Personal-bankruptcy cycles

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Abstract

This paper estimates the dynamics of the personal-bankruptcy rate over the business cycle by exploiting large cross-state variation. We find that bankruptcy rates are significantly higher than normal during a recession and rise as a recession persists. After a recession ends, there is a hangover whereby bankruptcy rates begin to fall but remain above normal for several more quarters. Recovery periods see a strong bounce-back effect with bankruptcy rates significantly below normal for several quarters. Despite the significant increases in bankruptcies during recessions, the largest contributor to rising bankruptcies during these periods has tended to be the longstanding upward trend.

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Personal-Bankruptcy Cycles

1. Introduction

It is surprising, perhaps, that there is little consensus regarding the importance of adverse events such as job loss for households' personal-bankruptcy decisions. Studies using individual-level data, for example, often find that the bankruptcy decision is unrelated to increases in local unemployment rates or decreases in average income (Fay et al., 2002; White, 2009; Fisher, 2005). These studies instead find support for bankruptcy as a strategic choice, whereby households react to the financial benefits of bankruptcy rather than a nonstrategic outcome driven by a reduced ability to repay debts. In contrast with these empirical results, numerous surveys of bankruptcy filers suggest that the underlying cause of most bankruptcies is an unexpected negative shock to household income, such as a job loss, the most-cited reason in most surveys (Stavins, 2000; Warren, 2003). Even so, survey results are inconsistent: Whereas Sullivan et al. (2000) attribute two-thirds of personal bankruptcies to job loss, Himmelstein et al. (2005) find that more than half are the result of the lack of medical insurance following a serious injury or illness.

At the national level, data present an inconsistent picture of the link between economic conditions and personal bankruptcy, even during recessions, when job losses are especially prevalent. Theoretical models such as Rampini (2005) suggest that personal bankruptcies are countercyclical, but during two of the five NBER recessions experienced in the United States between 1980 and 2009—1982-83 and 2001—the

national bankruptcy rate actually fell (Figure 1). In addition, recovery periods have been accompanied sometimes by higher rates of bankruptcy than were experienced during the recessions that preceded them. And even for those recessions during which the bankruptcy rate rose, it is not clear that this was anything more than ongoing trends.

The purpose of this paper is to take a closer look at the link between economic conditions and personal bankruptcy. Our approach is based on the notion that it is not the weakness of economic activity that matters, but the persistence of the weakness. To capture the persistence of weak labor markets, we estimate a personal-bankruptcy cycle with three phases—normal, recession, and recovery—that align with the business cycle. Also, rather than using official recession dates from the NBER, which are linked most closely with national GDP growth, we use state-level recession dates that are based on labor-market conditions. State-level data give us a better geographic match between economic conditions and bankruptcy decisions, while labor-market recessions provide us a better match between households and the conditions that matter for them.

We find a personal-bankruptcy cycle for which the rate of personal bankruptcy rises above its normal rate throughout the length of a recession, standing roughly 8.4 percent above normal after one year of recession, 11.7 percent above normal after two years of recession, and 13.9 percent above normal after three years of recession. After the recession ends, there is a hangover whereby bankruptcy rates begin to fall but remain above normal for several more quarters. Recovery periods see a strong bounce-back effect with bankruptcy rates significantly below normal for several quarters before

returning to normal. The more severe the preceding recession, the deeper is this bounce-back.

The paper proceeds as follows: In Section 2 we review briefly the personal-bankruptcy literature, which has focused on explaining the upward trends in bankruptcies illustrated by Figure 1. Section 3 describes and presents the results of our estimation of state-level labor-market recessions. We describe the cross-state differences in the levels and trends in bankruptcy rates and outline our empirical approach in Section 4. Our baseline estimate of the movement of bankruptcy rates during and after recessions is presented in Section 5. Our baseline results are put into aggregate perspective in Section 6, and restricted versions of the baseline model are discussed in Section 7. Section 8 concludes.

2. The Personal-Bankruptcy Literature

The literature on U.S. personal bankruptcy has focused on the dramatic rise in bankruptcy filings that occurred between 1985 and 2004. As illustrated by Figure 1, the national bankruptcy rate increased from roughly 0.3 per 1,000 people in the first quarter of 1985 to 1.2 per 1,000 people in the fourth quarter of 2004.[1] National and state filing rates declined sharply after the implementation in 2005 of the Bankruptcy Abuse Prevention and Consumer Protection Act, which made it more difficult for consumers to file for bankruptcy (liquidation under Chapter 7). The new rules meant an upward spike

[1] This represents the sum of filings under Chapters 7, 11, and 13. All bankruptcy data are from the Administrative Office of the U.S. Courts and are available at www.uscourts.gov/bankruptcycourts.html.

in the national bankruptcy rate to 2.2 per 1,000 people in the fourth quarter of 2005, before the new rules were in place, followed by a huge downward spike to 0.4 per 1,000 people in the first quarter of 2006 under the new rules. Even under the new rules the personal-bankruptcy rate has steadily increased, hitting 1.2 per 1,000 people by the second quarter of 2009, after a year and a half of recession.[2]

Numerous explanations for this rise have been offered and estimated empirically: the increased use of credit cards and increased consumer debt (Durkin, 2000; White, 2007), the spread of casino gambling (Barron et al., 2002; Thalheimer and Ali, 2004; Garrett and Nichols, 2008), a reduced social stigma associated with filing for bankruptcy (Garrett, 2007), changes to state and federal bankruptcy laws (Nelson, 1999), and greater access to secured and unsecured credit (Gropp et al., 1997).[3] Most recently, Livshits et al. (forthcoming) model and compare the various explanations and conclude that "a decrease in the transactions cost of lending and in the cost of bankruptcy" account for the rise in personal bankruptcy.

