). See also Livshits (2015) for a recent survey and Gordon (2017) for recent work on optimal bankruptcy policy. This approach shares the same flavor of Eaton and Gersovitz (1981) sovereign default model. For more theoretical treatments of default, see Zame (1993) and Dubey et al. (2005)

[9] The literature on optimal UI is vast. I build on the literature that uses calibrated structural models such as Hansen and Imrohoroglu (1992), Young (2004), Krusell et al. (2010), Mitman and Rabinovich (2015), Koehne and Kuhn (2015), and Michelacci and Ruffo (2015).

unemployment. The details of the UI imply that the amount received by unemployed workers depends on workers' earnings, and they are limited in terms of the amount of benefit and duration. These considerations are essential since they determine to which extent different workers are partially insured against labor risk and will shape their credit and labor decisions as well as the welfare implication of policies.[10]

I contribute to the literature on the interaction between unsecured credit and explicit forms of insurance, such as the work of Athreya (2003), Athreya and Simpson (2006), Athreya (2008), and Mahoney (2015), and Braxton et al. (2019).[11] Athreya and Simpson (2006) study bankruptcy and UI in a partial equilibrium infinite horizon model. Their model predicts that higher replacement rates necessarily imply more bankruptcy. This prediction is inconsistent with the county-level evidence presented here and also the study done by Fisher (2005). The option of bankruptcy is particularly costly for young or low productive workers in the sense that they face higher interest rates. The distortion of bankruptcy also implies that the moral hazard concerns of UI would be lower for credit-constrained workers.[12]

Braxton et al. (2019) focus on the role of aggregate public insurance in sustaining access to credit markets among the unemployed when adverse selection may limit credit access and the implications of credit access for the optimal provision of overall public insurance. Their focus is not on the interaction of bankruptcy and the trade-off implied by the UI, so they do not need to consider labor supply decisions, details of UI, and the cost of UI in terms of

[10] I build on the work of Krusell et al. (2010) and Nakajima (2012) who incorporated a Diamond-Mortensen-Pissarides (DMP) search and matching framework into an incomplete market model with risk adverse heterogeneous agents. I include unsecured credit and bankruptcy with competitive lending similar in spirit to Athreya et al. (2018). UI is modeled as adapted version of work done by Hansen and Imrohoroglu (1992) and Krusell et al. (2017).

[11] Also, a related literature is on the interaction between credit and labor markets, such as the study by Herkenhoff (2014), Athreya et al. (2015), Bethune et al. (2015), Bethune (2017), and Kehoe et al. (2019).

[12] Michelacci and Ruffo (2015) also argue lower moral hazard concerns about young people. However, their argument is the human capital depreciation (or non-accumulation) during unemployment spells. Chetty (2008) provides empirical evidence that the moral hazard is low for the UI current levels.

moral hazard, as I do here.

I also contribute to the literature on the implications of consumer bankruptcy for labor market outcomes, e.g., Han and Li (2007), Herkenhoff et al. (2016), Chen and Zhao (2017), and Corbae and Glover (2019). Chen and Zhao (2017) study the effect of Chapter 7 and 13 of personal bankruptcy on individual labor supply in a partial equilibrium infinite horizon setup. I focus on Chapter 7 and labor supply responses at the extensive margin. I study the effect of removing Chapter 7 bankruptcy on aggregate employment over the lifecycle.

2.2 Unemployment Insurance and Bankruptcy in the US

Theoretically, more generous UI can lead to either more or less bankruptcy. The purpose of this section is to investigate if the US data is more informative regarding one of these two opposite effects of UI on bankruptcy. Additionally, the empirical result regarding the maximum amount of UI benefits available will serve as a testable implication of the model. I start with a brief description of the institutional aspects of bankruptcy and UI.[13] Next, I describe the data sources and provide summary statistics of the main variables that I later use in the empirical analysis.

2.2.1 Institutional Background

Overview of the Consumer Bankruptcy Policy

Bankruptcy is a legal procedure through which borrowers can formally default on their unsecured debts. Consumer bankruptcies almost entirely fall under Chapter 7 or Chapter

[13]See the appendix for more details regarding the institutional aspects concerning bankruptcy and UI.

13 of the US Bankruptcy Code. I focus on Chapter 7 since it represents around 70% of all consumer bankruptcies. Under this chapter, debtors obtain the full discharge of their total qualifying unsecured debts, and their current and future earnings are protected from any debt collection action.[14] Chapter 7 is a liquidation type of bankruptcy since it requires the liquidation of all nonexempt assets in order to repay lenders. However, only 5% of Chapter 7 cases yield assets that could be liquidated to repay creditors, Livshits et al. (2007).

The Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 (BAPCPA), sometimes referred to as the New Bankruptcy Law, was the latest significant change to the US Bankruptcy Code. BAPCPA was the result of the expansion in consumer bankruptcy filings during the '80s and early 2000s. Two main changes introduced by BAPCPA were the introduction of means-tests to Chapter 7 and more complicated paperwork requirements that resulted in higher court and legal fees (50% increase on average, from $921 to $1,377 U.S.GAO (2008))

The introduction of means-tests did not play a major role in explaining the decline in Chapter 7 bankruptcy after BAPCPA and higher fees played a prominent role (Albanesi and Nosal (2018)). This result is consistent with the idea that the stated means-test is not binding. Note that, in order to qualify directly for Chapter 7, filers' income should be below their state median income for a household of their size. If not, the means-testing provision requires the filer's disposable income to be calculated. A filer will not pass the means test if her/his disposable income is beyond a certain threshold. Using administrative data from the US Courts (2007), I find that 99% pass the means test. For these reasons, in the model developed in Section 2.3, I abstract from means-tests.

[14]Some debts such as alimony, student loans, and most tax debts cannot be discharged.

Overview of the Unemployment Insurance Policy

The federal-state UI programs provide temporary income benefits to workers who lose their job. The number of workers covered by UI represents around 90% of the civilian labor force (employed plus unemployed workers).[15] These programs include Regular Unemployment Compensation (UC), the permanent Extended Benefits (EB), and the temporary Emergency Unemployment Compensation (EUC08). The EB is implemented during periods of high unemployment, and the EUC08 were extensions in benefits implemented during the Great Recession.

This paper focuses on the regular UC for two reasons. First, the theoretical tradeoff explained before is focused in a steady-state environment. Second, the empirical analysis is more challenging when considering EB since this part of the policy change is in response to the unemployment rate, which in turn is the result of changes in economic underlying conditions, posing serious endogeneity concerns.

2.3 Model

Motivated by the results in Section 2.2, I develop a model that helps us rationalize the underlying mechanisms connecting UI to bankruptcy rates. The model allows us to evaluate which of the different theoretical mechanisms quantitatively dominates as well as the welfare implications of bankruptcy for UI for the US economy as a whole.

[15] U.S. Department of Labor: https://oui.doleta.gov/unemploy/data_summary/DataSum.asp

2.3.1 Environment

I consider a lifecycle incomplete market model with heterogenous agents à la Aiyagari (1994) extended to include a frictional labor market and default in unsecured consumer credit.[16] Time is discrete; the economy runs forever and is composed of workers, firms, financial intermediaries, and the government.

2.3.2 Labor Market

Labor market frictions are modeled as an extended version of the search and matching framework of Diamond-Mortensen-Pissarides. Risk-averse workers differ on their labor productivity, ε, and whether they are matched with a firm. I denote the match status by $m \in \{0, 1\}$, where $m = 0$ means unmatched, $m = 1$ means matched.

Labor market frictions are summarized by a Cobb-Douglas matching technology that takes as inputs unemployed workers and job vacancies. The match is random and the matching function is $M(u, v) = \chi u^{\eta} v^{1-\eta}$, in which u and v represent the number of unemployed workers and vacancy posted in a given period, $\eta \in (0, 1)$ is the elasticity of new matches with respect to unemployment and χ is the matching efficiency parameter. The job-market tightness is defined by $\theta = v/u$.

Only unemployed workers engage in the costless random job search and get matched with a firm with probability $\gamma^m = \frac{M(u,v)}{u} = \chi\theta^{1-\eta},$. Firms are identical, and each one pays a fixed flow cost, κ, to post one vacancy to employ one worker. Vacancies are filled with probability $\gamma^v = \frac{M(u,v)}{u} = \chi\theta^{-\eta}$.

Wages are bilaterally determined between the worker and the firm by splitting what is

[16] The lifecycle framework is particularly relevant in light of the fact reported by Athreya et al. (2018) that the bankruptcy decision is decreasing in age, with around 55% of the filers being between the ages of 25 and 34, and around 30% between 35 and 44. These facts highlight the important lifecycle component in the use of credit and bankruptcy to smooth consumption.

left of the firm's current period revenue after capital rental payment. In every period, a worker with a job offer (matched worker) decides if she/he accepts the job offer or not at the negotiated wage (wages are determined in every period as well). At the end of each period, employed workers can exogenously be separated with probability γ^s.

2.3.3 Unemployment Insurance and Social Programs

The unemployment insurance policy is modeled to resemble the main features of the United States UI system. Only unemployed workers may receive UI benefits. The indicator variable I^B represents the UI qualification status. UI recipients keep their benefits with probability π_k next period such that UI benefits are collected on average for two quarters.[17] Unemployed workers not qualifying for UI receive social benefits, z, to ensure an income floor.

The following formula determines the amount of UI benefits,

$$b(\varepsilon) = \max\left\{\min\left(\theta_R \times w_p(\varepsilon), C_{UI}\right), z\right\} \tag{2.1}$$

where θ_R is the replacement rate over a proxy for past wages, $w_p(\varepsilon)$. For simplicity, this proxy is assumed to be equal to the wage that the worker would receive if he were employed. The UI cap C_{UI} is the maximum amount of UI benefits available in a given period.[18]

Retired workers receive social security benefits, z_R, that is equal to 34% of averages earnings in the economy.[19] Labor income taxes, τ, are levied on employed workers. The

[17] This modeling choice is a simplified way to capture the fact that regular UI benefits are available for at most 26 weeks in most states. The stochastic UI qualification avoids the computational burden of having the number of periods unemployed as another state variable.

[18] States vary in how they calculate the amount of UI benefits. According to the US Department of Labor website, most formulas consider that around 50% of the unemployed worker's earnings over a recent 52-week period to be replaced (up to a maximum weekly benefit amount).

[19] I calculate this replacement rate by dividing the average Social Security Retirement benefits available on the Social Security Administration website.

total amount of taxes collected finances the UI benefits plus the social benefit programs for unemployed and retirees.

Moral hazard. In principle, moral hazard concerns regarding UI can come from workers rejecting job offers or job-searching behavior by unemployed workers without a job offer. As explained in Hansen and Imrohoroglu (1992), it is more likely that it is easier for the government to monitor search efforts while unemployed. In this sense, I abstract from search intensity and consider job rejections only as a source of moral hazard while assuming that the government does not monitor job rejection decisions. Another way to interpret these assumptions is that the government can only monitor search behavior and that unemployed workers search just enough to be eligible to receive UI.

2.3.4 Credit Market and Financial Intermediaries

The credit market is incomplete. Perfectly competitive financial intermediaries have access to the international credit market in which they can borrow/save at the exogenous risk-free interest rate, r.[20] Financial intermediaries trade with workers one period non-contingent defaultable discount assets with face value $a' \in \mathcal{A}$.[21] Workers start with zero units of assets and they can buy (save, $a' \in \mathcal{A}^+ \subset \mathbb{R}^+$) or sell (borrow $a' \in \mathcal{A}^{--} \subset \mathbb{R}^{--}$) from financial intermediaries. I denote the asset space by $\mathcal{A} = \mathcal{A}^{--} \cup \mathcal{A}^+$, which includes zero. Physical capital is owned by the intermediaries who rent it to the firms.

Intermediaries maximize expected profits every period. Perfect competition in the financial market implies that they make zero expected profits on each loan. Each intermediary holds

[20] Chatterjee et al. (2007) show that there is no much gain to determine the risk-free interest rate endogenously, so the consideration of an open economy does not compromise the results for the question at hand.

[21] The credit market is exogenously incomplete; this assumption can be justified by some underlying informational friction, such as Townsend (1979) costly state verification, that prevents intermediaries from offering contingent loans.

a sufficiently large number of loans of any given size, and there is a continuum of agents, so by a law of large number, realized profits are also equal to zero.[22] Financial intermediaries incur a transaction cost ι that is proportional to the loan size.[23]

The bond price will depend on the face value, a', and household's characteristics that inform lenders about next period default risk. Let $q_t^W(a', \boldsymbol{e})$ be the bond price for an employed worker and $q_t^U(a', \boldsymbol{e})$ for an unemployed worker. A borrower receives $q_t(a', \boldsymbol{e})a'$ units of consumption goods in the current period and repays a' next period unless default. Intermediaries receive nothing if the household files for bankruptcy.

The zero expected profit condition implies the following loan price schedule for household as

$$\begin{aligned} q_t^W(a', \boldsymbol{\varepsilon}) &= \varphi_t \mathbb{E}_{\varepsilon'|\varepsilon} \left[(1-\gamma^s) p_{t+1}^M(a', \boldsymbol{\varepsilon}') + \gamma^s p_{t+1}^N(a', \boldsymbol{\varepsilon}') \right] / (1+r+\iota) \\ q_t^U(a', \boldsymbol{\varepsilon}) &= \varphi_t \mathbb{E}_{\varepsilon'|\varepsilon} \left[\gamma^m p_{t+1}^M(a', \boldsymbol{\varepsilon}') + (1-\gamma^m)(\pi_k p_{t+1}^N(a', \boldsymbol{\varepsilon}') + (1-\pi_k) p_{t+1}^S(a', \boldsymbol{\varepsilon}')) \right] / (1+r+\iota) \\ q_t^S(a', \boldsymbol{\varepsilon}) &= \varphi_t \mathbb{E}_{\varepsilon'|\varepsilon} \left[\gamma^m p_{t+1}^M(a', \boldsymbol{\varepsilon}') + (1-\gamma^m) p_{t+1}^S(a', \boldsymbol{\varepsilon}') \right] / (1+r+\iota) \end{aligned} \tag{2.2}$$

where $\varphi_t/(1+r+\iota)$ is the price of a risk-free loan that takes into account the surviving probability and transaction cost. The loan prices depend on current employment status so (q^W, q^U, q^S) corresponds to prices for employed, unemployed, and under social benefits. Tomorrow's repayment decisions are (p^M, p^N, p^S) for matched, unmatched with UI benefits, and unmatched with social benefits.

The price for saving is just $\varphi_t/(1+r)$. Note that the loan pricing function takes the individual unemployment risk into account since it affects their income prospects, e.g., for an employed, it takes into account the exogenous separation rate, γ^s. For an unemployed

[22] Also, financial intermediaries absorb losses and gains resulting from deaths.

[23] Livshits (2015) argues that this is necessary to match the gap between the average interest rate on unsecured credit and the risk-free rate. This gap is just too big to be explained by the risk premium.

worker, it takes into account the probability $(1-\gamma^m)$ of starting the next period with a job offer. Also, if the unemployed worker is currently qualifying for UI, the loan price includes the probability of keeping the UI benefits if she reminds without a job.

2.3.5 Bankruptcy policy

Default is modeled as Chapter 7 of the United States Bankruptcy Code following the institutional background described in Section 2.2.1 and as it is standard in the literature. In the model, the government allows workers to default on their debt by filing for bankruptcy in which case their current asset holdings are set to zero, and current and future income are protected for any debt collection. Workers cannot borrow nor save in the period of default but are not restricted in later periods.

The cost of bankruptcy includes a filing fee that depends on individual employment status, $(\Delta_W,\ \Delta_U,\ \Delta_S)$, for employed, unemployed with UI, and unemployed collecting social benefits. These fees are set to zero if they would imply negative consumption. This assumption captures the fact that these fees are waived in some cases for individuals with low income. Bankruptcy cost also includes a direct utility cost, λ, which represents other explicit and implicit costs associated with default not explicitly modeled.

2.3.6 Workers

Workers are born into the model at the age of 22, and they work for 44 years, then retire on they turn 66 years old, and live for 21 years as a retiree after which they die on their 87th birthday, leaving no bequest. At any period, workers die with probability $(1-\varphi_t)$. When a worker dies, it is replaced by a new one with zero assets, so the population is constant and normalized to one.

Each working-aged household is endowed with one unit of time for labor and a random labor efficiency $\varepsilon \in \mathcal{E}$. Labor efficiency is strictly positive and independent across workers and is given by,

$$\log \varepsilon_t = a_0 t + a_1 t + a_2 t^2 + u_t, \tag{2.3}$$

$$u_t = \rho_u u_{t-1} + \xi_t, \tag{2.4}$$

$$\xi_t \sim \mathcal{N}(0, \sigma_\xi^2). \tag{2.5}$$

So labor efficiency is the sum of a deterministic and a stochastic component. The deterministic component is a quadratic trend on the worker's age that captures experience gains across the worker's lifecycle. The stochastic component follows an AR(1) process. A newborn worker draws its labor efficiency from the invariant distribution associated to this stochastic component.

Workers dislike to work and derive utility from consuming the single good available. The expected lifetime utility of a worker takes the time-separable form with the period utility give by

$$U(c, l) = (c \times \exp\{\phi l\})^{1-\sigma}/(1-\sigma)$$

with $\sigma > 0$ as the coefficient of relative risk aversion, $l \in \{0, 1\}$ with $l = 1$ if the household works and zero otherwise, and $\phi > 0$ is the parameter governing the disutility from working.

Each household discounts the utility from future consumption streams by $\beta \in (0, 1)$ which is the common discount factor and attaches disutility from filing for bankruptcy, λ, which as explained before, includes the social stigma of being a defaulter.[24]

[24]See Fay et al. (1998) and Gross and Souleles (2002) for evidence about these non-pecuniary costs of default and the unexplained variability in the probability of default across households even after controlling for many observables. As explained in Athreya et al. (2010) these results suggest the presence of implicit unobserved collateral that is heterogeneous across households, including (but not limited to) any "stigma"

2.3.7 Workers' Problem

The problem faced by a working-age agent is presented below. Retirees face the same problem except that rather than wages, they receive social security benefits and don't face employment risk.

Every period, a worker decides whether to default or not and how much to consume and save/borrow. Workers take the loan price schedule, the bankruptcy system, and the public insurance framework as given. Figure 4.3 shows the time within a period. At the beginning of each period the state variables $(m, a, \varepsilon, t, I^B)$ are realized. Since there is perfect foresight within the period, a household will know the value of being solvent or not as well as being employed/unemployed.

Value Functions

Let $\boldsymbol{e} = (\varepsilon, I^B)$. The value functions for matched and unmatched households are denoted by $V_t^M(a, \boldsymbol{e})$ and $V_t^N(a, \boldsymbol{e})$, respectively. The value of being matched is

$$V_t^M(a, \boldsymbol{e}) = \max\left\{B_t(\boldsymbol{e})\ ,\ S_t(a, \boldsymbol{e})\right\},$$

where $B(\boldsymbol{e})$ and $S(a, \boldsymbol{e})$ denote respectively the value of filing for bankruptcy and being solvent taking into account the optimal job offer acceptance decision in each case.