3. State Labor-Market Recessions

Our first step is to determine appropriate dates for recessions at the state level. As is well known for the country as a whole, the close link between the NBER recession dates and employment growth broke down with the 1990-91 recession when the end of

[2] See Morgan et al. (2009) for a discussion of the effects of the change in bankruptcy laws on foreclosures and the onset of recession in 2008.

[3] See also Domowitz and Sartain (1999), who find that medical expenses and credit card debt are the strongest contributors to personal bankruptcy. These studies are a small sample of the much broader literature. Further research on the subject can be obtained by consulting the references in the cited studies.

the recession was followed by a lengthy period during which aggregate employment continued to fall. One reason that there has not been a consistent relationship between personal-bankruptcy rates and recessions is that NBER recession dates tend to be aligned with GDP growth rather than labor markets, which are more relevant for personal bankruptcy. It is not appropriate, therefore, to use NBER recession dates because the effects of a recession on labor markets and, therefore, personal bankruptcies, are not limited to the NBER recession period. It is, instead, more useful to obtain dates during which labor markets are in recession.

We also need recession dates that are better aligned geographically with the decision to file bankruptcy, which depends on local conditions. To match our state-level bankruptcy data, we need state-level recession dates. To obtain these dates, we follow Owyang, Piger, and Wall (2005), who show that the depth, timing, and duration of state labor-market recessions are quite different from national labor-market recessions and NBER recessions. They apply the Markov-switching model of Hamilton (1989) to the state-level coincident index of Crone and Clayton-Matthews (2005), which combines payroll employment, wages and salaries, the unemployment rate, and hours worked into a single index.

Although our bankruptcy data are available back to 1980 and through mid-2009, we restrict our analysis to 1988.Q1-2004.Q4. First, we need to excise the structural break associated with the 2005 changes in bankruptcy laws. Although this means that we are unable to consider the 2008-2009 recession, we cannot perform a complete analysis

anyway because we need a sufficiently long post-recession period. Second, as shown by Owyang, Piger, and Wall (2008), the so-called Great Moderation, which meant a structural break in a number of aggregate variables around 1984, occurred at different times across states, some as late as the latter part of the 1980s. Because the coincident index begins in 1979, we do not have a long enough time series to account for the structural break and cannot, therefore, include the recessions from the 1980s.

Despite the restrictions at both ends of our data set, our state-level analysis can be expected to yield something like 100 labor-market recessions. Because of this, we overcome a major obstacle to explaining bankruptcy rates during recessions because national-level data provide only two observations of recession during the period. We cannot, however, include all states in our analysis: The recession experiences of Alaska and Hawaii are extremely idiosyncratic and do not match up with official national recessions (Owyang, Piger, and Wall, 2005). We therefore exclude these states because we need states' recessions to have somewhat similar timing.

We apply the Markov-switching model to the remaining states and find that we also need to exclude Arizona, New Mexico, and Wyoming because they were in recession prior to 1988, so we don't know when their recessions began. For the remaining 45 states the occurrence of state recessions between 1988.Q2 and 2004.Q4 is shown in Figure 2.[4] What is clear from these results is that there is great variation across states in the timing and duration of recessions. It is this variation that we exploit in a

[4] Note that we apply the convention that a recession probability greater than 0.6 indicates a recession. Also, because the estimation is in growth rates, we do not have an observation for 1988.Q1.

panel-data framework to assess the behavior of the personal-bankruptcy rate during recessionary and recovery periods. In addition to providing more observations, our use of state-level data has the advantage of providing a better geographic match of weak economic conditions to the resulting bankruptcies.

As noted above, a benefit of our approach is that, because it considers labor-market recessions, it ameliorates the anomaly of a falling bankruptcy rate during a recession. This can be illustrated by comparing the national bankruptcy rate with the recession dates obtained from applying the Markov-switching model to the national coincident index. Figures 3 and 4 compare these labor-market-recession dates to the national bankruptcy rate during the two recession periods. Note that the national labor-market recessions began earlier and ended later than NBER recessions and that for each labor-market recession the bankruptcy rate was higher at its end than it was at its start. There was, nevertheless, significant movement in the bankruptcy rate during each labor-market recession, and we still have not removed the effect of the ongoing trend. Still, particularly for the 2001 recession, the labor-market-recession dates match up much better with the bankruptcy rate than do the NBER dates, reinforcing the notion that labor-market recessions are more useful for explaining the effects of recessions on bankruptcy rates than are NBER recession periods.

4. State Bankruptcy Rates

As at the national level, state-level bankruptcy rates have tended to rise over the last 30 years and within our sample period (1988-2004). There was, however, a great

deal of cross-state variation in both levels and trends.[5] For the states in our sample, the mean quarterly bankruptcy rate over the sample period (measured henceforth as per 100,000 persons) ranged from Vermont's average of 48.2 to Tennessee's average of 208.1, with a cross-state average of 99.6. The levels and trends in state bankruptcy rates are illustrated by Figure 5. In 1988, Northeastern states had the lowest bankruptcy rates whereas the highest bankruptcy rates were in the South and West. By 2004 the pattern had changed somewhat as only four of the ten states with the lowest bankruptcy rates were in the Northeast and the other six were in the Far West or Upper Midwest.

The differences in cross-state bankruptcy trends are illustrated by the bottom panel of Figure 5: States in the East tended to see much higher increases in bankruptcy rates than did states in the West. Whereas the average change over the sample period was 95.4 percent, the bankruptcy rates of Massachusetts and Vermont rose by 176 percent and 167.9 percent, respectively. At the other extreme, bankruptcy rates in California and Nevada rose during the early years of our sample, but fell in the wake of the housing booms of the late 1990s and early 2000s.

As outlined below, our estimation allows for these cross-state differences in levels and trends by including state fixed effects, state-specific quadratic time trends, and state-specific autoregressive errors. To capture the general movement in bankruptcy rates during and after recessions, we will assume commonality in the states' experiences

[5] Lefgren and McIntyre (2009) provide explanations for the cross-state differences. See also Miller (2009), who looks at how state laws affect who files for bankruptcy.

during those periods. As we describe below, however, we do allow for states to differ in the lengths and strengths of their recessions.

To characterize the behavior of bankruptcies during and after recessions, we estimate the relationship between state bankruptcy rates and sets of dummy variables that indicate where the states are in their idiosyncratic business cycles. We take account not only of whether or not the state is in a recession or recovery, but also where it is within the recession or recovery. We also control for the cross-state differences in trends and levels summarized in Figure 5.

A recessionary quarter is a period during which negative income shocks for individuals and households are dominant, and, conversely, an expansionary quarter is one during which positive income shocks are dominant. In an expansionary quarter, households become more confident in the future, are willing to take on a greater debt burden, and finance their increasing obligations based on their current income. As economic conditions worsen and a recession hits, on net, households lose income—through lower wages or job loss—and more find themselves overleveraged and filing for bankruptcy. Thus, for a given period of recession, a higher-than-average number of households are hit by a negative income shock, which means bankruptcy for some of them, perhaps with a lag.

The pressure on personal finances accumulates as the recession continues, suggesting a dynamic component to the link between the occurrence of negative income shocks and the bankruptcy rate. For one thing, perhaps some households can weather a

negative income shock for a short while, but, as a recession drags on, more of them are faced with bankruptcy. In addition, the longer a recession lasts, the more likely it is that a household is hit by subsequent negative income shocks. The household's personal finances might have been able to handle the first shock, but not a second or third. As a result, the rate of bankruptcy should rise as a recession persists.

There might also be a dynamic component to the bankruptcy rate even after the recession ends. First, if we think of a recovery period as one in which the occurrence of positive individual income shocks predominate, we would expect the bankruptcy rate to fall as soon as the recession ends. There could be, however, a bankruptcy hangover that lingers into the recovery period because people close to insolvency might have to wait for their positive shock to occur. Further, the length of time that this hangover continues might be related to the length of the preceding recession because longer recessions result in more at-risk households at the time the recovery begins. The speed at which the bankruptcy rate returns to its normal level should depend, therefore, on two opposing forces: the strength of the recovery (i.e., the rate at which positive income shocks occur) and the length of the preceding recession.

Our use of dummy variables means that we need not assume any particular functional form for the bankruptcy rate to follow during or after a recession. Specifically, the dummy variable R_{cit} equals one if at time t state i is in its c^{th} quarter of recession. Similarly, the dummy variable V_{kit} equals one if at time t state i is in its k^{th} quarter of recovery. Finally, we include the interaction term $V_{kit}L_{kit}$, for which L_{kit} is the length of

the recession that preceded the recovery. Denoting the bankruptcy rate for state *i* at time *t* as B_{it}, we estimate the following regression equation:

$$B_{it} = a^i(t) + \sum_{c=1}^{C} \beta_c R_{cit} + \sum_{k=1}^{K} \gamma_k V_{kit} + \sum_{k=1}^{K} \lambda_k V_{kit} L_{kit} + \varepsilon_{it} . \quad (1)$$

Equation (1) includes the state-specific time-dependent intercept, $a^i(t)$:

$$a^i(t) = \alpha_0 + \alpha_i + \omega_i t + \pi_i t^2 + \sum_{q=1}^{4} \psi_q Q_q ,$$

where α_0 is common across states, α_i is the state-specific fixed effect, and ω_i and π_i are the coefficients on the state-specific quadratic time trend. Note that $a^i(t)$ also includes dummies to control for the quarter within a year.

We set $C = 19$ and $K = 12$, the number of recession and recovery dummies, respectively. The value of C is dictated by the maximum recession length in our data, which is 19 quarters. The value of K, on the other hand, is somewhat arbitrary but is not crucial as long as it is high enough to allow for the bankruptcy rate to return to near its non-recession/non-recovery level, while still leaving enough observations of normal quarters to make the estimation possible.

5. Baseline Results

The results for our most general specification, Model I, are provided in Table 1, which also provides the results for three restricted versions of Model I. Note that in our estimation of all four models the error term ε_{it} allows for state-specific AR(1) autocorrelation and heteroskedastic errors with cross-state correlation. All of our

estimation uses Feasible Generalized Least Squares and a balanced panel of 67 quarterly observations for each of the 45 states (3,105 observations).

All estimated coefficients measure the difference between the actual and "normal" bankruptcy rates, where the normal bankruptcy rate is what occurs during a quarter that is neither a recessionary quarter nor a recovery quarter (the 12 quarters after the end of a recession). In (1) the normal bankruptcy rate for state *i* at time *t* is captured by the time-dependent intercept $a^i(t)$. As shown in the first column of results in Table 1, the bankruptcy rate is statistically greater than normal for each of the first 17 quarters of recession, although, because we have very few observations of recessions lasting beyond 13 quarters, results for recession quarters beyond the 13th should be interpreted with some caution. Note also that the recovery quarters tend to be statistically different from normal, starting above normal in the first quarters of recovery and ending below normal by the tenth quarter of recovery. Recall that we also interacted the recovery dummies with the length of the preceding recession. Our results show that there is a tendency for the recovery bankruptcy rate to be decreasing in the length of the recession.