The value of being bankrupt and solvent are given by:

$$B_t(\boldsymbol{e}) = \max\left\{W^B(\boldsymbol{e})\ ,\ U^B(\boldsymbol{e})\right\},$$
$$S_t(a, \boldsymbol{e}) = \max\left\{W_t^S(a, \boldsymbol{e})\ ,\ U_t^S(a, \boldsymbol{e})\right\},$$

associated with bankruptcy along with any other costs that are not explicitly pecuniary.

where conditional on going bankrupt, $W^B(\boldsymbol{e})$ and $U^B(\boldsymbol{e})$ represent the value of working and being unemployed, respectively. Similarly, conditional on being solvent, $W_t^S(a, \boldsymbol{e})$ and $U_t^S(a, \boldsymbol{e})$ represent the corresponding value of working and being unemployed.

Since wages are bilaterally determined, I first define $\hat{W}^S(a, \boldsymbol{e}|w)$ and $\hat{W}^B(\boldsymbol{e}|w)$ as the corresponding values of being employed-solvent and employed-bankrupt at any given wage w. This values are given by,

$$\hat{W}_t^B(\boldsymbol{e}|w) = U(c,l) - \lambda + \beta\varphi_t \left[\gamma^s \mathbb{E}V_{t+1}^N(0, \boldsymbol{e}') + (1-\gamma^s)\mathbb{E}V_{t+1}^M(0, \boldsymbol{e}')\right] ,$$
$$\text{s.t. } c = (1-\tau)w - \Delta_W$$

$$\hat{W}_t^S(a, \boldsymbol{e}|w) = \max_{c,a'} \left\{U(c,l) + \beta\varphi_t \left[\gamma^s \mathbb{E}V_{t+1}^N(a', \boldsymbol{e}') + (1-\gamma^s)\mathbb{E}V_{t+1}^M(a', \boldsymbol{e}')\right]\right\} .$$
$$\text{s.t. } c_t + q_t^W(a', \boldsymbol{e})a' = (1-\tau)w + a$$

Let w^* be the equilibrium wage. Then, $W_t^S(a, e) = \hat{W}_t^S(a, e \ ; \ w = w^*)$ and $W_t^B(a, e) = \hat{W}_t^B(a, e \ ; \ w = w^*)$.

Similarly, the value for an unmatched equals the maximum value of being unemployed after the bankruptcy decision is made, i.e.,

$$V_t^N(a, \boldsymbol{e}) = \max\left\{U_t^B(\boldsymbol{e}) \ , \ U_t^S(a, \boldsymbol{e})\right\},$$

where $U_t^B(\boldsymbol{e})$ and $U_t^S(a, \boldsymbol{e})$ given by

$$U_t^B(\boldsymbol{e}) = u(c) - \lambda + \beta\varphi_t \left[\gamma^m \mathbb{E}V_{t+1}^M(0, \boldsymbol{e}') + (1-\gamma^m)\mathbb{E}V_{t+1}^N(0, \boldsymbol{e}')\right]$$
$$\text{s.t. } c_t = b(\varepsilon) - \Delta_U$$

,

$$U_t^S(a, \boldsymbol{e}) = \max_{c_t, a'} \left\{u(c) + \beta\varphi_t \left[\gamma^m \mathbb{E}V_{t+1}^M(a', \boldsymbol{e}') + (1-\gamma^m)\mathbb{E}V_{t+1}^N(a', \boldsymbol{e}')\right]\right\}$$
$$\text{s.t. } c_t + q_t^U(a', \boldsymbol{e})a' = b(\varepsilon) + a$$

Note that this case corresponds to an unemployed worker collecting UI.

2.3.8 Firms Problem

Firms decide whether to post a vacancy and, if so, how much to produce. Each firm can post one vacancy at most. Let $F_t(\varepsilon)$ be the value of a firm that is matched with a worker and J^V the value of a vacant job. First, define $\hat{F}_t(\varepsilon|w)$ as the value of a filled job at any wage w. This function is given by:

$$\hat{F}_t(\varepsilon|w) = \max_k \left\{ k^\alpha \varepsilon^{1-\alpha} - w - rk + \frac{1}{1+r}\left\{(1-\gamma^s)\left[\varphi_t \mathbb{E}F_{t'}(\varepsilon) + (1-\varphi_t)J^V\right] + \gamma^s J^V\right\}\right\}.$$

$F_t(\varepsilon)$ is then given by,

$$F_t(\varepsilon) = l \times \hat{F}_t(\varepsilon|w = w^*).$$

Note that from the firm's perspective, the value of being matched with a worker is either $\hat{F}_t(\varepsilon|w = w^*)$ or zero if the worker rejects to work for w^* (recall $l \in 0, 1$ is the indicator variable of worker's employed decision).

The value of a vacancy, J^V, is given by,

$$J^V = -\kappa + \frac{1}{1+r}\left\{(1-\gamma^v)J^V + \gamma^v \sum_{t,a,\boldsymbol{e}} \left[\varphi_t \mathbb{E}F_{t+1}(\varepsilon') + (1-\varphi_t)J^V\right] \frac{f_u(t,a,\boldsymbol{e})}{u}\right\}.$$

In order to have a vacant position, a firm has to pay a fixed flow cost, κ. New matches happen at the end of the period, so production will start in the next period if the worker accepts it. Firms take into account the aging process as well as the surviving probability of the workers. The population of unemployed workers with characteristics $(t, a, \boldsymbol{e})$ is given by $f_u(t, a, \boldsymbol{e})$ so the current density of the unemployed workers with these characteristics is $\frac{f_u(t,a,\boldsymbol{e})}{u}$. Since there is free entry, firms in equilibrium post vacancies until $J^V = 0$.

Wages determination: For the current setup, wages are determined by a splitting rule between the worker and the firm. In particular, worker's wage will be a fraction of the firm pre-wage-payment current profit, $w = \omega \times (k^\alpha \varepsilon^{1-\alpha} - rk)$, where ω is the worker's share.

2.3.9 Equilibrium

The recursive competitive equilibrium definition is standard. Given risk-free interest rate, r, the bankruptcy system, UI and social benefits, a recursive competitive equilibrium consists of:

- loan prices functions $\{q_t^W(a', e), q_t^U(a', e), q_t^S(a', e)\}$
- wage functions $\{w(\epsilon_t)\}$
- value functions for workers $\{V^M(a, e), V^N(a, e), V^S(a, e)\}$ and for firms $\{F_t(\epsilon), J^V\}$
- distribution of workers $\mathcal{H}$ over (t, a, e) and employment status.
- consumption, saving, default, labor decisions $\{c_t(a, e), a_t'(a, e), d_t(a, e), l_t(a, e)\}$

s.t.

- $\{q(\cdot)\}$ are such that intermediaries make expected zero profits.
- $\{w(\cdot)\}$ is consistent with the sharing surplus rule between a workers and a firms.
- $\{c(\cdot), a'(\cdot), d(\cdot), l(\cdot)\}$ solve the household problem given loan prices and wages.
- firms enter until the value of posting a vacancy is zero, $J^V = 0$.
- The government budget constraint holds.

2.4 Calibration and Estimation

The model period is set to 1 quarter so that the model can capture the high frequency of unemployment events and the period over which regular UI is available (26 weeks, or 2 quarters, in most states).[25]

Considering the large number of model parameters, I use a two-step procedure to determine their values. First, some parameters can be directly observed in the data, so they are set to their corresponding values, while others are set to standard values in the literature. Second, parameters that play a key role in the question at hand are estimated such that the model replicates as closely as possible key empirical moments of the credit and labor markets.

2.4.1 Parameters determined independently

The coefficient of relative risk aversion is set to 2, which is in the range of values typically used in the literature. The quarterly risk-free interest rate, r, is set to 0.3729% (corresponding

[25]For example, the postwar average unemployment duration is more than 4 months.

to 1.5% annually). The transaction cost for making loans, ι, is set such that it implies a 3% annual rate (Athreya et al. (2018)).

In the model, average quarterly earning is normalized to 1 and represents \$16,266 in 2007 dollars. This latter value corresponds to the average households' earning in the PSID sample used to construct the targets related to earnings (and explained later).[26]

The UI replacement rate, θ_R, is set to 0.50, replicating what most states target in their benefits formulas (US Department of Labor). In 2007, the population-weighted average of the maximum weekly amount of UI benefits across states was \$407.40. The UI cap, C_{UI}, was then set to \$407.4*13/16,266 $\approx$ 0.33 per quarter.

Unemployed workers not receiving UI receive social benefits—i.e., the income floor—that are set to match the average household monthly transfer from the Supplemental Nutrition Assistance Program (SNAP), which was \$216.10 in 2007, as reported by the US Department of Agriculture. Thus the income floor, z, was set to 0.04. According to the Social Security Administration, the average monthly Social Security Retirement benefit in 2007 was \$1,100 (including spouse and children), so the retirement social security benefit in the model is $z_r = 0.2$.

The separation rate $\gamma^s = 0.06$, such that it matches the monthly separation rate of 2.03% estimated by Shimer (2012). The elasticity of the matching function with respect to unemployment, η, is set to 0.72 following Shimer (2005). Job-market tightness, θ, is normalized to 1 in the benchmark model. The cost of entry, κ, is set such that in equilibrium, the value of posting a vacancy is zero.

The level of assets in the model represents the household's net worth. As explained by Livshits (2015), negative net worth is the most natural measure of households' indebtedness,

[26] Annual average household earnings (head of the household + spouse) in the PSID sample is \$65,064 in 2007 dollars and \$16,266 in quarterly terms.

which I consider to be more relevant than using revolving credit when focusing on bankruptcy. This is because almost 90% of filers under Chapter 7 have a negative net worth (Administrative Office of US Courts, 2007). As pointed out by Athreya et al. (2018), if we subtract home equity from net worth to construct liquid net worth, the share of filers with negative liquid net worth rises to 98%. Also, if it were possible to measure the value of exemptions, most likely all bankruptcy filers would have a negative net worth; 99% of filers estimate that no assets would be available for liquidation (Administrative Office of US Courts, 2007).

According to the U.S.GAO (2008), average attorneys' fees for Chapter 7 bankruptcy in 2007 were \$1,078 and the filing fee was \$299, so the total pecuniary cost of filing was \$1,377. I then set $\Delta_W = 0.085$. Considering that these fees can be waived in case of very low income, Δ_U and Δ_S are set to 50% and 25% of Δ_W, respectively. Also, any of these fees are set to zero if that implies a negative level of consumption. Table 2.1 summarizes the calibrated parameters.

Table 2.1: Summary of parameters determined independently

Parameter	Description	Value	Source
σ	Coeff. of relative risk aversion	2.0	Standard in the literature
r	Risk-free interest rate (quarterly)	0.373%	Athreya et al. (2018)
ι	Transaction cost for loans (quarterly)	0.742%	Athreya et al. (2018)
θ_R	UI replacement rate	50%	U.S. Department of Labor
C_{UI}	(Normalized) max. quarterly amount of UI	0.33	U.S. Department of Labor
z	Income floor (social benefits)	0.04	U.S. Dep. of Agriculture
z_r	Social Security retirement benefits	0.20	Social Security Administration
γ^s	Job separation rate (quarterly)	0.06	Shimer (2012)
η	Matching elasticity w.r.t. unemployment	0.72	Shimer (2005)
Δ_W	Filing fee	0.085	U.S.GAO (2008)
α	Capital share	0.33	Standard in the literature

Set of parameters for which values can either be observed directly in the data or are based on the literature. All monetary values are in 2007 dollars and normalized by average quarterly earning.

2.4.2 Estimated parameters

In the second stage, the remaining 9 parameters, represented by θ in Equation 2.6 and listed below, are estimated jointly using the simulated method of moments (SMM)—that is, by minimizing a weighted squared sum of differences between model and data moments. The minimum distance estimator solves

$$\min_{\theta \in \Theta} [M - m(\theta)]' W [M - m(\theta)], \tag{2.6}$$

where M and $m(\theta)$ are the data-based and model-based moments, respectively. The weighting matrix, W, is a diagonal matrix with $1/M_i$ in the diagonal element corresponding to row i. As described below, the targeted moments are different units of measure (and therefore differ in magnitude), so the estimator minimizes the percentage deviation between data and model moments.

The estimated parameters contained in θ are:

- Utility cost of default: λ
- Disutility from working parameter: ϕ
- Discount factor: β
- Matching efficiency parameter: χ
- Coefficients of the quadratic age trend of the log of labor productivity: (a_0, a_1, a_2)
- Parameters related to the stochastic component of labor productivity: ρ_u, σ_ξ

Targeted moments

The first set of targeted moments contains some key statistics of the unsecured credit and labor markets, and the second set contains moments that capture the evolution of households' earnings over the lifecycle. The first set of moments are as follows:

- In the Survey of Consumer Finance (SCF 2007), the annual bankruptcy rate of 1.18% (Athreya et al. (2018)).
- Annual household employment rate of 80%, estimated using the 2007 SCF in which a household is categorized as employed if either the head of the household or the spouse or both are employed. Only households in which the head is between 22 and 65 years old are considered.
- Annual average debt-to-income ratio for the population, which is 1.64% (Athreya et al. (2018)). Debt is defined as Debt = max(0,-Networth).
- Annual average debt-to-income ratio for the subpopulation of bankruptcy filers is 110% (US Courts, 2007).
- Annual bankruptcy rate among unemployed of 4.0% (Athreya and Simpson (2006)).
- Annual employment rate among Chapter 7 bankruptcy filers of 73% (US Courts, 2007).[27]

The set of moments related to the earning process are calculated using data from the PSID from Heathcote et al. (2010) and ranges from 1967 to 2002. This data set has been cleaned

[27]Note that there are no demographic characteristics in this sample, so I cannot constrain the sample for ages 22 to 65 years old. To get a proxy of the working-age population to calculate employment rate, I only consider those filers who (i) are not receiving a pension or, (ii) if receiving a pension, also have positive labor income.

and processed such that missing or miscoded observations are dropped, top-coded values are extrapolated using a Pareto distribution, observations with implausible consumption levels or earnings are dropped (e.g., positive labor earnings with zero hours worked), and wage rates below half of the prevailing federal minimum wage.

In this sample, I calculate total household annual earnings as the sum of earnings of the head of the household and his wife.[28] All monetary values are expressed in 2007 dollars. I restrict the sample to households in which the head is between 22 and 65 years old and in which the combined number of hours worked is above 260. As standard in the literature, I assume that the household earning process in the data is the sum of a deterministic component that depends on age and a stochastic component.[29] The earning process is given by

$$\begin{aligned} \log w_{i,t} &= b_0 + b_1 t + b_2 t^2 + z_{i,t} \\ z_{i,t} &= \rho_z z_{i,t-1} + \zeta_{i,t} \\ \zeta_{i,t} &\sim \mathcal{N}(0, \sigma_\zeta^2). \end{aligned} \tag{2.7}$$

The age coefficients (b_0, b_1, b_2) are obtained using ordinary least squares. The shock process parameters (ρ_z, σ_ζ) are identified by method of moments using the variance $E_t(\hat{z}_{i,t}^2)$ and the second-order autocovariance $E_t(\hat{z}_{i,t}, \hat{z}_{i,t+2})$ of the residuals from the regression of log earnings, $\hat{z}_{i,t}$. As explained by Heathcote et al. (2010), the second-order autocovariance is used, because after 1995 the PSID became biannual.

The remaining targets for the estimation are:

[28] When a woman is the head of the household (i.e., there is no husband), I consider her earnings.

[29] For tractability, this is a parsimonious version of the process used for example in Heathcote et al. (2010) and Gordon (2017)

- Quarterly mean earnings equals to 1 (normalization).
- The estimated age coefficients for the deterministic component of the log of annual household earnings in the PSID sample: $(b_1, b_2) = (0.14, -0.0016)$.
- The persistence parameter of the residual of log earning, $\rho_z = 0.83$.
- The standard deviation of the i.i.d. shock to the residual log earnings, $\sigma_\zeta = 0.41$.

Although the parameters above are estimated jointly to match the targets, there is a close relationship between the utility cost of bankruptcy and bankruptcy rates; the discount factor and debt-to-income ratios, and the disutility from working and matching efficiency and unemployment rates.

Importantly, since earnings are endogenous in the model, the coefficients of the quadratic age trend in the labor efficiency are estimated such that the model delivers a hump-shaped earning profile over the lifecycle by matching (b_1, b_2). In particular, for each set of parameters, I simulate a sample of 10,000 workers over their entire lifecycle, store the simulated annual earnings, and repeat the same estimation procedure used with the PSID data to estimate $(b_0, b_1, b_2, \rho_z, \sigma_\zeta)$.

The estimated parameters are obtained by minimizing Equation 2.6. The discrete nature to default and job acceptance decision as well as the discretization of labor efficiency, translate into nonmonotonicities of the targeted moments that create local minima and require the use of a global optimizer. The estimated parameter values are listed in Table 2.2.

Table 2.2: Jointly estimated parameters

Parameter		Value
Utility cost of default	λ	2.71
Discount factor	β	0.95
Disutility from working	ϕ	-0.45
Matching efficiency	χ	0.89
Intercept in ϵ age trend	a_0	-2.67
Linear coef. in ϵ age trend	a_1	0.0741
Quadratic coef. in ϵ age trend	a_2	-0.00144
Autocorrelation of u_t	ρ_u	0.961
Std. Dev. of ξ_t	σ_ξ	0.227

Table 2.2: Estimated parameters by SMM.

As standard in the bankruptcy literature, λ and β are more related to the moments related to the unsecured credit, i.e., debt-to-income and bankruptcy rates. Employment rates moments will be more informative for ϕ and χ. The probability of receiving a job offer is determined by χ which is in this model is not the same as the job-finding probability, the latter also depends on ϕ, i.e., in this model the job-finding probability is the probability of being match with a firm where the worker will accept to work.

The subpopulation statistics as targeted moments are a novel component in disciplining the parameters. Of particular interest is the employment rate among bankruptcy filers. Matching the employment composition of bankruptcy filers is related to a lower value of *phi*, a parameter that also determines the degree of moral hazard. Since bankruptcy filers tend to be young people, this is informative that the moral hazard concern of UI for young people is lower than for old. This result is consistent with the point made by Michelacci and Ruffo (2015) about optimal UI over the lifecycle with the argument of human capital depreciation (or non-accumulation) during unemployment spells. Here, I provide an additional channel for lower moral hazard for young workers, which is that bankruptcy implies tighter credit

conditions for them.

2.4.3 Model fit

Table 2.3 shows that the model fits the targets relatively well. This result means that a workhorse unsecured credit model, combined with a workhorse DMP search and matching model, can account for the main statistics regarding unsecured credit and labor markets, including the subpopulations of bankruptcy filers and nonemployed.

Table 2.3: Estimation: Data vs. Model Moments

Name	Data	Model
Annual bankruptcy rate (2007 SCF)*	1.18%	0.96%
Employment rate (2007 SCF)	80%	85.6%
Annual debt-to-income ratio (2007 SCF)*	1.64%	1.54%
Annual debt-to-income ratio for bankruptcy filers (US Courts, 2007)	110%	93.2%
Bankruptcy rate for nonemployed	4%	3.22%
Employment rate for bankruptcy filers (US Courts, 2007)	73%	65.3%
Mean earnings	1.0	0.96
b_1	0.14	0.139
b_2	-0.0016	-0.00146
ρ_z	0.83	0.836
σ_ζ	0.41	0.476

*See Athreya et al. (2018), these statistics corresponds to borrowers aged 25-65. Debt is defined as: Debt=max(0,-Networth)

As may be expected, the greater challenge is to match the subpopulation statistics. In particular, for the subpopulation of bankruptcy filers, the mean debt-to-income ratio and employment rate are slightly smaller than the targets. However, this result is not surprising, given the relatively parsimonious process assumed for labor productivity.