These results, along with 95 percent confidence intervals, are illustrated in percentage terms by Figure 6. As shown by the top panel, after the first year of recession the bankruptcy rate tends to be about 8.4 percent above normal, rising to 13.9 percent above normal by the end of the third year of recession. As illustrated by the middle panel, for a given length of the preceding recession, the bankruptcy rate continues to rise after a recession ends and remains above its normal rate for several quarters before falling

steadily as the recovery proceeds. The length of the preceding recession matters in determining the path by which the bankruptcy rate returns to normal during a recovery, but not for every quarter of recovery. The bottom panel of Figure 6 shows that the bankruptcy rate is positively related to the length of the preceding recession for the first year of recovery, but it is negatively related to the length of the recession for the fifth through tenth quarters of recovery. Thus, conditional on the length of the preceding recession, the bankruptcy rate a few quarters into the recovery period can be below its normal rate, and the extent to which it is below normal is increasing in the length of the preceding recession.

For example, the bankruptcy rate for the seventh quarter of recovery is about 1 percent lower for each quarter that the preceding recession lasted. Combining this with the estimate that, for a given recession length, the bankruptcy rate in the seventh quarter of recovery is about 3.1 percent above normal, the total effect is obtained: The bankruptcy rate in the seventh quarter of recovery following a recession that lasted 10 quarters should be 6.9 percent below normal.

This "bounce-back effect" might be a reflection of that found by Kim, Morley, and Piger (2005) for real GDP whereby growth following a recession tends to be higher than during normal expansionary periods and is related positively to the severity of the preceding recession. On the other hand, the bounce-back might be due to a depletion in the stock of at-risk households. Even during normal periods there is some number of households at risk of bankruptcy, and a certain percentage of them file for bankruptcy

during any quarter. The longer a recession lasts, the fewer at-risk households there are when the recovery begins.

Figure 7 combines the results from the bottom two panels of Figure 6 and illustrates the estimated path of the bankruptcy rate during recovery periods conditional on recession lengths of from three to 13 quarters. Bankruptcy rates during the first quarter of recovery are somewhat higher the longer the recession had lasted, but return to normal more quickly. Further, the longer the recession was, the bigger the bounce-back in the bankruptcy rate. So, although the bankruptcy rate rises throughout the length of a recession, a long recession is followed by a recovery period with bankruptcy rates that are substantially below normal for several quarters beyond the first six quarters of recovery.

Figure 8 puts all of our results together to illustrate the entire personal-bankruptcy cycle, conditional on recession lengths of from three to 13 quarters. Longer recessions mean rising bankruptcy rates throughout the recession, followed by bankruptcy rates that remain above normal during the first year of recovery. But longer recessions also mean that bankruptcy rates return to normal earlier and a have a larger bounce-back that can last into to the fourth year of recovery. For example, for a recession that lasts one year, the bankruptcy rate peaks at about 9.3 percent above normal during the second quarter of recovery, and then declines throughout the recovery before becoming well below normal for several quarters. For a recession that lasts three years, the bankruptcy rate peaks at about 13.9 percent above normal in the final quarter of the recession and returns to

normal more than one year later. This is followed by a bounce-back effect whereby about one year later the bankruptcy rate is about 8.3 percent below normal.

6. Aggregate Implications

In the previous section we outlined our finding that bankruptcies respond strongly to labor-market conditions, thereby indicating a statistically and economically significant occurrence of nonstrategic bankruptcy. Even during recessions, however, when nonstrategic considerations should be most important, ongoing trends explain a larger portion of changes in bankruptcy rates. Specifically, state bankruptcy rates increased by an average of 35.9 percent during the state recessions that occurred in conjunction with the national recessions of 1990-91 and 2001.[6] Combining our results with the data, the recessions alone would have led to an average increase of 11.9 percent, whereas ongoing trends by themselves would have meant an average increase of 16.5 percent.

So how much did the occurrence of state personal-bankruptcy cycles affect the overall national bankruptcy picture? Recall that states entered recessions at different times and that during some periods there are states in recession, others in recovery, and the rest at their normal bankruptcy rates. Because state recessions are staggered in this way, so are their personal-bankruptcy cycles, which would tend to smooth their affect on the aggregate picture. To see this, look at Figure 9, which shows the cross-state average in the recession- and recovery-induced changes in bankruptcy rates. Note that for some

[6] Note that we only consider up to the 13th quarter of recession and the longest continuous recession for a state during the period surrounding the national recession.

periods after the end of the two NBER recessions, the bankruptcy rates for some states are above normal because the state is still in recession, while for other states it is because they are in the early quarters of recovery. Eventually, as some states continue their recoveries and other states that had experienced long recessions have just begun their recoveries, the bounce-back effect becomes dominant.

Figure 10 puts our results in the context of the actual average bankruptcy rate over the sample period. The solid line is the actual average in logs whereas the dashed line is what the average would have been with the personal-bankruptcy cycle removed. The first thing to notice from the figure is that the dominant movements in the average bankruptcy rate have nothing to do with the recessions that occurred during the period. Still, it is clear from the figure that the average bankruptcy rate was affected substantially before, during, and after NBER recessions. Usually the underlying state personal-bankruptcy cycles meant a higher average bankruptcy rate. But during 1993 and 1994, when states were well into their recoveries, the average bankruptcy rate was lower because of the preponderance of state-level bounce-back effects.

7. Restricted Specifications

We estimated three alternative specifications of (1), each of which is a restricted version of the baseline, Model I. The first two alternatives, Models II and III, impose commonality restrictions on the state time trends $(\omega_i = \omega \text{ and } \pi_i = \pi \,\forall i)$ and state fixed effects $(\alpha_i = 0 \,\forall i)$, respectively. The third alternative, Model IV, assumes that the bankruptcy rate during recovery is unrelated to the length of the preceding recession

$(\lambda_k = 0 \,\forall k)$. The results for Models II-IV are provided in Table 1 and are compared with Model I and each other in Figure 11.

For the most part, Model II provides results for all three categories of coefficients that are very similar to those from the baseline estimation. This is somewhat surprising given the large differences in state-level bankruptcy trends. Nevertheless, this suggests that differences in state trends appear to be unrelated to the movement of state bankruptcy rates over the business cycle, so a common trend would not have injected significant bias into our estimation of the personal-bankruptcy cycle. Model III, on the other hand, provides substantially different quantitative results from the baseline model, indicating that the state fixed effects are related to each of the three components of the personal-bankruptcy cycle. Specifically, Model III yields smaller increases in bankruptcy rates during recessions, higher bankruptcy rates during recoveries, and a stronger link between recession length and the bounce-back effect.

If we had estimated Model IV, we would have missed much of the bounce-back effect. Specifically, the middle panel of Figure 11 shows that this model suggests a faster return to normal during recoveries and the entire bounce-back effect is captured by these coefficients. Because Model IV does not allow for the differences in the length of the recession to affect what happens during the recovery, the estimated bounce-back that it provides is something like the average across the span of recession lengths in our sample. It therefore misses the large differences in bounce-back across recessions of different lengths.

We have also estimated the baseline model with additional restrictions on the error terms. Recall that Model I allows for state-specific autocorrelation and state-specific heteroskedasticity that is correlated across states. The effects of not allowing for these error structures are summarized in an appendix, which provides a table with the results for versions of Model I that have no autocorrelation, no heteroskedasticity, and neither autocorrelation nor heteroskedasticity. The appendix also includes a figure illustrating the effects of these restrictions on our point estimates. Suffice it to say that the restrictions have effects that are similar in magnitude to those discussed above for restrictions on the specification.

8. Summary and Conclusions

By using recessionary periods to capture the persistence of weak labor markets, we have estimated a personal-bankruptcy cycle that is related to the business cycle. Bankruptcy rates are significantly higher than normal during recessions and rise as recessions persist. Even after recessions end, there is a hangover whereby bankruptcy rates begin to fall but remain above normal for several more quarters. The longer the recession, the faster is the return to normal. Recovery periods see a strong bounce-back effect whereby bankruptcy rates are significantly below normal for several quarters before returning to normal. The more severe the preceding recession, the deeper is this bounce-back.

Although there are numerous studies that have explored the relationship between local labor-market conditions and personal-bankruptcy decisions, there is little consensus

regarding the strength of this relationship. Our results suggest that nonstrategic considerations can matter a great deal in personal-bankruptcy decisions, at least when weak labor markets are endemic and persistent. This is very far from saying that strategic considerations are not important, however. In fact, ongoing trends, which capture everything that happens over time except for recessions, explain a larger share of the changes in bankruptcy rates during recessions than does our model of the personal-bankruptcy cycle.