To connect the model to the empirical section, I calculate the partial equilibrium outcomes of altering the UI cap. I simulate the model for a range of values similar to the data.

The model quantitative replicates the negative relationship between bankruptcy and UI generosity of the same order of magnitude (See Table 2.4). The change in the bankruptcy rate with respect to the maximum amount available is negative and statistically significant but very small. In the model, this result is because the cap is most likely binding for prime-age middle- to high-earnings workers who are less likely to default.[30]

Table 2.4 also shows that the model implied unemployment duration elasticities with respect to changes in the potential benefit duration and level of benefits are very close to the rage of values in the literature. Other statistics regarding unsecured credit are also considered. As it is typically the case of this class of model of unsecured credit, the average interest rate on loans is lower than the data, and the share of bankruptcy for households between ages 25-34 is higher in the model. The fraction of bankrupt debt –the ration of debt discharged in bankruptcy to the total amount of outstanding debt– is lower than the data.[31]

Table 2.4: Untargeted statistics

Name	Data	Model
Semi-elasticity bankruptcy rate w.r.t. UI cap	-0.06015	-0.041
Elasticity potential benefit durations on unemployment durations**	(0.10 , 0.41)	0.08
Elasticity benefit increases on unemployment durations**	(0.10 , 1.21)	1.23
Mean interest rate on loans*	13.7%	8.24%
Bankrupt debt*	2.74%	1.49%
Share of bankruptcy by age*		
- Ages 25-34	55%	61%
- Ages 35-44	30%	17%
- Ages 45-54	15%	13%
- Ages 55-65	0%	9%

*See Athreya et al. (2018). **See Schmieder and von Wachter (2016)

[30]The model also predicts that beyond current UI levels, borrowing increases, which implies higher bankruptcy rates. This prediction from the model is also consistent with the data if instead of regressing bankruptcy rates on log of UI, I use UI in levels and include a quadratic term for UI; the quadratic coefficient is also significant. See Appendix.

[31]As it is the case for the aggregate bankruptcy rate, this can be the result, at least in part, of just focusing on labor income risk.

2.5 Results

In this section, I present some policy counterfactuals regarding steady-state comparisons between different levels of UI.

2.5.1 Unemployment Insurance and Consumer Bankruptcy

In the empirical analysis, I proxy the generosity level of UI as the maximum amount that can be collected in a given spell of unemployment. This measure is plausible under the assumption that it is positively correlated with the amount of benefits that a qualifying unemployed worker can receive—i.e., states that offer more benefits overall will tend to have a higher UI cap, which seems reasonable.

In terms of the model, it is more relevant to define UI generosity in terms of higher replacement rates (or the combination of higher replacement rates and higher UI cap). Note that in the data, it is not clear that replacement rates would be the most convincing notion of generosity, since earning distribution can vary across states. Thus, states with higher earning distribution may choose lower replacement rates which would make them seen less generous in terms of UI even though they still provide more benefits in terms of the dollar amount. Since we do not have such problems in the model, I start the analysis by considering different levels of replacement rates.

2.5.2 Changes in the Replacement Rate

In this section, I consider different levels of the replacement rate θ_R keeping other policy parameters constant in the benchmark case with bankruptcy. Note that keeping the UI cap would mean that increases in θ_R would represent higher benefits for only a fraction of the population (those below the UI cap, such as young or low productive). Figure 4.5 shows the

UI benefit schedule for the first eight productivity levels across age for different values of θ_R.

Average effects

A key result of this section is that UI affects the trade-off implied by the bankruptcy system between smoothing consumption across income realizations versus smoothing consumption over time. In particular, when considering replacement rates, θ_R, from 35% to 60%, the overall bankruptcy rate falls. However, the mean amount of debt to mean income only increases when going from $\theta_R = 35\%$ to $\theta_R = 50\%$ and then falls. Therefore, a more generous UI improves consumption smoothing by allowing more borrowing without adding a higher default risk only for relatively low levels of UI.

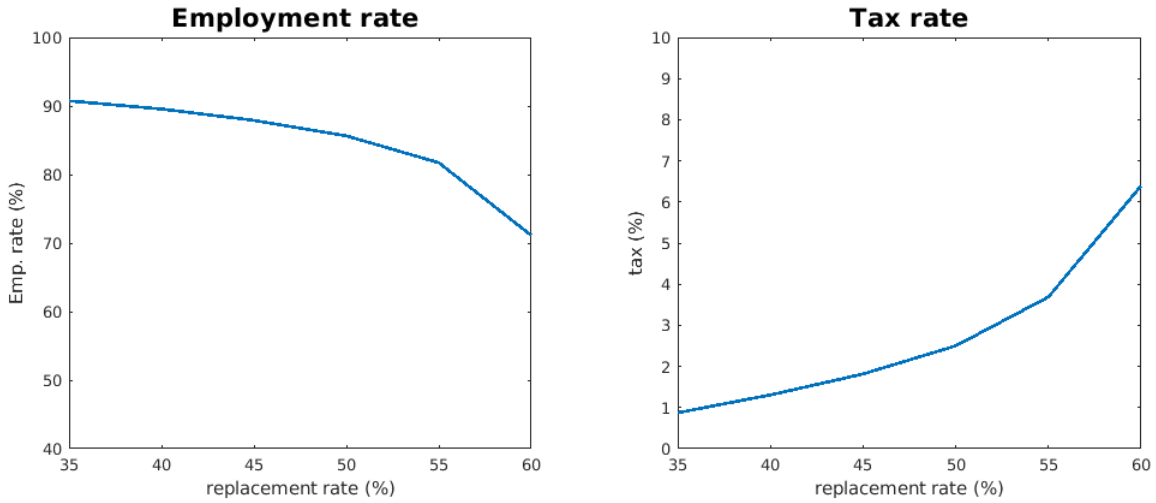

Figure 2.1: Steady-state comparison of employment rate and labor tax across different replacement rates. Benchmark case is for $\theta_R = 50\%$ (with bankruptcy).

Figure 2.1 shows that the fall in employment is higher beyond 50% (and consequently higher taxes need to be collected). Also, changes in the replacement rate have nontrivial credit market effects, given the bankruptcy system. Figure 2.2 shows that if $\theta_R = 35\%$, the bankruptcy rate would be 1.28%; likewise, if $\theta_R = 60\%$, the bankruptcy rate would be 0.74%

(which is 0.21 percentage points lower than under the benchmark of $\theta_R = 50\%$).

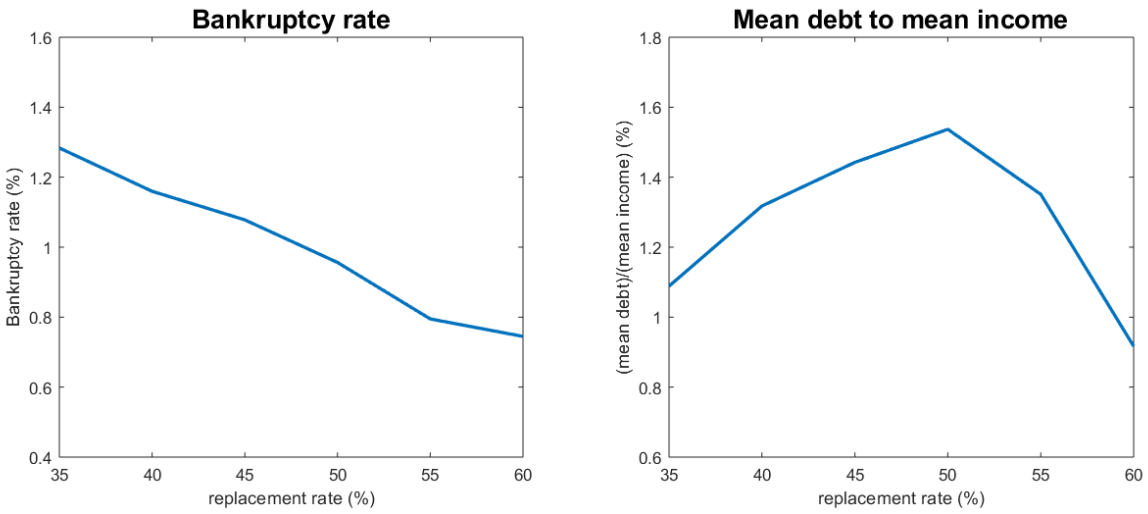

Figure 2.2: Steady-state comparison of bankruptcy rate and mean-debt to mean-income ratio across different replacement rates keeping the cap on UI benefits. Benchmark case is for $\theta_R = 50\%$.

The bankruptcy rate monotonically decreases with θ_R for the overall population even though the ratio of mean debt to mean income is inverted U-shaped. First, this ratio increases when going from $\theta_R = 35\%$ to $\theta_R = 50\%$ and then falls when further increasing to $\theta_R = 60\%$. At first, debt increases, since we are transferring resources to a relative low-income state, and this allows agents to borrow more without adding much default risk. This transfer is from a relatively big and richer group of employed to a relatively small and poorer group of unemployed, so initially this transfer does not necessarily translate into higher default risk and credit rationing (which alleviates the credit distortion created by the bankruptcy system).

When going beyond $\theta_R = 50\%$, the point is more subtle since the average debt relative to average income also falls (Figure 2.2). This result coincides with the more rapid increase in unemployment, higher taxes, and the fact that fewer people are receiving higher benefits

since most people hit the UI cap. These effects imply that expected income falls on average, increasing default risk. Lenders anticipate these effects and charge higher interest rates, so the fall in debt relative to income could, at least in part, be the result of credit rationing due to higher default risk. Figure 2.3 shows that the average interest rate on loans increases for replacement rates above 50%.

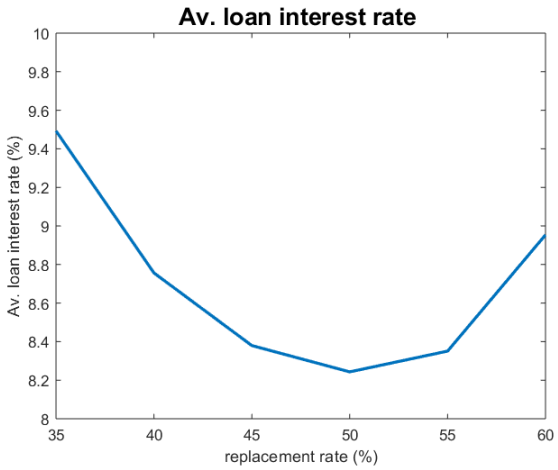

Figure 2.3: Steady-state comparison of bankruptcy rate and average loan interest rate across different replacement rates keeping the cap on UI benefits. Benchmark case is for $\theta_R = 50\%$.

The amount of debt relative to income (debt-to-income ratio) that is discharged, on average, initially increases (from $\theta_R = 30\%$ to $\theta_R = 50\%$), which is consistent with the initial increase in overall debt. However, then starts falling, which is consistent with the overall decrease in borrowing (Figure 4.6).

Effects across age and employment status groups

Increases in the replacement rate have different implications depending on the initial level of UI and the age and employment status of workers. Figures 4.8, 4.9, 4.10, and 4.11 in the appendix show the average loan price schedule for employed and unemployed workers

across different ages and replacement rate. Increasing the replacement rate from $\theta_R = 35\%$ to $\theta_R = 50\%$ implies substantial credit access for relative young (mostly employed) workers. This increase improves expected income for this group, reducing bankruptcy risk and allowing more credit access.

For $\theta_R = 50\%$, relative young workers have minimal credit access when unemployed. For workers older than 40 years old, loan price functions are very similar across employment status, so the model predicts that unemployed workers can have substantial access to credit for prime-age workers when unemployed. When comparing $\theta_R = 50\%$ with $\theta_R = 60\%$, loan price functions shift to the right, limiting overall credit access and fall for employed and unemployed workers at most ages. This result explains the reduction in overall debt mentioned before.

For the subpopulation of unemployed workers, the bankruptcy rate falls when going from $\theta_R = 35\%$ to $\theta_R = 60\%$. This result could imply that increasing the generosity of the UI in this manner increases the pool of unemployed but reduces its relative default risk (Figure 4.6). However, as a fraction of the total population, the fraction of workers that are both unemployed and filing for bankruptcy falls when going from $\theta_R = 35\%$ to $\theta_R = 50\%$ but then increases.

Changes in the replacement rate without cap

A natural question is how the previous analysis change if there were no cap on the benefits. Figure 2.4 shows that the bankruptcy rate is U-shaped, and the amount of debt monotonically increases. Without the cap, all qualifying unemployed are receiving the UI benefits, so a higher replacement rate keeps increasing borrowing even beyond the 50% replacement rate. More borrowing can be supported since workers that are borrowing are middle- to low-income (relatively young), and their expected income improves. However, more borrowing

also translates into more bankruptcy, which explains the U-shape on the bankruptcy rate.

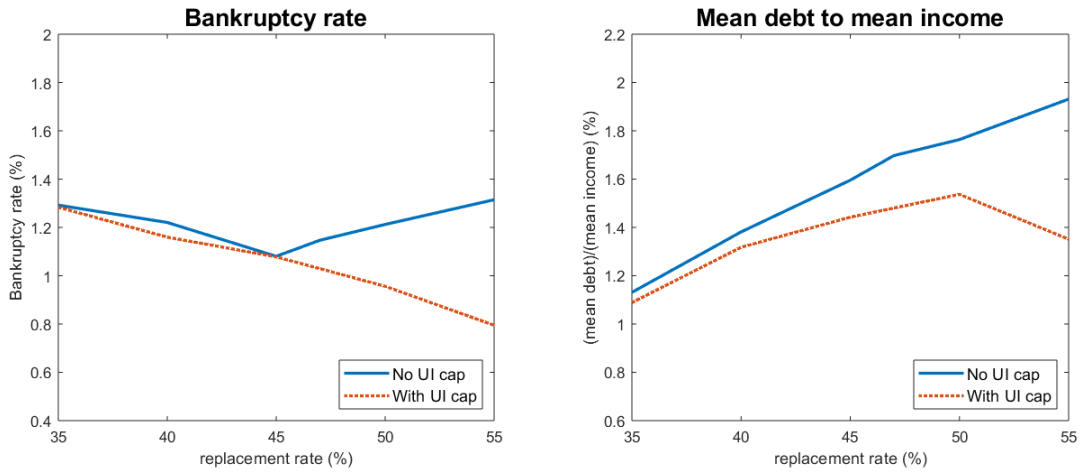

Figure 2.4: Steady-state comparison of bankruptcy rate and mean-debt to mean-income ratio across different replacement rates with and without the UI cap. Benchmark case is for $\theta_R = 50\%$ with UI cap.

Welfare

In terms of ex-ante welfare, Figure 2.5 shows that welfare is lower at any level of replacement rate considered when bankruptcy is available. As commonly found in the quantitative literature, the cost in terms of smoothing consumption over time associated with bankruptcy surpass any of its benefits.

A key result is in terms of the desirability of increasing the replacement rate beyond the current 50%. If bankruptcy is not allowed, there are still welfare gains from increasing the replacement rate beyond current levels. For example, rising to a 60% replacement rate would increase welfare by 1.3% in terms of lifetime consumption equivalent. In an environment in which bankruptcy is allowed, increasing the replacement rate to 60% reduces welfare by 3.6% of lifetime consumption. This result is due to the additional distortions beyond 50% when

the cap on UI benefit is fixed (and beyond 40% when there is no cap).[32]

The consideration of bankruptcy then does have important implications when thinking about the optimal design of UI. The result here implies that consumer bankruptcy, to the extent that weakens workers' ability to commit to future debt repayment, prevents the UI from being more generous.

Also, the different components of the UI play a key role in determining the welfare implication of increasing the generosity of UI since they imply different distributional effects across income and age groups. Figure 2.6 shows that reducing the UI cap, keeping $\theta_R = 50\%$, from a weekly benefit amount (WBA) of \$407 to a WBA of \$150 increases welfare by 1% in terms of lifetime consumption and extending the duration of benefits to 3 quarters on average increases welfare by less than 0.1%.

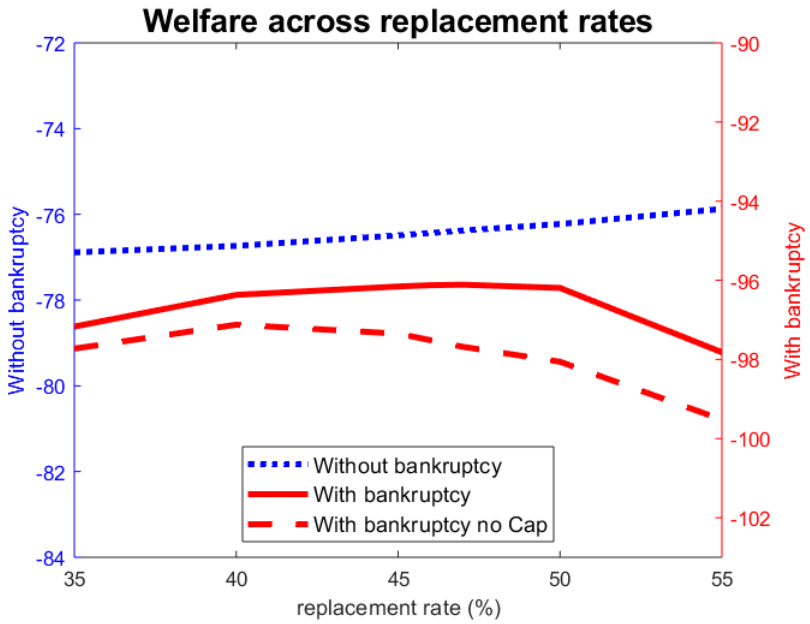

Figure 2.5: Ex ante welfare across replacement rate for the case with and without bankruptcy.

[32]The optimal replacement rate is below the current levels to 47% if we keep the UI cap and 40% without the cap (Figure 2.5).

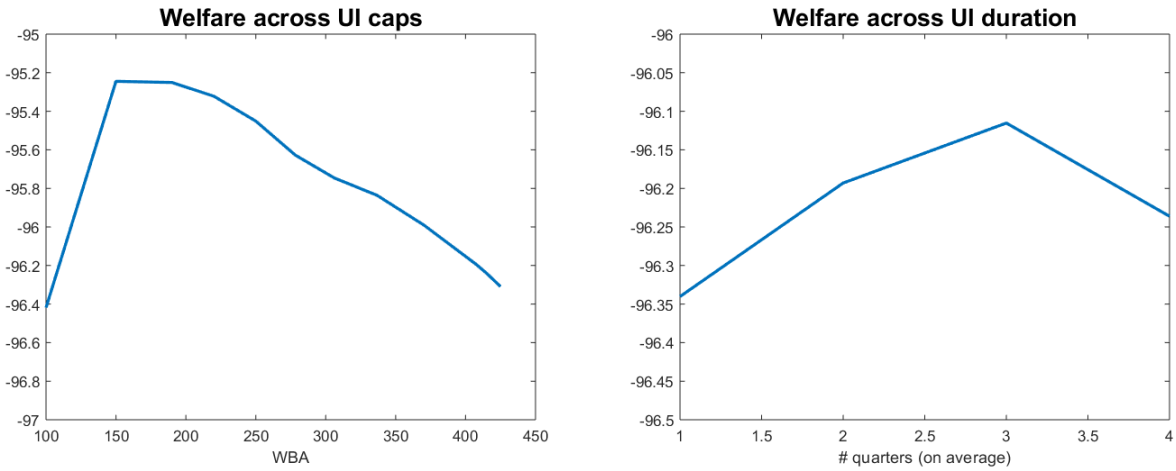

Figure 2.6: Ex ante welfare for either different UI caps or benefit durations.