Appendix. Regression Results with Alternative Error Structures

		Model I		Model IA		Model IB		Model IC	
Recession Quarter	1	0.019	(0.003)*	0.001	(0.003)	0.031	(0.009)*	-0.006	(0.015)
	2	0.032	(0.004)*	0.023	(0.003)*	0.051	(0.011)*	0.024	(0.015)
	3	0.056	(0.005)*	0.056	(0.003)*	0.084	(0.012)*	0.056	(0.015)*
	4	0.081	(0.006)*	0.089	(0.004)*	0.116	(0.014)*	0.092	(0.016)*
	5	0.080	(0.007)*	0.089	(0.004)*	0.118	(0.015)*	0.095	(0.017)*
	6	0.084	(0.007)*	0.102	(0.004)*	0.127	(0.015)*	0.107	(0.017)*
	7	0.098	(0.008)*	0.123	(0.004)*	0.141	(0.016)*	0.123	(0.018)*
	8	0.110	(0.008)*	0.141	(0.004)*	0.162	(0.017)*	0.143	(0.019)*
	9	0.127	(0.009)*	0.152	(0.005)*	0.184	(0.018)*	0.164	(0.020)*
	10	0.115	(0.009)*	0.146	(0.005)*	0.158	(0.019)*	0.148	(0.021)*
	11	0.119	(0.010)*	0.145	(0.005)*	0.167	(0.021)*	0.152	(0.024)*
	12	0.130	(0.010)*	0.145	(0.005)*	0.181	(0.022)*	0.149	(0.026)*
	13	0.129	(0.011)*	0.134	(0.006)*	0.189	(0.025)*	0.153	(0.030)*
	14	0.118	(0.015)*	0.102	(0.011)*	0.181	(0.035)*	0.110	(0.050)*
	15	0.085	(0.017)*	0.055	(0.012)*	0.131	(0.042)*	0.040	(0.053)
	16	0.116	(0.017)*	0.071	(0.012)*	0.176	(0.045)*	0.076	(0.054)
	17	0.058	(0.019)*	0.030	(0.014)*	0.113	(0.050)*	0.009	(0.058)
	18	0.036	(0.020)	-0.002	(0.015)	0.100	(0.051)*	0.004	(0.064)
	19	-0.034	(0.021)	-0.020	(0.016)	0.032	(0.056)	0.001	(0.073)
Recovery Quarter	1	0.065	(0.008)*	0.113	(0.007)*	0.093	(0.022)*	0.125	(0.034)*
	2	0.099	(0.009)*	0.134	(0.007)*	0.129	(0.027)*	0.147	(0.037)*
	3	0.092	(0.011)*	0.108	(0.009)*	0.125	(0.030)*	0.129	(0.039)*
	4	0.037	(0.012)*	0.063	(0.009)*	0.049	(0.033)	0.072	(0.040)
	5	0.055	(0.013)*	0.085	(0.009)*	0.069	(0.034)*	0.087	(0.041)*
	6	0.038	(0.013)*	0.045	(0.009)*	0.055	(0.035)	0.056	(0.043)
	7	0.030	(0.014)*	0.024	(0.011)*	0.038	(0.039)	0.034	(0.050)
	8	-0.037	(0.015)*	-0.063	(0.011)*	-0.036	(0.041)	-0.069	(0.051)
	9	-0.012	(0.015)	-0.058	(0.012)*	0.000	(0.041)	-0.041	(0.051)
	10	-0.035	(0.015)*	-0.117	(0.012)*	-0.045	(0.041)	-0.127	(0.051)*
	11	-0.065	(0.013)*	-0.157	(0.012)*	-0.082	(0.038)*	-0.182	(0.051)*
	12	-0.078	(0.010)*	-0.179	(0.012)*	-0.109	(0.031)*	-0.245	(0.052)*
Recession-Length Interaction	1	0.003	(0.001)*	0.000	(0.001)	0.004	(0.003)	-0.001	(0.004)
	2	-0.003	(0.001)*	-0.004	(0.001)*	-0.002	(0.003)	-0.006	(0.004)
	3	-0.002	(0.001)	-0.003	(0.001)*	-0.002	(0.003)	-0.004	(0.004)
	4	0.001	(0.001)	-0.001	(0.001)	0.003	(0.004)	-0.001	(0.004)
	5	-0.004	(0.001)*	-0.007	(0.001)*	-0.003	(0.004)	-0.007	(0.005)
	6	-0.006	(0.002)*	-0.008	(0.001)*	-0.006	(0.004)	-0.008	(0.005)
	7	-0.010	(0.002)*	-0.013	(0.001)*	-0.012	(0.005)*	-0.015	(0.007)*
	8	-0.003	(0.002)	-0.004	(0.001)*	-0.006	(0.005)	-0.005	(0.007)
	9	-0.005	(0.002)*	-0.006	(0.001)*	-0.010	(0.006)	-0.009	(0.007)
	10	-0.004	(0.002)*	-0.003	(0.001)*	-0.007	(0.005)	-0.004	(0.007)
	11	0.001	(0.002)	0.003	(0.001)	-0.001	(0.005)	0.002	(0.007)
	12	0.005	(0.001)*	0.008	(0.001)*	0.005	(0.004)	0.009	(0.007)
Quarter Dummies	Q2	0.055	(0.004)*	0.051	(0.006)*	0.054	(0.003)*	0.052	(0.007)*
	Q3	-0.011	(0.005)*	-0.016	(0.006)*	-0.013	(0.003)*	-0.015	(0.007)*
	Q4	-0.032	(0.004)*	-0.032	(0.006)*	-0.031	(0.003)*	-0.030	(0.007)*
Heteroskedasticity		correlated state-specific		correlated state-specific		none		none	
AR(1) Structure		state-specific		none		state-specific		none	

The dependent variable is the log of the state personal-bankruptcy rate and data are quarterly for 1988.2-2004.4. The numbers in parentheses are standard errors and an "*" indicates statistical significance at the 5% level. All estimates are obtained using Feasible Generalized Least Squares.