The Employment Effect of Bankruptcy

In Figure 2.5, we saw that in a world without commitment problems in debt repayment, increasing the replacement rate increases welfare. This result is even though employment is lower without bankruptcy. In this section, I study what would the employment rate (overall and across age) be if workers were not allowed to default? In the context of the model, this implies that all debt would be risk-free and constrained by the natural debt limit.

The overall employment rate is 3.1 percentage points lower without bankruptcy (or the nonemployment rate is 21% higher without bankruptcy). Since I am abstracting from informal default, we can interpret the result of this exercise as an upper bound on the effect of bankruptcy on employment.[33] Higher interest rates, when bankruptcy is possible, restrict individuals from using credit markets to smooth consumption and cause primarily young or low-productive workers to reject fewer offers to consume more. This result implies lower moral hazard concerns of UI for this group.

[33]Think of this exercise as a scenario in which the government can ideally enforce debt repayments.

Since young workers are more likely to borrow against expected higher future income, most of the effect is on this age group. Figure 2.7 shows the employment rate over the lifecycle. For workers in their 20s, the employment rate is on average 13 percentage points higher with bankruptcy.[34]

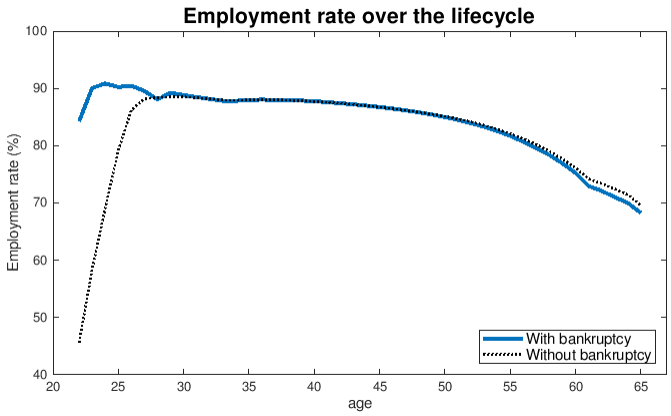

Figure 2.7: Employment rate across ages for the case in which $\theta_R = 50\%$ with and without bankruptcy.

Additionally, increases in the replacement rate reduce employment by more when bankruptcy is not allowed (see Figure 2.8). For example, increasing the replacement rate from $\theta_R = 50\%$ to $\theta_R = 55\%$ implies an increase in the nonemployment rate of 3.9 percentage points with bankruptcy and 5.5 percentage points without bankruptcy. This result is because when bankruptcy is allowed, interest rates on loans increase to compensate lenders for the default risk. Higher interest rates reduce the use of credit to smooth consumption over time. As a result, young or low-productive workers would reject fewer job offers. In this sense, the credit distortions created by the bankruptcy option, reduce the moral hazard problem of rejecting job offers, and collecting UI instead.

[34]Note that I am not targeting the employment rate across age groups, but the model yields a pattern that is qualitatively similar to what is observed in the data.

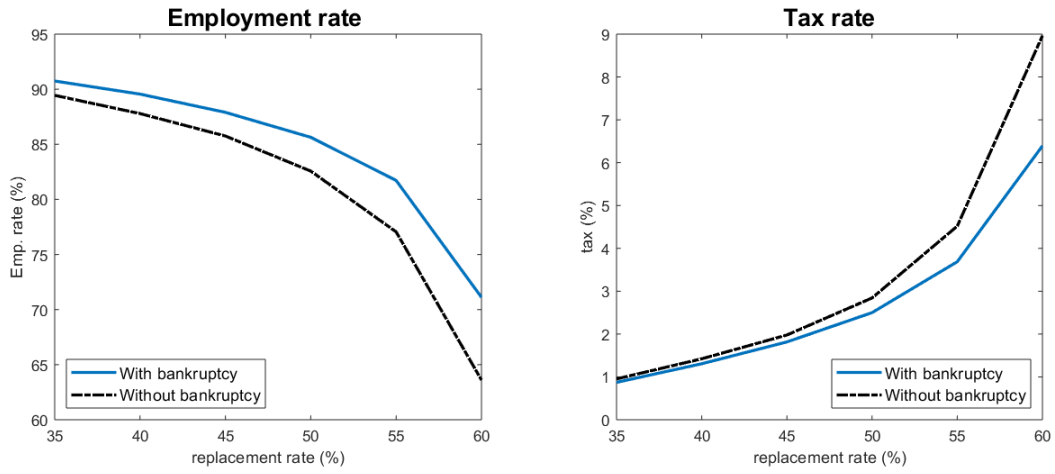

Figure 2.8: Steady-state comparison of employment rate and labor tax across different replacement rates with and without bankruptcy. Benchmark case is for $\theta_R = 50\%$ (with bankruptcy).

2.6 Conclusion

The main contribution of this paper is to study how the trade-offs of UI interact with bankruptcy over the lifecycle in a general equilibrium model of unsecured credit and frictional labor market. There are two key results, one positive and another normative. First, with bankruptcy, UI has additional benefits and costs in terms of its effect on unsecured credit and consumption smoothing, and it depends on the level of UI which one dominates. Second, from a normative perspective, in an environment where increasing the level of UI beyond the current levels of replacement rates is welfare improving without bankruptcy, adding a bankruptcy option makes the increase of UI welfare reducing. The ability of UI to increase welfare is even more limited if we consider that all qualifying unemployed will receive the increase in benefits (i.e., not considering a cap on UI benefits).

To put this result into context, in an environment in which the optimal level of UI at the current levels is optimal but does not include bankruptcy, the introduction of bankruptcy

will imply substantially lower optimal UI. An important point to make is that this result can be interpreted as a lower bound since the wage function in the model does not depend on UI. This assumption shuts down a potentially important channel from the firms' perspective. This possibility will be included in future versions of the paper. However, here, reservation wages and equilibrium wages still change with the UI since it affecting workers' outside option.

A common result in the optimal UI literature, especially within the sufficient statistics literature, is that the current levels of UI are close to the optimal. However, there are still welfare gains from increasing the level of benefits. In an influential paper, Chetty (2008) found that the optimal UI benefit level exceeds 50% replacement rate and that this result is robust since it does not require a structural estimation of primitives. Chetty (2008)'s result, even nowadays, is still commonly found in this literature (See Schmieder and von Wachter (2016) for a recent survey). However, Chetty (2008) himself acknowledged that an important caveat to his policy conclusion is that it does not consider other types of policy instruments to resolve credit and insurance market failures. This result does not hold here even though, without bankruptcy, there are still welfare gains beyond a 60% replacement rate. The reason is the distortions created by extending UI spill over into the unsecured credit markets. An interpretation of this result is that the bankruptcy system constitutes a significant barrier that is preventing the UI from delivering further benefits.

The policy results of this paper shed light on the policy debate regarding the optimal design of public insurance, such as the UI. Taking the US system to levels of generosity similar to some European countries can have unintentional welfare costs. A key component to make more generous UI welfare improving is to target it to the fraction of the population, such as young and low earnings that are more credit constrained and ensure the proper measures to minimize the distortions in terms of work incentives.

Chapter 3

The Effect of the Minimum Wage on Consumer Bankruptcy

Coauthored with Professor Eric Young

Abstract

We use cross-state differences in minimum wage (MW) and county-level consumer bankruptcy rates from 1991-2017 to estimate the effect of MW on consumer bankruptcy by exploiting policy discontinuities at the state borders. We find that Chapter 7 bankruptcy rates are significantly lower in counties belonging to states with higher MW compared to its neighboring county in the lower MW state (a 10% increase in MW decreases the bankruptcy rate by around 4.4%). However, for Chapter 13, we find no statistically significant relationship. Also, the data suggest that prior to the 2005 Bankruptcy Reform, the effect of MW on reducing bankruptcy was almost as twice as large than for the overall period.

3.1 Introduction

The debate on Minimum Wages (MW) has received much attention recently with 29 States plus the District of Columbia, setting their MW rates higher than the federal minimum wage of $7.25 per hour. Moreover, 18 of these States have scheduled annual adjustments for their MW that, in many cases, get to $15 per hour. While most of the MW debate focuses on its labor market consequence (mostly employment and earnings), little or no attention has been given to its effects on credit markets and, in particular, on consumer bankruptcy.

The MW policy is primarily aimed at improving labor market conditions for young- to middle-aged or low-earning workers, which are also the main characteristics of many individuals filing for bankruptcy. Moreover, bankruptcy filers have strong labor market attachment in the sense that the employment rate among bankruptcy filers are slightly about the population counterpart (Fisher (2017)) and also the unemployment rate seems to be three times higher than the population (Athreya and Simpson (2006) and Bankruptcy Reports from the Institute of Financial Literacy).

Therefore, the potential consequences of MW changes on financially distressed households should be part of the policy debate if there is evidence of the effect of MW policy on consumer bankruptcy. This paper address this question by using cross-state differences in MW and county level consumer bankruptcy from 1991-2017 to estimate the effect of minimum wages on consumer bankruptcy by exploiting policy discontinuities at the state borders.

In principle, consumer bankruptcy can be seen as a form of implicit insurance in the sense that allows borrowers to eliminate or reduce the amount of debt payment in the event of sudden unforeseen contingencies. A natural question is then how bankruptcy interacts with other forms of insurance related to the different causes leading borrowers to bankruptcy. The literature have focused on this questions studying the interaction of bankruptcy with

unemployment insurance (Athreya (2003), Athreya and Simpson (2006), and Legal-Canisá (2019c)) or health insurance (Mahoney (2015)).

Theoretically, a higher minimum wage can reduce the labor income risk face by working borrowers, which could improve their expected income reducing their bankruptcy risk for a given level of borrowing. However, it could increase borrowing ex-ante that can increase bankruptcies in the event of bad luck. We empirically evaluate which of these effects dominates. We find that Chapter 7 bankruptcy rates are lower in counties belonging to states with higher minimum wage compared to its neighboring county in the lower minimum wage state. However, for Chapter 13, we find no statistically significant relationship, which suggests that the two effects are canceling each other. Also, the data indicate that before the 2005 Bankruptcy Reform, the effect of minimum wage on reducing bankruptcy was higher than after the reform.

3.2 Overview of Consumer Bankruptcy and Minimum Wage

3.2.1 Consumer Bankruptcy

Consumer bankruptcy is a legal procedure through which borrowers can formally default on their unsecured debts. In the US, consumer bankruptcies almost entirely fall under Chapter 7 or Chapter 13 of the US Bankruptcy Code.

Chapter 7 represents around 70% of all consumer bankruptcies. Debtors obtain the full discharge of their total qualifying unsecured debts and their current and future earnings are protected from any debt collection action.[1] This chapter is a liquidation-type of bankruptcy

[1]Some debts like alimony, student loans, and most tax debts cannot be discharged.

since it requires the liquidation of all nonexempt assets to repay lenders. However, only 5% of Chapter 7 cases yield assets that could be liquidated to repay creditors, Livshits et al. (2007). Chapter 13 is a reorganization-type of bankruptcy. Debtors keep their assets and pay back all or a fraction of their debts through a repayment plan. The final amount paid back to lenders will depend on the debtor's income, expenses, and type of debt.

The Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 (BAPCPA), sometimes referred to as the *New Bankruptcy Law*, was the last major change to the US Bankruptcy Code. BAPCPA increases the barriers for individuals to file for bankruptcy by *(i)* introducing Mean-tests for Chapter 7, *(ii)* adding more complicated paperwork requirements that resulted in higher court and legal fees (50% increase from $921 to $1,377 (U.S.GAO (2008))), *(iii)* requiring mandatory credit counseling, *(iv)* adding a two-year residency requirement, (v) increasing the waiting period to file again for Chapter 7 from 6 to 8 years (if received discharge the first time) (vi) adding a cap in state homestead exemption by requiring that to fully take advantage of the state homestead exemption (if any), the filer should have bought her/his home within 1,215 days (3.3 years) before filing otherwise a cap of around $160,000 is applied.[2]

Bankruptcy Exemptions. Exemptions are State and Federal laws specifying types and amounts of assets that are protected from liquidation to pay creditors. In Chapter 7 bankruptcy, exemptions are used to determine how much property filers are allowed to keep. In Chapter 13 bankruptcy, debtors keep all property but must pay unsecured creditors an amount equal to the value of nonexempt assets, so exemptions help keep debtors plan payments low.

[2]In order to qualify directly for Chapter 7, filers' income should be below their state median income for a household of their size. If no, the mean-test requires the filer's disposable income to be calculated. A bankruptcy filer will not pass the mean-test if its disposable income is beyond a certain threshold. Using administrative data from the US Court (2007), I find that 99% pass the mean-test.

Exemptions include homestead, personal property, retirement accounts, public benefits (social security benefits, unemployment benefits, veteran's benefits, public assistance, and disability or illness benefits.), among others. In wildcard, exemptions can be applied to any property. The amount of exempt assets varies widely across states. Table 4.2 in the appendix shows different exemptions levels for assets in 2007. For example, some states are very generous, providing unlimited homestead exemptions while others did not have it. Also, some states allow filers to choose between state or federal exemptions.

States update their exemptions levels form time to time. Table 4.3 in the appendix shows homestead exemptions levels for 1989 and 2017 and the years when they were updated.

3.2.2 Minimum wages

The federal minimum wage was created by the Fair Labor Standards Act of 1938 during the administration of Franklin D. Roosevelt.[3] In addition to establishing a minimum wage of 25 cents per hour, the Fair Labor Standards Act of 1938 mandated a 44-hour workweek, scheduled to decrease to 40 hours in three years, with time-and-a-half overtime wages (Atkas. (2015)).

The last revision of the Fair Labor Standards Act was in 2009 in which the federal minimum wage was increased to $7.25 per hour. Many states have set their minimum wages above the federal level. As of October 2018, 29 states plus DC have minimum wages above the state level, 14 equal to the federal, two below the federal level, and 5 have no minimum wage requirement. For those states without minimum wage or with a minimum wage below the federal level, the federal applies.

[3]Massachusetts was the first state in 1912 to pass a minimum wage law as a way to protect women and child laborers from discrimination. Thirteen more states, along with DC and Puerto Rico, followed in the next 11 years (Atkas. (2015)).

3.2.3 Minimum wages and consumer bankruptcy

Consumer bankruptcy filers tend to be relative low-to-middle income, young-to-middle age with strong labor market attachment if we consider that the employment rate among bankruptcy filers are slightly about the population counterpart (Fisher (2017)) and also the unemployment rate seems to be three times higher than the population (Athreya and Simpson (2006) and Bankruptcy Reports from the Institute of Financial Literacy). In this sense, we can expect that a labor market policy such as the minimum wage can affect bankruptcy decisions since it is particularly relevant to the same group of people for which borrowing and bankruptcy are relevant.

Using state-level data on consumer bankruptcy under chapters 7 and 13, Figure 3.1 shows that states with higher minimum wages tend to have lower bankruptcy rates.

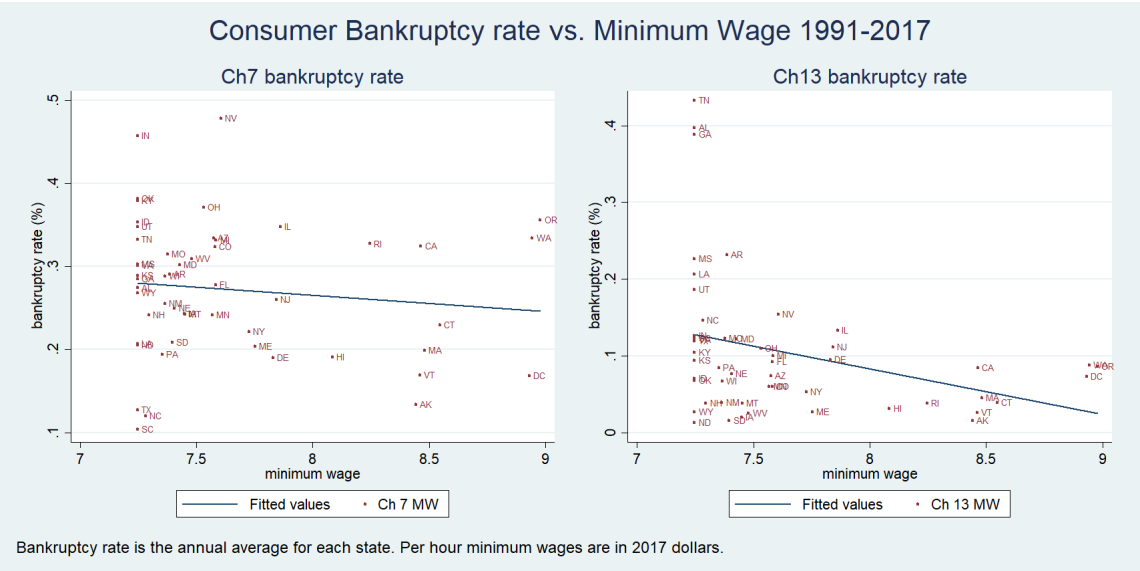

Figure 3.1: Average annual Ch7 and Ch13 consumer bankruptcy rate (in %) and real average hourly minimum wages (1991-2017).

Figure 3.1 is motivating, but at the same time does now allow to draw strong conclusions

about the effect of minimum wages on bankruptcy since states are different in many other aspects than just their minimum wage levels. To test more formally the effect of minimum wages on consumer bankruptcy, I use policy discontinuity at the state border in the next section.

3.3 Contiguous Counties

Comparing states can be misleading since they are very different in terms of observable/unobservable both in levels and in growth. State/county fixed effects to control for these heterogeneities as long as they are constant over time. However, since MW is determined at the state level, changes in underlying state conditions (shocks) can influence both MW changes as well as bankruptcy decisions. A regression using state-levels (or all counties within states) would erroneously attribute changes in bankruptcy to changes in MW because it omits to control for such underlying changes.

To control for changes in underlying state-level conditions that may drive both MW changes and bankruptcy, we examine the difference in MW generosity between neighboring counties that belong to different states with different levels of MW. We refer to such counties as county-pairs (see for example Dube et al. (2010) and Hagedorn et al. (2019)). The basic idea is that state-level changes in underlying conditions do not stop at the border and affect neighboring counties symmetrically. Also, bordering counties are similar in terms of geography, climate, labor market conditions, routes, etc., so it is more plausible that unobserved heterogeneity between contiguous counties evolves similarly, making them a better control group. Then, the discontinuity of the MW policy at the border can be exploited by using a Difference-in-Difference (DID) type regression to identify if differences in MW across county-pairs are associated with differences in bankruptcy rates.