Appendix
Comparing Various Error Structures
% Difference in Bankruptcy Rate

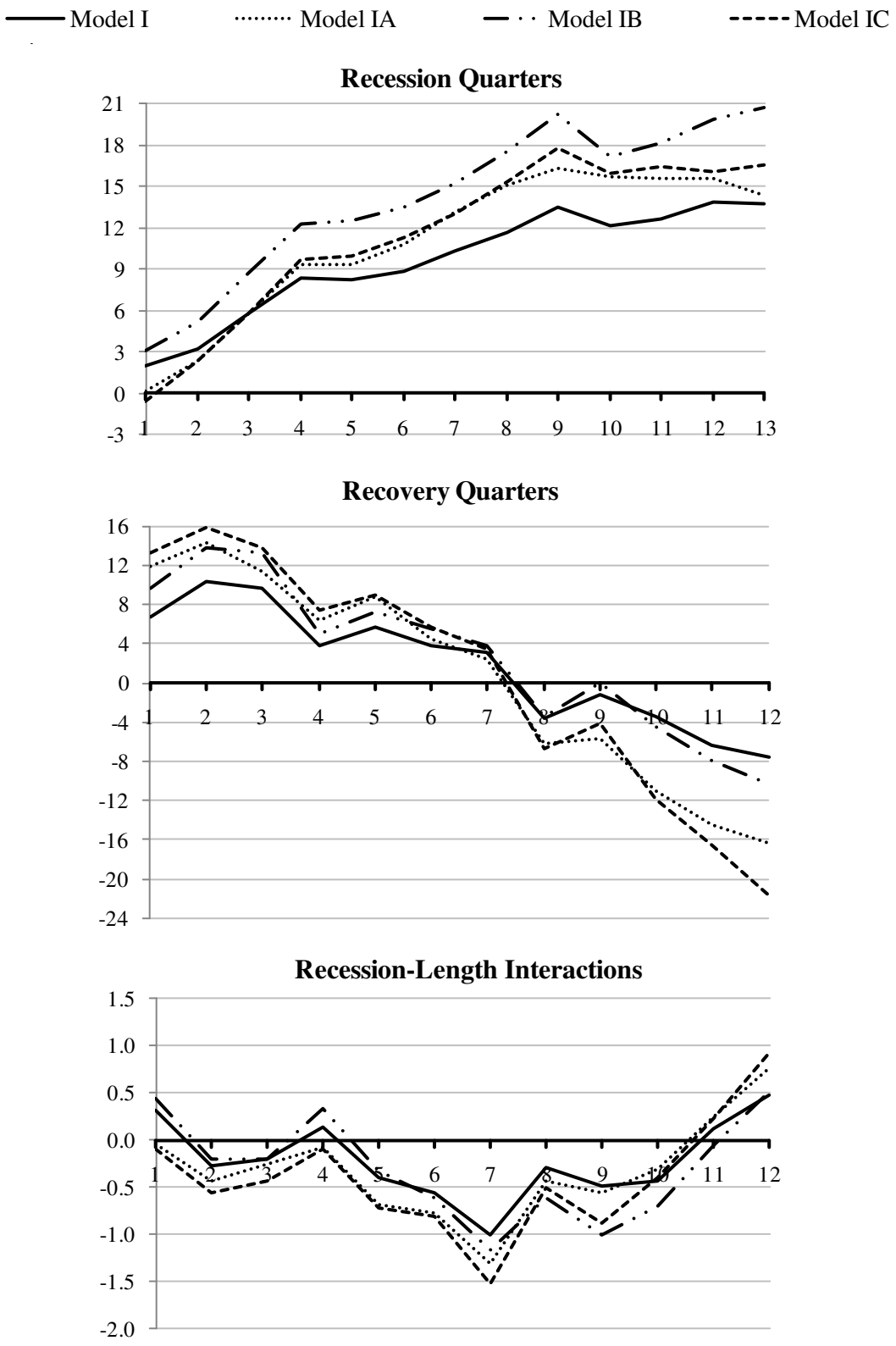

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Table 1. Regression Results with Alternative Specifications

		Model I		Model II		Model III		Model IV	
Recession Quarter	1	0.019	(0.003)*	0.018	(0.003)*	0.012	(0.003)*	0.021	(0.003)*
	2	0.032	(0.004)*	0.030	(0.005)*	0.026	(0.005)*	0.035	(0.004)*
	3	0.056	(0.005)*	0.053	(0.005)*	0.045	(0.005)*	0.061	(0.005)*
	4	0.081	(0.006)*	0.074	(0.006)*	0.065	(0.006)*	0.088	(0.006)*
	5	0.080	(0.007)*	0.072	(0.007)*	0.060	(0.007)*	0.087	(0.007)*
	6	0.084	(0.007)*	0.079	(0.008)*	0.065	(0.008)*	0.091	(0.007)*
	7	0.098	(0.008)*	0.096	(0.008)*	0.077	(0.008)*	0.102	(0.007)*
	8	0.110	(0.008)*	0.109	(0.008)*	0.088	(0.008)*	0.113	(0.008)*
	9	0.127	(0.009)*	0.125	(0.009)*	0.101	(0.009)*	0.127	(0.008)*
	10	0.115	(0.009)*	0.113	(0.009)*	0.086	(0.009)*	0.113	(0.008)*
	11	0.119	(0.010)*	0.118	(0.010)*	0.089	(0.010)*	0.119	(0.008)*
	12	0.130	(0.010)*	0.129	(0.011)*	0.097	(0.011)*	0.124	(0.008)*
	13	0.129	(0.011)*	0.128	(0.011)*	0.096	(0.011)*	0.124	(0.008)*
	14	0.118	(0.015)*	0.126	(0.016)*	0.089	(0.015)*	0.110	(0.012)*
	15	0.085	(0.017)*	0.098	(0.018)*	0.054	(0.017)*	0.079	(0.013)*
	16	0.116	(0.017)*	0.126	(0.018)*	0.078	(0.017)*	0.108	(0.014)*
	17	0.058	(0.019)*	0.072	(0.020)*	0.024	(0.019)	0.054	(0.016)*
	18	0.036	(0.020)	0.068	(0.021)*	0.018	(0.020)*	0.029	(0.018)*
	19	-0.034	(0.021)	0.015	(0.022)*	-0.043	(0.022)*	-0.036	(0.019)*
Recovery Quarter	1	0.065	(0.008)*	0.058	(0.008)*	0.070	(0.008)*	0.093	(0.006)*
	2	0.099	(0.009)*	0.087	(0.009)*	0.105	(0.009)*	0.079	(0.006)*
	3	0.092	(0.011)*	0.084	(0.011)*	0.103	(0.011)*	0.078	(0.006)*
	4	0.037	(0.012)*	0.031	(0.012)*	0.062	(0.012)*	0.053	(0.007)*
	5	0.055	(0.013)*	0.048	(0.012)*	0.093	(0.013)*	0.026	(0.007)*
	6	0.038	(0.013)*	0.032	(0.013)*	0.081	(0.014)*	0.000	(0.007)
	7	0.030	(0.014)*	0.026	(0.014)	0.075	(0.015)*	-0.039	(0.008)*
	8	-0.037	(0.015)*	-0.049	(0.015)*	0.003	(0.016)	-0.057	(0.008)*
	9	-0.012	(0.015)	-0.017	(0.015)	0.033	(0.015)*	-0.045	(0.008)*
	10	-0.035	(0.015)*	-0.037	(0.014)*	0.009	(0.015)	-0.065	(0.008)*
	11	-0.065	(0.013)*	-0.061	(0.013)*	-0.031	(0.013)*	-0.060	(0.007)*
	12	-0.078	(0.010)*	-0.076	(0.010)*	-0.063	(0.010)*	-0.046	(0.005)*
Recession-Length Interaction	1	0.003	(0.001)*	0.004	(0.001)*	0.000	(0.001)		
	2	-0.003	(0.001)*	-0.001	(0.001)	-0.005	(0.001)*		
	3	-0.002	(0.001)	-0.001	(0.001)	-0.005	(0.001)*		
	4	0.001	(0.001)	0.002	(0.001)	-0.003	(0.001)		
	5	-0.004	(0.001)*	-0.003	(0.001)*	-0.009	(0.002)*		
	6	-0.006	(0.002)*	-0.004	(0.001)*	-0.011	(0.002)*		
	7	-0.010	(0.002)*	-0.008	(0.002)*	-0.015	(0.002)*		
	8	-0.003	(0.002)	0.001	(0.002)	-0.006	(0.002)*		
	9	-0.005	(0.002)*	-0.003	(0.002)	-0.009	(0.002)*		
	10	-0.004	(0.002)*	-0.002	(0.002)	-0.008	(0.002)*		
	11	0.001	(0.002)	0.002	(0.002)	-0.002	(0.002)		
	12	0.005	(0.001)*	0.006	(0.001)*	0.004	(0.001)*		
Quarter Dummies	Q2	0.055	(0.004)*	0.055	(0.004)*	0.054	(0.004)*	0.056	(0.004)*
	Q3	-0.011	(0.005)*	-0.012	(0.005)*	-0.012	(0.005)*	-0.010	(0.005)*
	Q4	-0.032	(0.004)*	-0.029	(0.004)*	-0.029	(0.004)*	-0.030	(0.004)*
Quadratic Trend		State-specific		Common		State-specific		State-specific	
State Fixed Effects		Yes		Yes		No		Yes	