As explained in Dube et al. (2010), contiguous border counties represent good control groups if there are significant differences in treatment intensity withing cross-state county-pairs. Also, bordering counties are more similar to each other than another randomly chosen county, so it is more plausible that unobserved heterogeneity between contiguous counties evolves similarly. Figure 3.2 shows that, for the period in consideration, the number of counties-pairs with minimum wage differentials ranges from 200 to 1,600, and the average minimum wage difference between pairs ranges from 4% to 18%.

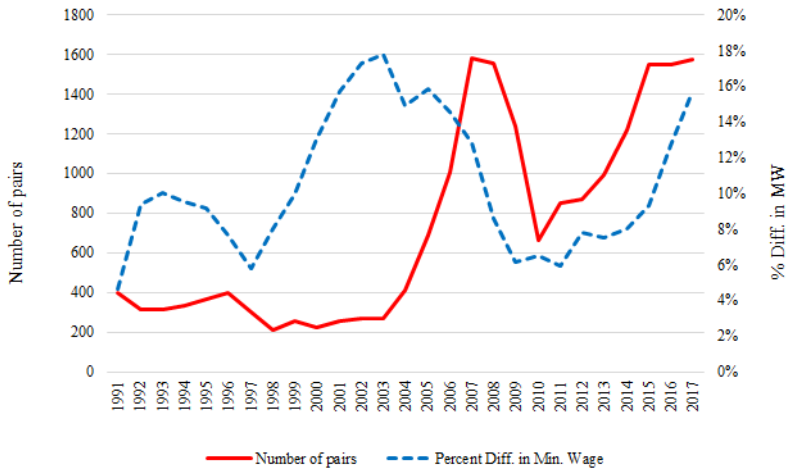

Figure 3.2: Number of county-pairs with difference in MW and average MW differentials from 1991-2017.

3.3.1 Data Sources

In the empirical analysis, we consider a sample of U.S. counties from 1991-2017 in annual frequency. In what follows, we describe the sources of the main variables used in the empirical analysis.

The data on annual county-level Chapter 7 bankruptcy rates comes from U.S. Courts

records. We updated the data provided by Keys (2018). Data on minimum wages comes from Dube et al. (2016), which we update it using the historical tables available at the U.S. Department of Labor website.[4]

The data for state-level UI comes from different issues of the "Significant Provisions of State UI Laws" of the US Department of Labor. These publications contain records on the maximum number of weeks and the maximum weekly benefit amount (WBA) that is available under the regular UI.[5] We follow Hsu et al. (2018) by defining UI generosity in a given state as the maximum amount of benefits available during an unemployment spell (i.e., the maximum number of weeks times maximum weekly benefit amount). These reports are available twice a year, for January and July. Since the data on bankruptcy is available at an annual frequency, we use the average to compute the UI values for a given year.

Data on state-level homestead exemption levels comes from Pattison (2018). The county unemployment rate comes from the Local Area Unemployment Statistics (LAUS) from the Bureau of Labor Statistics. County-level income comes from the Bureau of Economic Analysis (BEA) website.

Comparative sample statistics. The total number of bordering-counties used each year ranges from 1,099 to 1,117, which represents around 36% of the total number of counties in the mainland US and contains almost one-third of the population.[6]

A concern with the bordering-counties specification is that this sample may not contain the same information as the all-counties sample. Table 3.1 shows some statistics from both samples. Both samples are quite similar in terms of the variables of interest that are used, which mitigates the potential concern about the information cost of reducing the number of counties.

[4]Available at https://www.dol.gov/agencies/whd/state/minimum-wage/history
[5]Available at https://oui.doleta.gov/unemploy/statelaws.asp
[6]Over the time, some counties disappeared and new ones were formed, etc.

Table 3.1: Comparative sample statistics

	All counties				
	Mean	Std. Dev.	25th perc.	Median	75th perc.
Chap. 7 BK rate (%)	0.24, 0.28*	0.16	0.12	0.20	0.32
Min. Wage (per hour)	5.86	1.35	4.88	5.15	7.25
Max. UI Benefits	8,685	2,992	6,500	8,112	10,530
Unemp. Rate (%)	6.24	2.88	4.20	5.64	7.66
Income	3,353,919	12,952,007	273,022	645,628	1,799,394
	Bordering counties				
Chap. 7 BK rate (%)	0.24, 0.28*	0.16	0.12	0.21	0.32
Min. Wage (per hour)	5.86	1.36	4.88	5.15	7.25
Max. UI Benefits	8,725	3,120	6,422	8,203	10,647
Unemp. Rate (%)	6.21	2.86	4.16	5.63	7.68
Income	3,154,821	11,500,000	256,170	627,258	1,741,193

*First value of mean is unweighted, the second is the population weighted mean. The data on annual county-level Chapter 7 bankruptcy rates comes from US Courts records. I updated the data provided by Keys (2018). Minimum wage data comes from Dube et al. (2016), which we update it using the historical tables available at the U.S. Department of Labor website. The data for state-level UI comes from different issues of the "Significant Provisions of State UI Laws" of the US Department of Labor. Data on state-level homestead exemption levels comes from Pattison (2018). The county unemployment rate comes from the Local Area Unemployment Statistics (LAUS) from the Bureau of Labor Statistics. County-level income comes from the Bureau of Economic Analysis (BEA) website.

3.3.2 Results

The sample period for this exercise is from 1991-2017 at an annual frequency. As a benchmark specification, I estimate the following Difference-in-Difference (DID) type regression:

$$BK_{cpt} = \alpha + \eta \log(MW_{ct}) + \phi_c + \tau_{pt} + X_{ct} + \varepsilon_{cpt} \tag{3.1}$$

Here BK_{cpt} represents bankruptcy percentage rate (either Ch7 or Ch13) in county c belonging to pair p at time t. $\log(MW_{ct})$ is the natural logarithm of the real hourly minimum wage.[7] The term ϕ_c represents a county fixed effect that controls for observables/unobservables characteristics that are constant over time. The variables τ_{pt} is a pair-specific time fixed effect that controls for changes in state-level underlying conditions, which is a key element in the identifying assumption of this setup.[8] To control for time-varying differences that are observed, X_{ct} includes county-level unemployment rate and income as well as other relevant state policies such as state home exception and Unemployment Insurance generosity. Controlling for these policies are relevant to address potential simultaneous treatment effect that is a concern in DID specifications.

Standard errors are two-way clustered at the state level and the border segment.[9] First, MW is constant across counties within a state. Second, each county is repeated as many times as it can be paired with a neighboring county in the other state. As explained in Dube et al. (2010), the presence of a single county in more than one pair induces a mechanical correlation across county-pairs and potentially across the entire border segment. Also, all standard errors are corrected for heteroskedasticity.

The identifying assumption for this local specification is that $E(\log(MW_{ct}), \varepsilon_{cpt}) = 0$, that is, within pair differences in minimum wages are uncorrelated with differences in the residual bankruptcy rate in either county. Table 3.2 shows the results

[7] All the results are robust if consider the nominal wage instead.

[8] More specifically, the comparison is between bordering counties at a given point in time in which county-level variables were demeaned by their average (and controlling for other observables in X_{ct}).

[9] A border segment is defined as the set of all counties on both sides of a border between two states.

Table 3.2: The effect of Minimum Wage on consumer bankruptcy (1991-2017)

	Ch7 bankruptcy rate			Ch13 bankruptcy rate		
Sample period	1991-2017	1991-2004	2006-2017	1991-2017	1991-2004	2006-2017
$\log(MW_{it})$	-0.129***	-0.266***	-0.013	-0.013	-0.013	0.008
	(0.041)	(0.084)	(0.03)	(0.021)	(0.038)	(0.018)
Covariates (X_{ct})	Y	Y	Y	Y	Y	Y
County FE	Y	Y	Y	Y	Y	Y
Pair-specific time FE	Y	Y	Y	Y	Y	Y
N. Obs.	41,680	18,224	21,660			

Standard errors are in parenthesis. Significance levels: *10%, **5%, ***1%. Standard errors are two-way clustered at the state level and at the border segment.

Interestingly, in any of the specifications, the results were significant for Chapter 13. For Chapter 7, Table 3.2 shows that for the sample 1991-2017, a 10% increase in minimum wages is associated with around 13 fewer Chapter 7 bankruptcy filings per 100,000 individuals in the population or, alternatively, a 10% increase in minimum wage decreases bankruptcy rate by about 4.4% (for an average bankruptcy rate of 0.28% in the population).

Note that the period in consideration contains the last mayor bankruptcy reform in 2005 (BAPCPA) that made bankruptcy most costly, as explained earlier. Table 3.2 also shows the same estimation but for the sub-period of 1991-2004. The main result is that before BAPCPA, the effect of minimum wages on Chapter 7 was bigger. A 10% increase in minimum wages was associated with 27 fewer filings per 100,000 individuals in the population or, alternatively, a 10% increase in minimum wages decreases bankruptcy rate by around 8.2% (for an average bankruptcy rate of 0.31% in the population for that period).

Analyzing the effect of minimum wages on bankruptcy after 2005 is difficult since it contains another mayor event as the Great Recession. After the Recession, the dynamics of bankruptcy seem that were dominated by the striking rise in long-term unemployment. Still, Table 3.2 also reports the result for sub-period 2006-2017 and we do not find a significant

effect of minimum wage on Chapter 7 bankruptcy. An alternative explanation is that, as the result of the 2005 reform, filing cost increased, reducing the insurance component of the bankruptcy legislation, particularly for relatively low-income borrowers (Albanesi and Nosal (2018)). The result here suggests that it also reduced the insurance component of the minimum wage for this group of relatively low-income borrowers.

3.3.3 Spillovers

As mentioned in Chapter 1, a common concern in this methodology is the spillover associated with the fact that workers can move to the other county as a consequence of the policy change. In Chapter 1, we argue that this is not a concern given the measure of UI used. However, for MW, the spillover concerns can be more serious. Figure 3.3 shows the map of bordering-counties. As we can see, the distance between bordering-counties tends to be higher among states in the west part of the country.

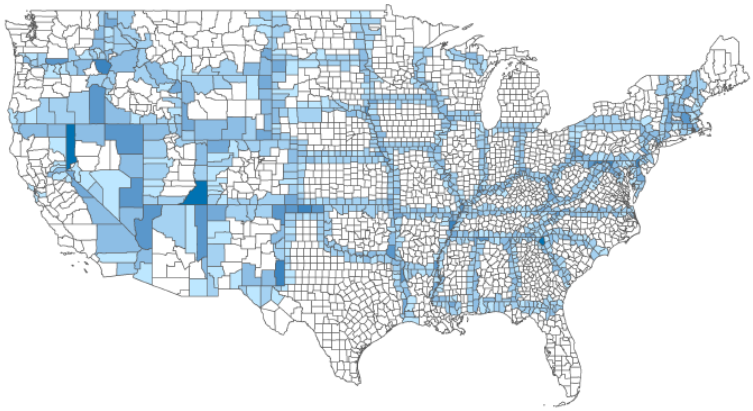

Figure 3.3: Longer distance among bordering-counties in the west half. Potentially lower spillovers.

We can expect that the commuting cost associated with working in the neighboring-county to be higher for the west than for the east half of the states. In this sense, the

spillover effect would be lower for states in the west part. Table shows the regression result for the whole country as well as for the subregions. As we can see, the effect of spillover tends to have an attenuating bias since the coefficient for the western counties is more negative.

Table 3.3: The effect of Minimum Wage on consumer bankruptcy (1991-2017)

	Ch7 bankruptcy rate		
Sample period	U.S.	West	East
$\log(MW_{it})$	-0.129***	-0.282***	-0.083**
	(0.041)	(0.0795)	(0.037)
Covariates (X_{ct})	Y	Y	Y
County FE	Y	Y	Y
Pair-specific time FE	Y	Y	Y
N. Obs.	41,680	9,200	28,542

Standard errors are in parenthesis. Significance levels: *10%, **5%, ***1%. Standard errors are two-way clustered at the state level and at the border segment. X_{ct} includes county-level unemployment rate, housing prices, and income as well as other relevant state policies such as state home exception and Unemployment Insurance generosity.

3.4 Conclusion

Labor income is the main source of income for most households, which makes labor-market risks the primary source of income risk. MW policy is aimed at improving labor market conditions for young- to middle-aged or low-earning workers, which are also the main characteristics of many individuals filing for bankruptcy. In this paper, we argue that the potential consequences of MW changes on financially distressed households should be part of the policy debate. We find that Chapter 7 bankruptcy rates are lower in counties belonging to states with higher minimum wage compared to its neighboring county in the lower minimum wage state. However, for Chapter 13, we find no statistically significant relationship, which suggests that the two effects are canceling each other.

Also, the data suggest that before the 2005 Bankruptcy Reform, the effect of minimum wage on reducing bankruptcy was higher than after the reform. Analyzing the effect of minimum wages on bankruptcy after 2005 is difficult since it contains another mayor event as the Great Recession. After the Recession, the dynamics of bankruptcy seem that were dominated by the striking rise in long-term unemployment. An alternative explanation is that, as the result of the 2005 reform, filing cost increased, reducing the insurance component of the bankruptcy legislation, particularly for relatively low-income borrowers (Albanesi and Nosal (2018)). The result here suggests that it also reduced the insurance component of the minimum wage for this group of relatively low-income borrowers. So the bankruptcy policy is also important for the effectiveness of labor market policies such as MW in helping middle- to low-income workers coping with labor income risks.

Chapter 4

Appendix

4.1 More details on Consumer Bankruptcy and UI in the US

4.1.1 Consumer Bankruptcy in the US

Bankruptcy is a legal procedure through which borrowers can formally default on their unsecured debts. Consumer bankruptcies almost entirely fall under Chapter 7 or Chapter 13 of the US Bankruptcy Code. I focus on Chapter 7 since it represents around 70% of all consumer bankruptcies. Under this chapter, debtors obtain the full discharge of their total qualifying unsecured debts and their current and future earnings are protected from any debt collection action.[1] Chapter 7 is a liquidation type of bankruptcy since it requires the liquidation of all nonexempt assets in order to repay lenders. However, only 5% of Chapter 7 cases yield assets that could be liquidated to repay creditors, Livshits et al. (2007). Chapter 13 is a reorganization type of bankruptcy. Debtors keep their assets and pay back all or a

[1]Some debts such as alimony, student loans, and most tax debts cannot be discharged.

fraction of their debts through a repayment plan. The final amount paid back to lenders will depend on the debtor's income, expenses, and type of debt.

The Bankruptcy Abuse Prevention and Consumer Protection Act of 2005 (BAPCPA), sometimes referred to as the New Bankruptcy Law, was the last major change to the US Bankruptcy Code. BAPCPA increases the barriers for individuals to file for bankruptcy by *(i)* introducing means-tests to Chapter 7, *(ii)* adding more complicated paperwork requirements that resulted in higher court and legal fees (50% increase on average, from $921 to $1,377 U.S.GAO (2008)), *(iii)* requiring mandatory credit counseling, *(iv)* adding 2-year residency requirements, *(v)* increasing the waiting period to file again for Chapter 7 from 6 to 8 years (if discharge received the first time) *(vi)* adding a cap to the state homestead exemption by requiring that, in order to fully take advantage of the exemption, the filer should have bought her/his home within 1,215 days (around 3.3 years) before filing, otherwise a cap of around $160,000 is applied.

In order to qualify directly for Chapter 7, filers' income should be below their state median income for a household of their size. If not, the means-testing provision requires the filer's disposable income to be calculated. A filer will not pass the means test if her/his disposable income is beyond a certain threshold. Using administrative data from the US Courts (2007), I find that 99% pass the means test.

Bankruptcy Exemptions: Exemptions are the state and Federal laws specifying types and amount of assets that are protected from liquidation to pay creditors. In Chapter 7 bankruptcy, exemptions are used to determine how much property filers may be allowed to keep. In Chapter 13 bankruptcy, debtors keep all their property but must pay unsecured creditors an amount that is at most equal to the value of nonexempt assets, so exemptions help keep debtors' plan payments low.

Exemptions include homestead, personal property, retirement accounts, and public benefits

(Social Security benefits, unemployment benefits, veteran's benefits, public assistance, and disability or illness benefits) among others. Wildcard exemptions may be applied to any property. The amount of exempt assets varies widely across states. Table 4.2 in the Appendix shows different exemption levels for assets in 2007. For example, some states are very generous, providing unlimited homestead exemption while others do not offer it. In addition, some states allow filers to choose between state or federal exemptions.

States often update their exemptions levels. Table 4.3 in the Appendix shows homestead exemptions levels for 1989 and 2017 and the years when they were updated.

4.2 Figures

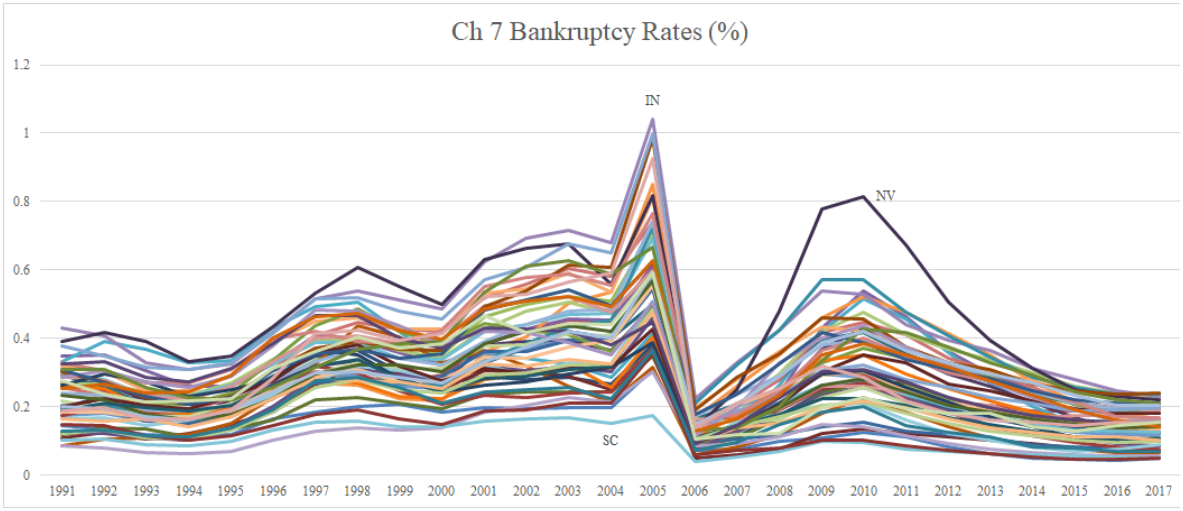

Figure 4.1: Average annual Chapter 7 consumer bankruptcy rate (in %) for each state from 1991-2017.

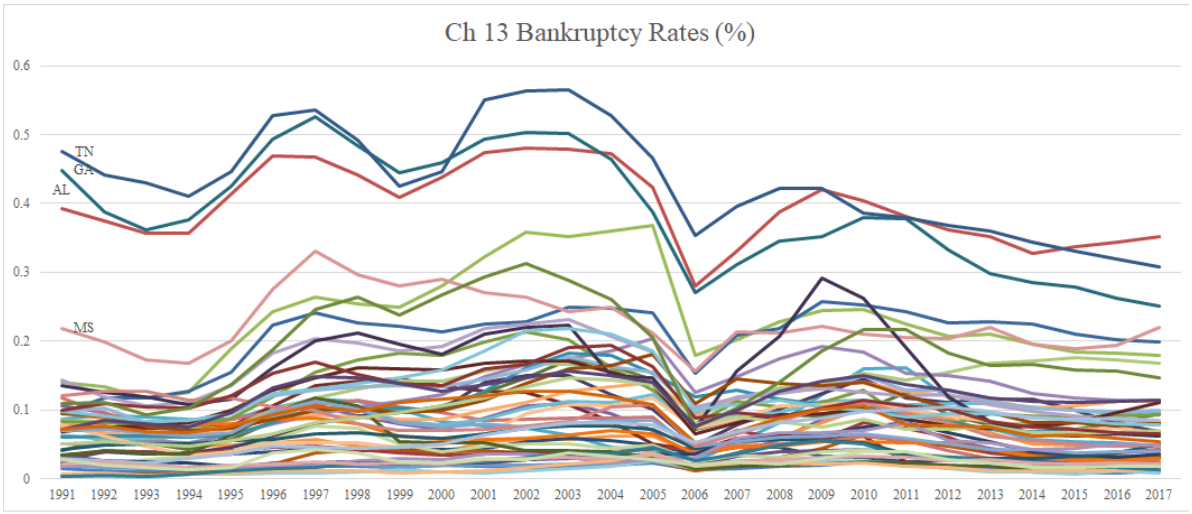

Figure 4.2: Average annual Chapter 13 consumer bankruptcy rate (in %) for each state from 1991-2017.

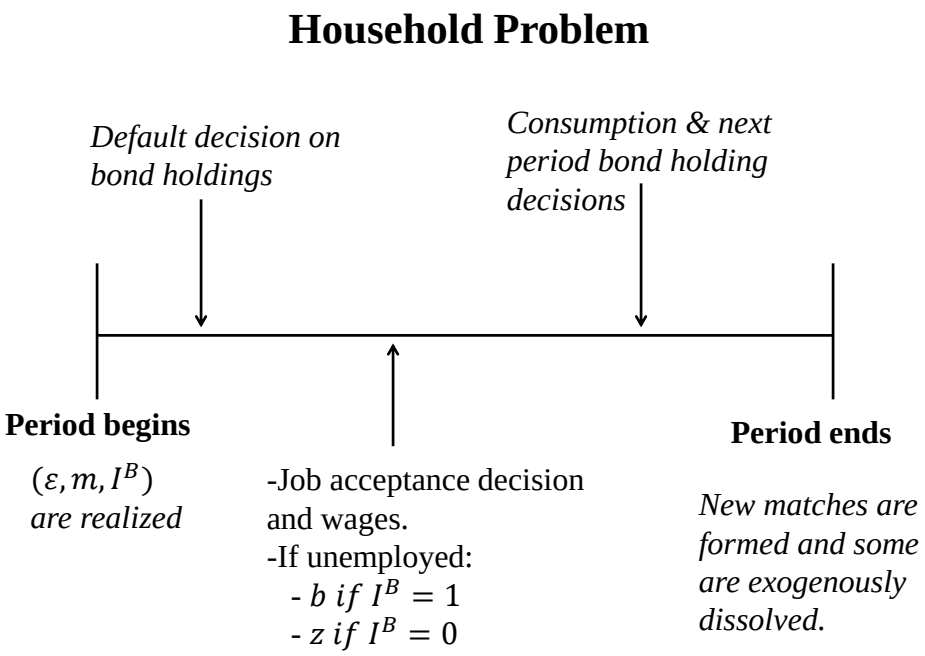

Figure 4.3: Timing within a period. Note that since all the uncertainty is resolved at the beginning of the period this timing is actually irrelevant and is just an artifact to present the model in an organized way.

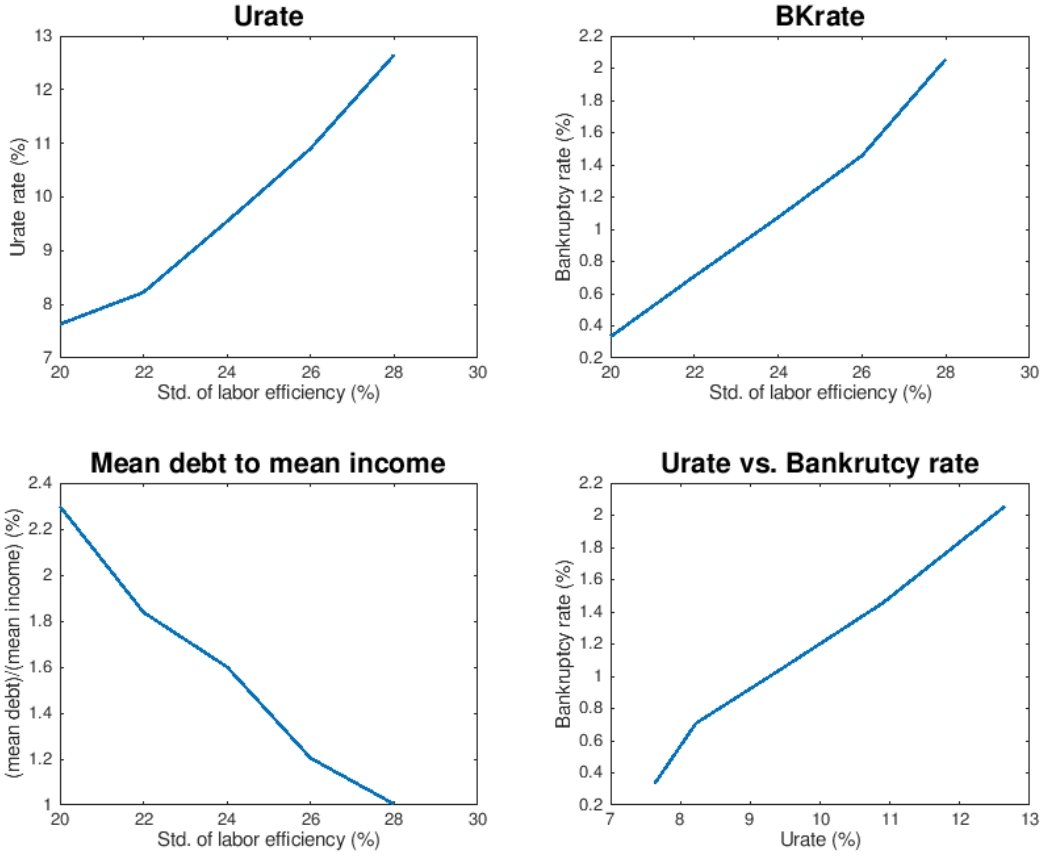

Figure 4.4: Steady state comparison for different levels of standard deviation of labor productivity (The implied log wage standard deviation are 0.40, 0.43, 0.47, 0.51, and 0.55).

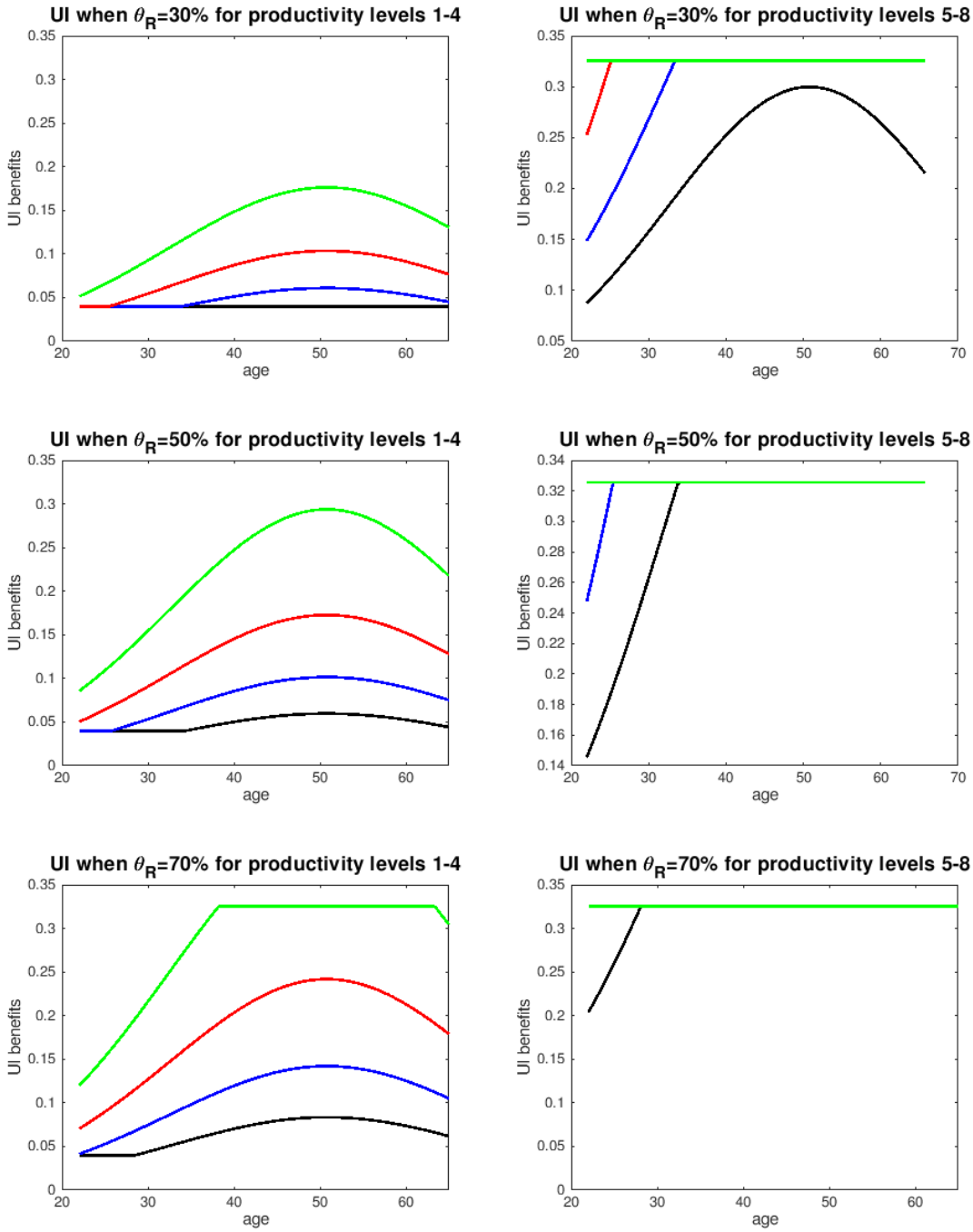

Figure 4.5: Steady state comparison of UI benefits (normalized units) across age, labor productivity, and for different replacement rates.

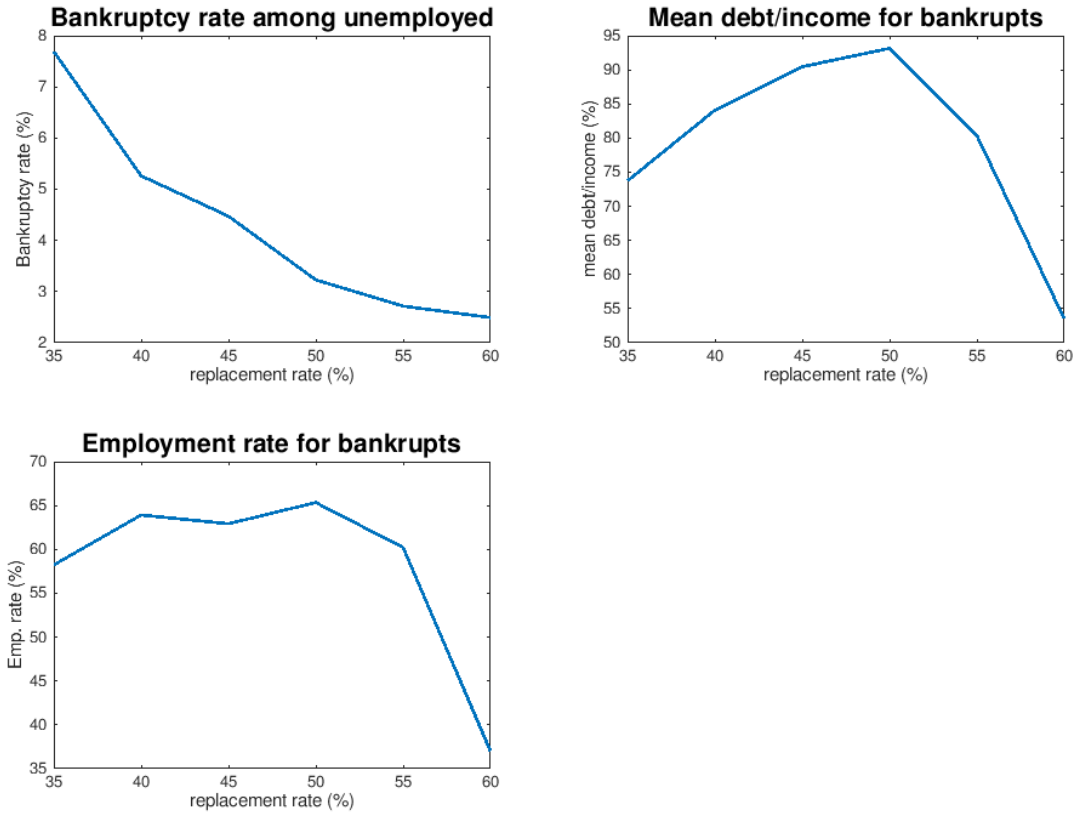

Figure 4.6: Steady state comparison: bankruptcy rate among unemployed, mean debt-to-income ratio and employment rate for bankruptcy filers across different replacement rates.

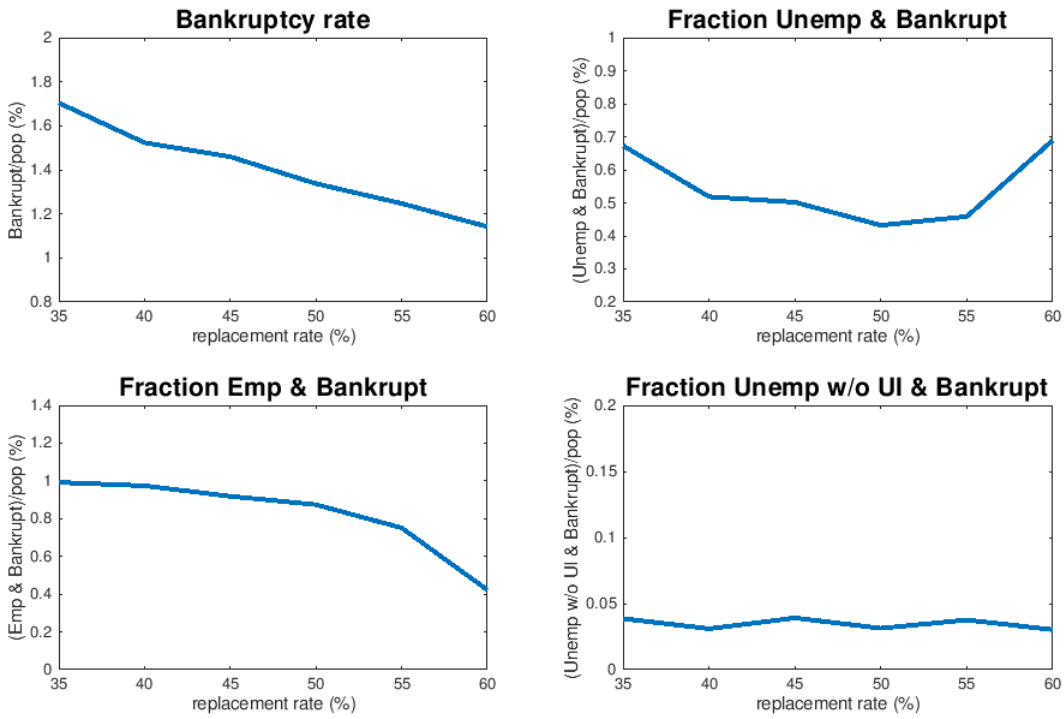

Figure 4.7: Steady state comparison: bankruptcy rate, fraction of the population unemployed and bankrupt, fraction of the population employed and bankrupt, and fraction of the population unemployed without UI and bankrupt.

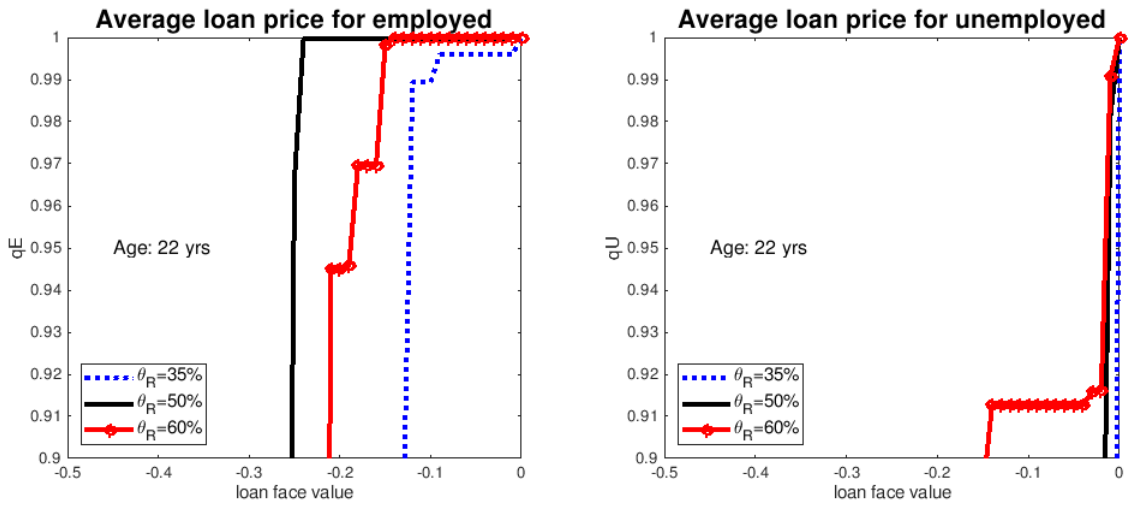

Figure 4.8: Steady state comparison: Loan price for employed and unemployed across different replacement rates.

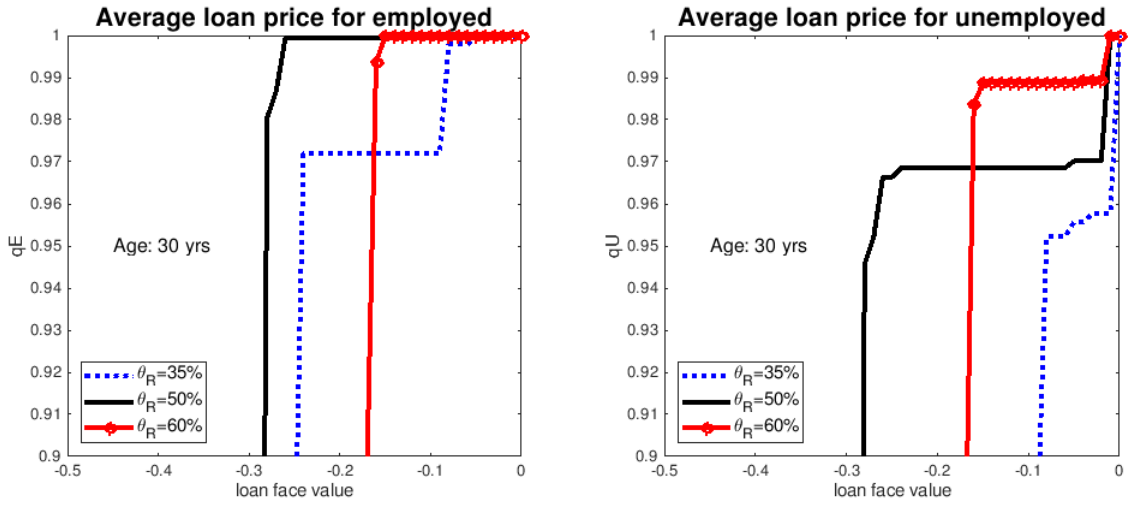

Figure 4.9: Steady state comparison: Loan price for employed and unemployed across different replacement rates.

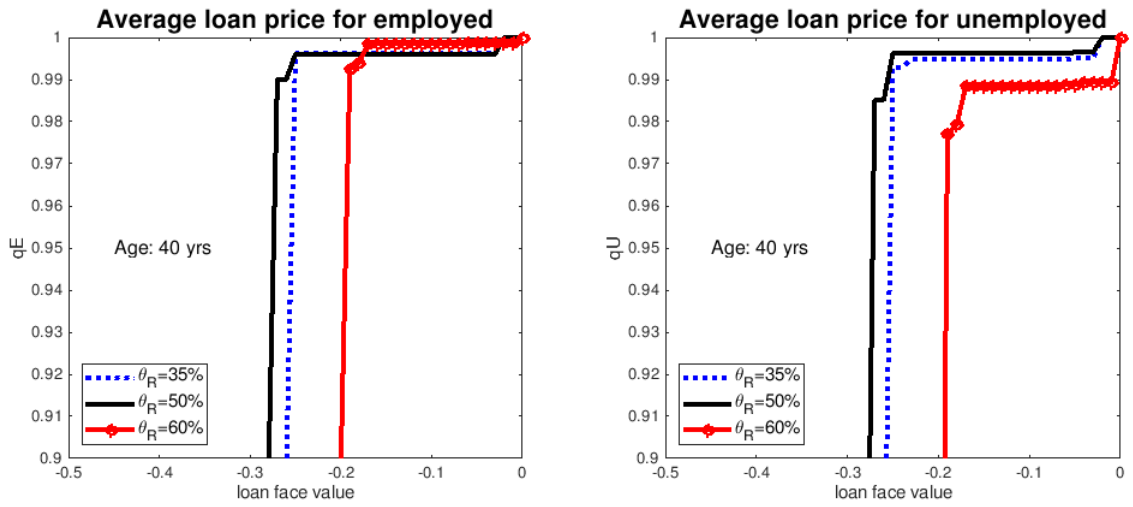

Figure 4.10: Steady state comparison: Loan price for employed and unemployed across different replacement rates.

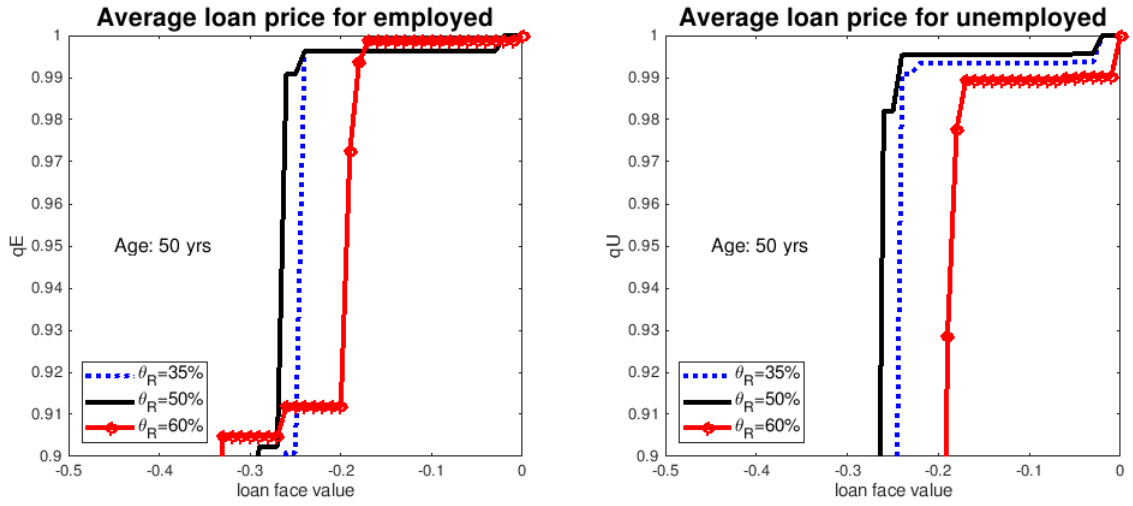

Figure 4.11: Steady state comparison: Loan price for employed and unemployed across different replacement rates.

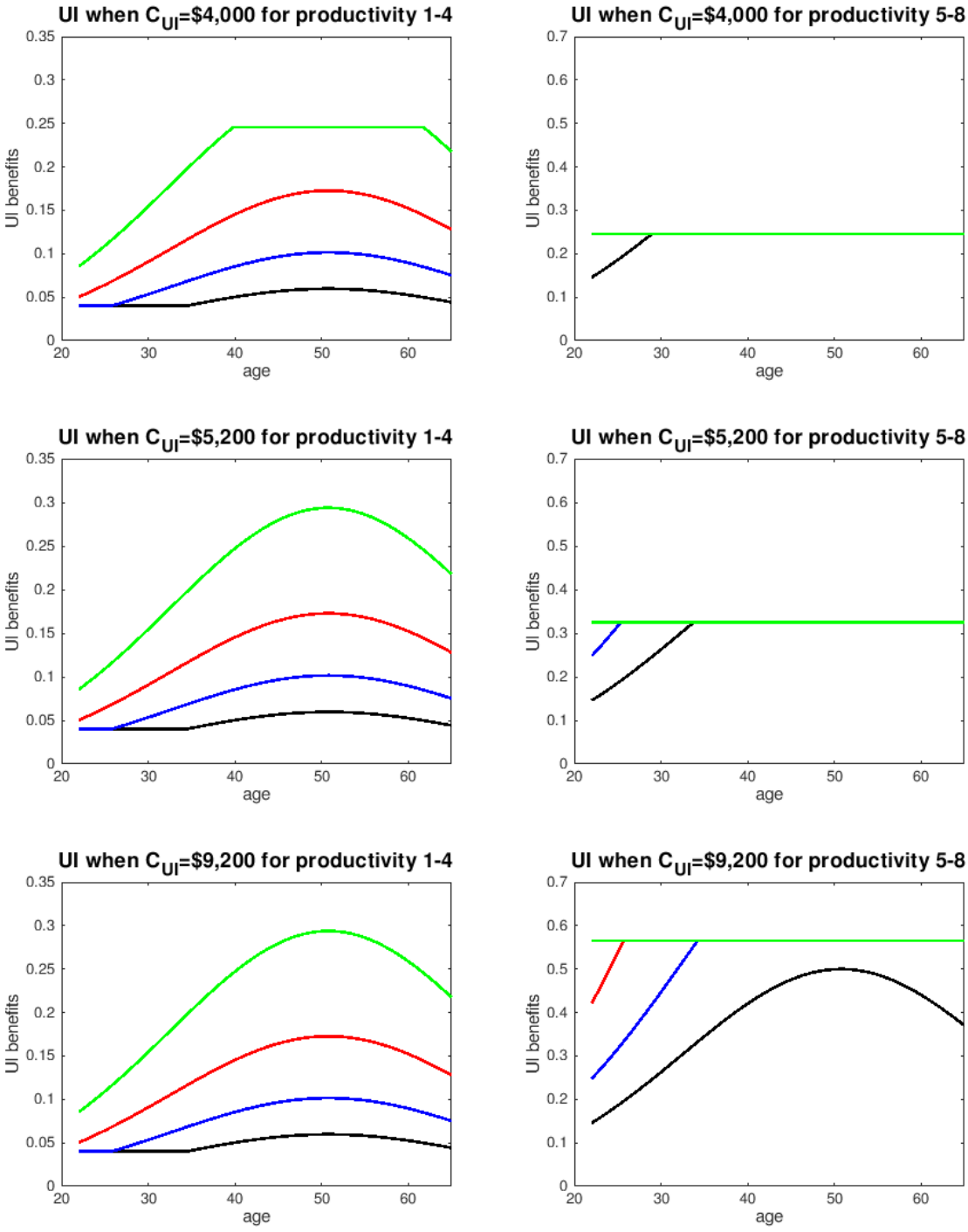

Figure 4.12: Steady state comparison of UI benefits (normalized units) across age, labor productivity, and for different levels UI cap.

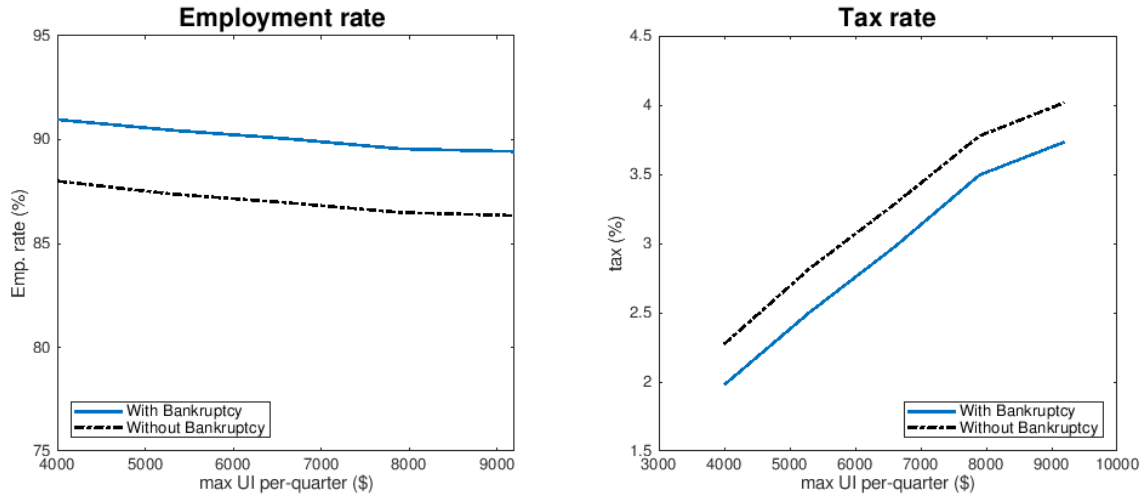

Figure 4.13: Steady state comparison for employment rate and labor tax across different UI caps for scenarios with and without bankruptcy.

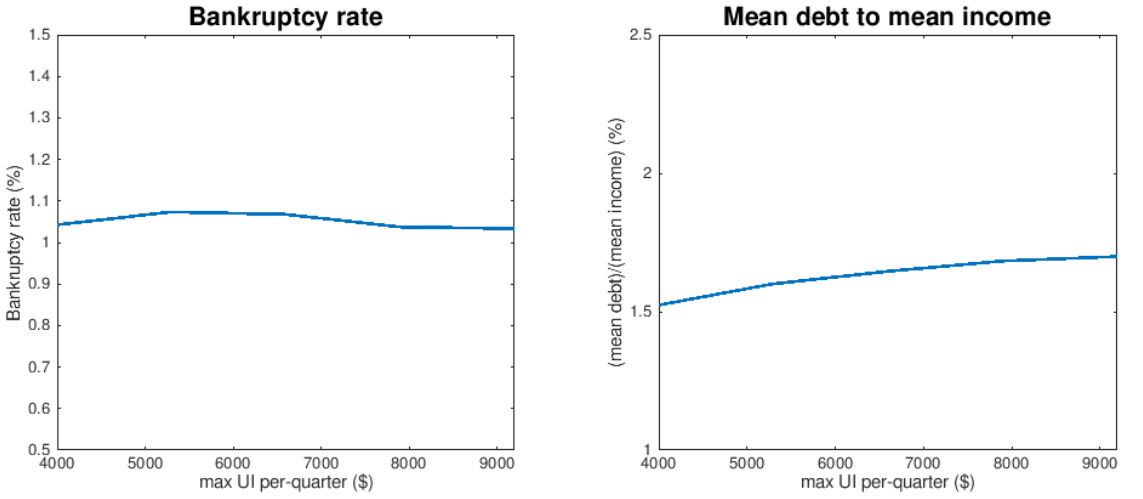

Figure 4.14: Steady state comparison for bankruptcy rate and mean-debt to mean-income ratio across different UI caps for scenarios with and without bankruptcy.

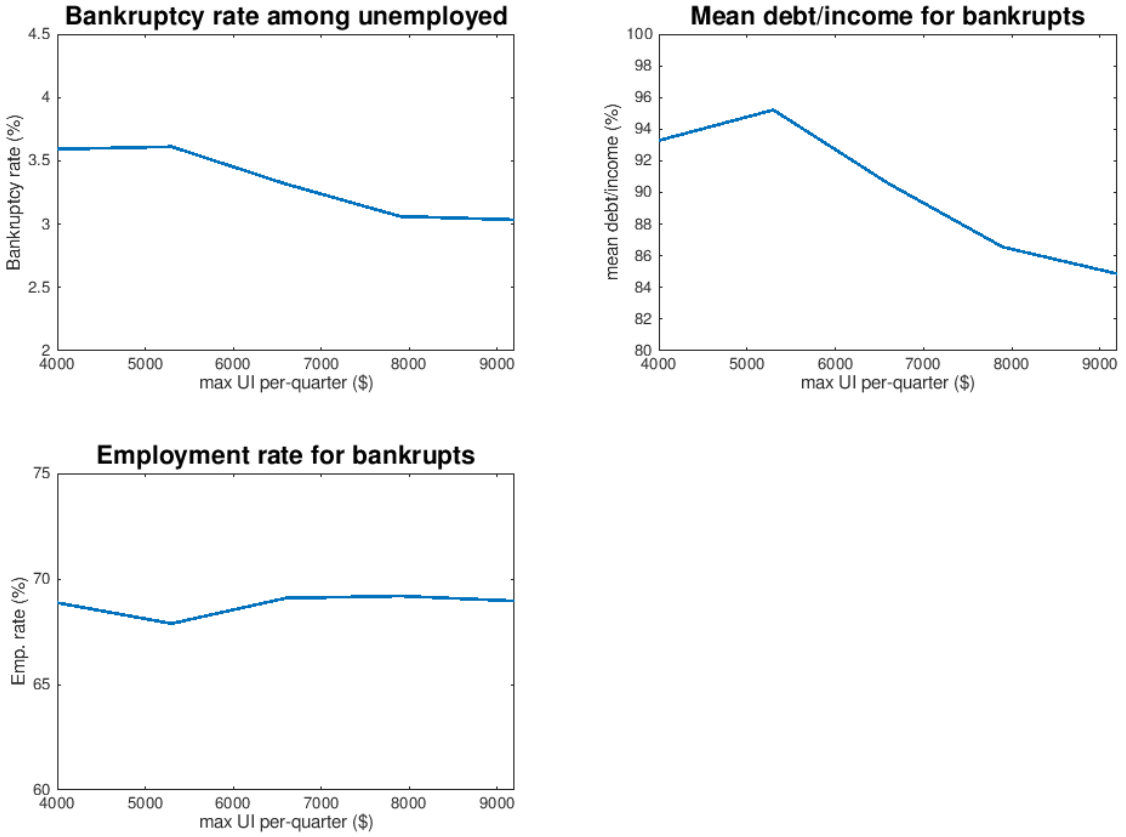

Figure 4.15: Steady state comparison: bankruptcy rate among unemployed, mean debt-to-income ratio and employment rate for bankruptcy filers for different values of UI caps.

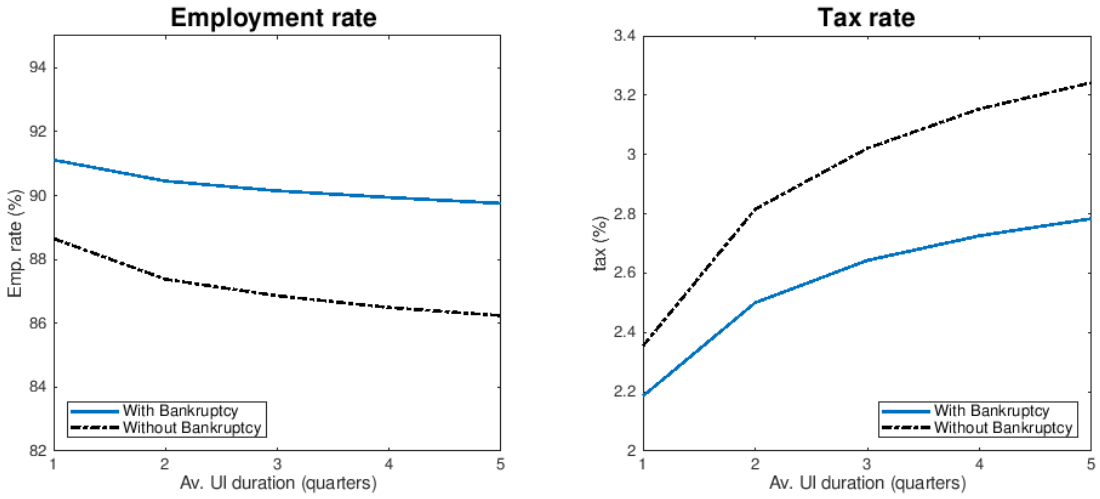

Figure 4.16: Steady state comparison for employment rate and labor tax across different UI average duration (in quarters) for scenarios with and without bankruptcy.

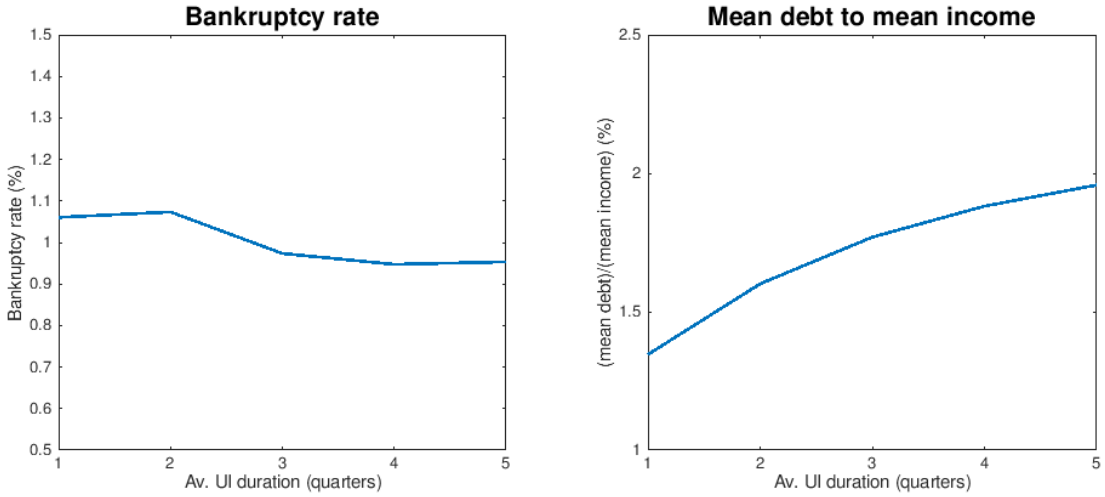

Figure 4.17: Steady state comparison for bankruptcy rate and mean-debt to mean-income ratio across different UI average duration (in quarters) for scenarios with and without bankruptcy.

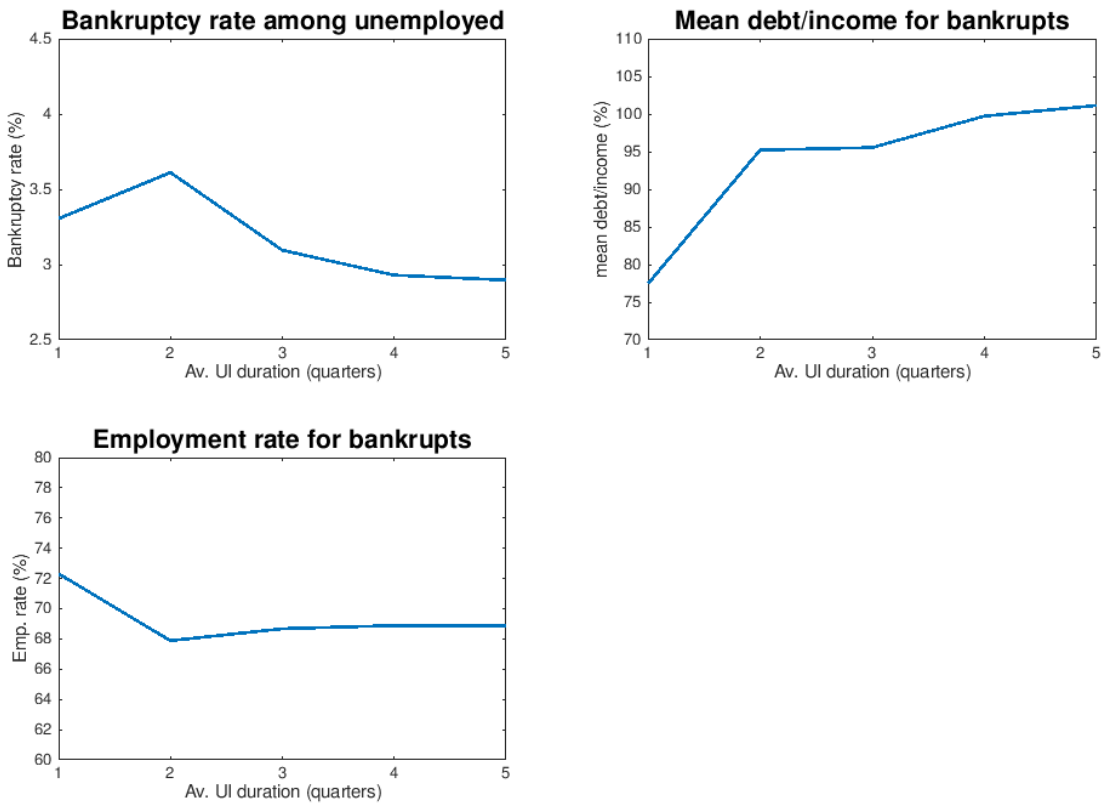

Figure 4.18: Steady state comparison: bankruptcy rate among unemployed, mean debt-to-income ratio and employment rate for bankruptcy filers for different values of average duration of UI benefits.

4.3 Tables

Table 4.1: Unemployment Insurance statistics 1991-2017

	Regular number of weeks				Maximum weekly benefit amount				
state	mean	sd	min	max	mean	sd	min	max	N. Obs.
Alabama	26	0	26	26	217.22	39.69	150	265	27
Alaska	26	0	26	26	352.67	65.90	284	442	27
Arizona	26	0	26	26	215.83	25.69	170	240	27
Arkansas	25.33	1.62	20	26	357.50	81.65	225	454	27
California	26	0	26	26	350.74	107.06	210	450	27
Colorado	26	0	26	26	400.65	107.90	234	570.5	27
Connecticut	26	0	26	26	512.48	118.54	320	691	27
DC	25.93	0.38	24	26	341.07	28.19	293	425	27
Delaware	26	0	26	26	309.72	31.01	225	330	27
Florida	23.85	4.47	12	26	266.67	15.50	225	275	27
Georgia	23.93	4.22	14	26	278.43	55.93	185	330	27
Hawaii	25.89	0.58	23	26	438.54	97.79	275	592	27
Idaho	25.74	1.29	21	28	311.30	58.30	210.5	410	27
Illinois	25.78	0.42	25	26	443.39	106.81	270	613	27
Indiana	26	0	26	26	314.41	85.82	166	390	27
Iowa	26	0	26	26	381.30	99.52	233	553.5	27
Kansas	24.81	3.00	16	26	358.41	85.77	226.5	474	27
Kentucky	26	0	26	26	338.63	80.28	204	431.5	27
Louisiana	26	0	26	26	233.70	33.10	181	284	27
Maine	26	0	26	26	439.41	112.62	288	621	27
Maryland	26	0	26	26	323.13	81.79	219	430	27
Massachusetts	28.90	1.71	26	30	762.70	218.40	423	1103	27
Michigan	24.69	2.51	20	26	333.17	33.94	276	362	27
Minnesota	26	0	26	26	470.02	135.37	262.5	683	27
Mississippi	26	0	26	26	204.81	26.93	155	235	27
Missouri	24.52	2.58	20	26	254.56	59.96	170	320	27
Montana	27.09	1.00	26	28	334.91	103.16	197	514	27
Nebraska	26	0	26	26	267.39	81.76	144.5	400	27
Nevada	26	0	26	26	324.17	74.52	206.5	432.5	27
New Hampshire	26	0	26	26	336.54	94.26	173.5	427	27
New Jersey	26	0	26	26	489.00	120.10	291	677	27
New Mexico	26	0	26	26	336.09	116.74	177	503	27
New York	26	0	26	26	371.48	52.44	270	427.5	27
North Carolina	24	4.62	12	26	379.22	83.37	245	522	27
North Dakota	26	0	26	26	365.52	136.19	202	631.5	27
Ohio	26	0	26	26	437.96	97.53	291	592.5	27
Oklahoma	26	0	26	26	328.50	89.76	204.5	510	27
Oregon	26	0	26	26	416.57	102.31	253	597	27
Pennsylvania	26	0	26	26	466.74	100.69	299	581	27
Rhode Island	26	0	26	26	556.48	129.36	345	707	27
South Carolina	24.56	2.55	20	26	274.44	51.70	180.5	326	27
South Dakota	26	0	26	26	256.89	72.24	147	385	27
Tennessee	26	0	26	26	256.39	45.32	165	325	27
Texas	26	0	26	26	342.24	82.84	224	493	27
Utah	26	0	26	26	369.35	96.52	221	524	27
Vermont	26	0	26	26	337.76	95.65	187	462	27
Virginia	26	0	26	26	302.44	73.56	198	378	27
Washington	27.33	1.92	26	30	483.48	123.68	257	697	27
West Virginia	26	0	26	26	357.87	60.87	257	424	27
Wisconsin	26	0	26	26	319.30	47.41	225	370	27
Wyoming	26	0	26	26	335.28	102.42	200	490	27
Total	25.85	1.58	12	30	357.97	131.32	144.5	1103	1377

Summary statistics for UI.

Table 4.2: Asset Exemptions (2007)

State	Homestead	Vehicle	Retirement	Other Financial Assets	Wildcard	Federal Available
Alabama	10,000	0	Unlimited	0	6,000	No
Alaska	67,500	7,500	Unlimited	3,500	0	No
Arizona	150,000	10,000	Unlimited	300	0	No
Arkansas	Unlimited	2,400	40,000	0	500	Yes
California, system 1	75,000	4,600	Unlimited	1,825	0	No
California, system 2	0	2,975	Unlimited	0	19,675	No
Colorado	90,000	6,000	Unlimited	0	0	No
Connecticut	150,000	3,000	Unlimited	0	2,000	Yes
Delaware	0	0	Unlimited	0	500	No
District of Columbia	Unlimited	5,150	Unlimited	0	17,850	Yes
Florida	Unlimited	2,000	Unlimited	0	2,000	No
Georgia	10,000	7,000	Unlimited	0	11,200	No
Hawaii	40,000	5,150	Unlimited	0	0	Yes
Idaho	50,000	6,000	Unlimited	0	1,600	No
Illinois	15,000	2,400	Unlimited	0	4,000	No
Indiana	0	0	Unlimited	0	20,000	No
Iowa	Unlimited	1,000	Unlimited	0	200	No
Kansas	Unlimited	40,000	Unlimited	0	0	No
Kentucky	10,000	5,000	Unlimited	0	2,000	No
Louisiana	25,000	0	Unlimited	0	0	No
Maine	70,000	10,000	Unlimited	0	12,800	No
Maryland	0	0	Unlimited	0	22,000	No
Massachusetts	1,000,000	1,400	Unlimited	1,250	0	Yes
Michigan	7,000	0	Unlimited	0	0	No
Minnesota	200,000	7,600	Unlimited	0	0	Yes
Mississippi	150,000	0	Unlimited	0	10,000	No
Missouri	15,000	6,000	Unlimited	0	1,250	No
Montana	200,000	5,000	Unlimited	0	0	No
Nebraska	12,500	0	Unlimited	0	0	No
Nevada	400,000	30,000	1,000,000	0	0	No
New Hampshire	200,000	8,000	Unlimited	0	8,000	Yes
New Jersey	0	0	Unlimited	0	2,000	Yes
New Mexico	60,000	8,000	Unlimited	0	1,000	Yes
New York	20,000	0	Unlimited	0	10,000	No
North Carolina	13,000	3,000	Unlimited	0	8,000	No
North Dakota	80,000	2,400	200,000	0	0	No
Ohio	10,000	2,000	Unlimited	800	800	No
Oklahoma	Unlimited	6,000	Unlimited	0	0	No
Oregon	33,000	3,400	15,000	15,000	800	No
Pennsylvania	0	0	Unlimited	0	600	Yes
Rhode Island	200,000	20,000	Unlimited	0	0	Yes
South Carolina	10,000	2,400	Unlimited	0	0	No
South Dakota	Unlimited	0	500,000	0	4,000	No
Tennessee	7,500	0	Unlimited	0	8,000	No
Texas	Unlimited	0	Unlimited	0	60,000	Yes
Utah	40,000	5,000	Unlimited	0	0	No
Vermont	150,000	5,000	Unlimited	1,400	8,400	Yes
Virginia	0	4,000	35,000	0	32,000	No
Washington	40,000	5,000	Unlimited	0	4,000	Yes
West Virginia	0	4,800	Unlimited	0	51,600	No
Wisconsin	40,000	0	Unlimited	2,000	10,000	Yes
Wyoming	20,000	4,800	Unlimited	0	0	No
Federal	18,500	5,900	Unlimited	0	20,450	n/a
Averages*	58,821	4,884	298,333	501	6,592	0

Source: Mahoney (2015). Note: Contemporaneous exemptions for couples filing jointly from Elias (2007). Under contemporaneous law, California residents can choose between system 1 and 2, and residents can choose federal exemptions in states where federal exemptions are available. States that did not have homestead exemptions are assigned a value of zero. *Excludes states with unlimited or n/a exemptions.

Table 4.3: Homestead exemptions 1989 and 2017

State	1989	2007	Years of change
Alabama	5000	15000	2015
Alaska	54000	72900	1992, 1999, 2004, 2008, 2012
Arizona	100000	150000	2004
Arkansas	999999	999999	
California	30000	75000	1990, 2010
Colorado	20000	60000	1991, 2000, 2007
Connecticut	0	75000	1993
Delaware	0	125000	2006, 2010, 2011, 2012
Florida	999999	999999	
Georgia	5000	21500	2001, 2012
Hawaii	20000	20000	
Idaho	30000	100000	1992, 2006
Illinois	7500	15000	2006
Indiana	7500	17600	2005, 2010
Iowa	999999	999999	
Kansas	999999	999999	
Kentucky	5000	5000	
Louisiana	15000	35000	2000, 2009
Maine	7500	47500	1991, 2001, 2003, 2008
Maryland	0	23675	2011, 2013, 2016
Massachusetts	100000	500000	2000, 2004
Michigan	3500	38225	2005, 2008, 2011, 2017
Minnesota	999999	390000	1993, 2007, 2010, 2012
Mississippi	30000	75000	1991
Missouri	8000	15000	2003
Montana	40000	250000	1997, 2001, 2007
Nebraska	10000	60000	1997, 2007
Nevada	95000	550000	1995, 2003, 2005, 2007
New Hampshire	5000	100000	1992, 2002, 2004
New Jersey	0	0	
New Mexico	20000	60000	1993, 2007
New York	10000	75000	2005, 2011
North Carolina	7500	35000	1991, 2006, 2009
North Dakota	80000	100000	2009
Ohio	5000	132900	2008, 2010, 2013
Oklahoma	999999	999999	
Oregon	15000	40000	1993, 2006, 2009
Pennsylvania	0	0	
Rhode Island	0	500000	1999, 2001, 2004, 2006, 2012
South Carolina	5000	59100	2006, 2010, 2012, 2016
South Dakota	999999	999999	
Tennessee	5000	5000	
Texas	999999	999999	
Utah	8000	30000	1997, 1999, 2013
Vermont	30000	125000	1997, 2009
Virginia	5000	5000	
Washington	30000	125000	1999, 2007
West Virginia	7500	25000	1996, 2002
Wisconsin	40000	75000	2009
Wyoming	10000	20000	2012

Source: Pattison (2018) constructed from Elias, Renauer and Leonard "How to File for Bankruptcy" (1989-2013) and state statutes.

Table 4.4: Annual Bankruptcy Rates by States 1991-2017

	Chapter 7				Chapter 13				
state	mean	sd	min	max	mean	sd	min	max	N. Obs.
Alabama	0.274	0.107	0.141	0.614	0.398	0.055	0.280	0.481	27
Alaska	0.133	0.065	0.043	0.309	0.016	0.004	0.009	0.025	27
Arizona	0.334	0.121	0.102	0.609	0.073	0.027	0.022	0.109	27
Arkansas	0.290	0.147	0.146	0.716	0.231	0.073	0.117	0.368	27
California	0.324	0.122	0.076	0.515	0.084	0.033	0.027	0.161	27
Colorado	0.323	0.158	0.166	0.849	0.060	0.017	0.036	0.102	27
Connecticut	0.229	0.078	0.101	0.382	0.039	0.009	0.025	0.060	27
DC	0.168	0.098	0.049	0.369	0.073	0.042	0.016	0.145	27
Delaware	0.190	0.062	0.077	0.348	0.095	0.034	0.041	0.173	27
Florida	0.277	0.101	0.087	0.494	0.092	0.036	0.035	0.150	27
Georgia	0.285	0.088	0.163	0.500	0.389	0.085	0.250	0.525	27
Hawaii	0.191	0.115	0.060	0.436	0.031	0.015	0.006	0.063	27
Idaho	0.353	0.153	0.157	0.738	0.070	0.030	0.024	0.117	27
Illinois	0.347	0.118	0.146	0.697	0.133	0.034	0.071	0.176	27
Indiana	0.457	0.182	0.224	1.042	0.126	0.046	0.050	0.203	27
Iowa	0.243	0.109	0.117	0.585	0.020	0.004	0.014	0.030	27
Kansas	0.289	0.133	0.126	0.692	0.094	0.018	0.057	0.123	27
Kentucky	0.379	0.140	0.196	0.812	0.104	0.024	0.060	0.141	27
Louisiana	0.207	0.121	0.080	0.545	0.206	0.046	0.096	0.257	27
Maine	0.204	0.099	0.074	0.461	0.026	0.008	0.016	0.042	27
Maryland	0.302	0.114	0.084	0.489	0.122	0.044	0.076	0.214	27
Massachusetts	0.198	0.073	0.076	0.366	0.045	0.013	0.029	0.083	27
Michigan	0.332	0.139	0.160	0.725	0.100	0.037	0.060	0.183	27
Minnesota	0.241	0.070	0.111	0.405	0.060	0.020	0.027	0.096	27
Mississippi	0.303	0.131	0.140	0.596	0.226	0.043	0.157	0.330	27
Missouri	0.314	0.126	0.170	0.743	0.122	0.026	0.076	0.178	27
Montana	0.242	0.114	0.101	0.565	0.038	0.016	0.017	0.077	27
Nebraska	0.249	0.097	0.135	0.554	0.076	0.025	0.035	0.117	27
Nevada	0.478	0.189	0.138	0.816	0.154	0.064	0.062	0.291	27
New Hampshire	0.241	0.084	0.095	0.387	0.038	0.018	0.018	0.081	27
New Jersey	0.260	0.078	0.091	0.426	0.111	0.037	0.066	0.172	27
New Mexico	0.255	0.113	0.109	0.567	0.039	0.028	0.013	0.117	27
New York	0.221	0.089	0.106	0.489	0.053	0.014	0.029	0.077	27
North Carolina	0.120	0.062	0.057	0.302	0.146	0.047	0.080	0.232	27
North Dakota	0.205	0.105	0.069	0.508	0.013	0.007	0.002	0.027	27
Ohio	0.371	0.169	0.191	0.984	0.110	0.031	0.070	0.181	27
Oklahoma	0.382	0.197	0.145	0.999	0.067	0.020	0.038	0.113	27
Oregon	0.356	0.149	0.157	0.764	0.086	0.026	0.048	0.127	27
Pennsylvania	0.194	0.095	0.095	0.485	0.085	0.029	0.048	0.147	27
Rhode Island	0.327	0.107	0.117	0.506	0.038	0.019	0.016	0.082	27
South Carolina	0.104	0.044	0.038	0.173	0.122	0.044	0.079	0.219	27
South Dakota	0.208	0.092	0.097	0.475	0.015	0.007	0.005	0.038	27
Tennessee	0.333	0.116	0.177	0.623	0.433	0.077	0.308	0.565	27
Texas	0.127	0.070	0.045	0.353	0.119	0.038	0.065	0.194	27
Utah	0.347	0.148	0.132	0.667	0.186	0.068	0.075	0.314	27
Vermont	0.169	0.079	0.067	0.363	0.026	0.014	0.003	0.055	27
Virginia	0.301	0.112	0.092	0.468	0.121	0.026	0.072	0.156	27
Washington	0.334	0.135	0.128	0.629	0.088	0.024	0.053	0.128	27
West Virginia	0.309	0.189	0.139	0.925	0.025	0.005	0.017	0.034	27
Wisconsin	0.288	0.102	0.148	0.595	0.067	0.026	0.023	0.104	27
Wyoming	0.268	0.132	0.104	0.590	0.026	0.009	0.013	0.042	27
Total	0.272	0.142	0.038	1.042	0.104	0.099	0.002	0.565	1377

Summary statistics for Consumer Bankruptcy by States constructed using bankruptcy filings data from the US Courts and population data from Census.

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