The dependent variable is the log of the state personal-bankruptcy rate and data are quarterly for 1988.2-2004.4. The numbers in parentheses are standard errors and an "*" indicates statistical significance at the 5% level. All estimates are obtained using Feasible Generalized Least Squares.

Figure 1
Shaded areas indicate NBER Recessions

U.S. Quarterly Personal Bankruptcies Per 1,000; 1980-2009

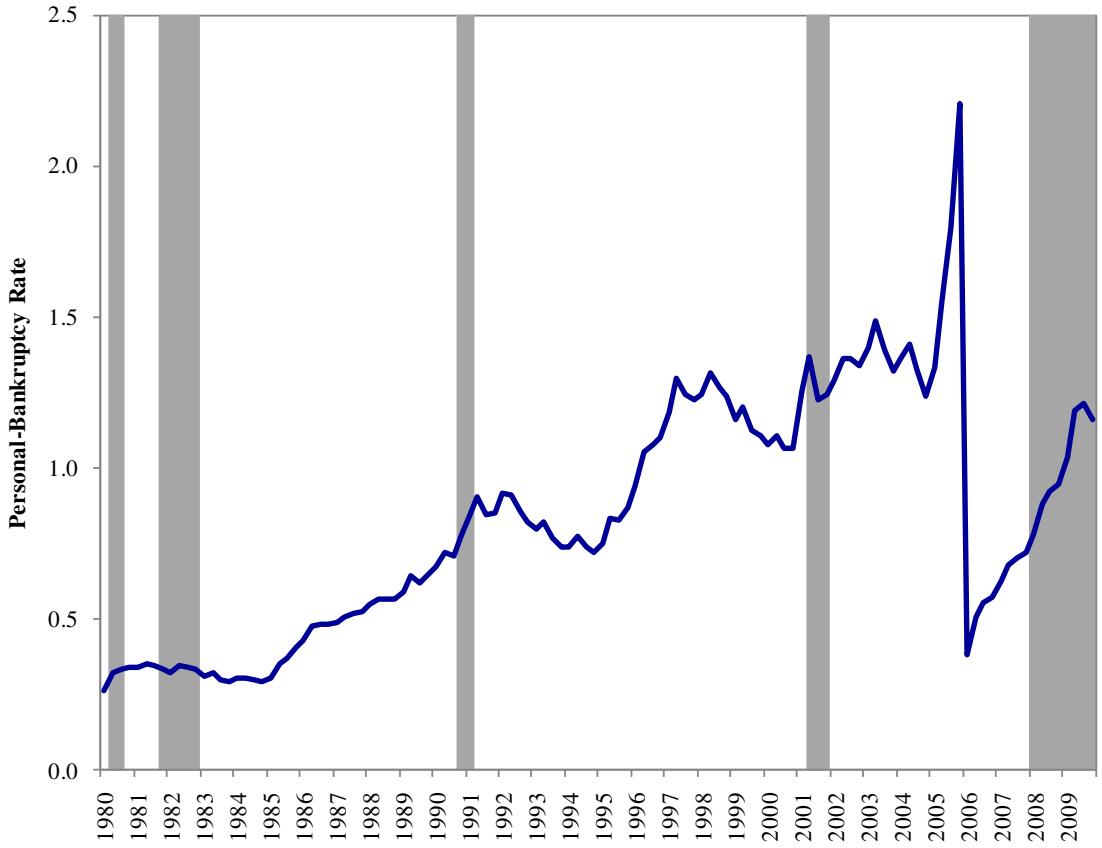


Figure 2

State Labor-Market Recession Dates, 1988-1994 and 1998-2004

(Shaded Area Indicates a National Labor-Market Recession)

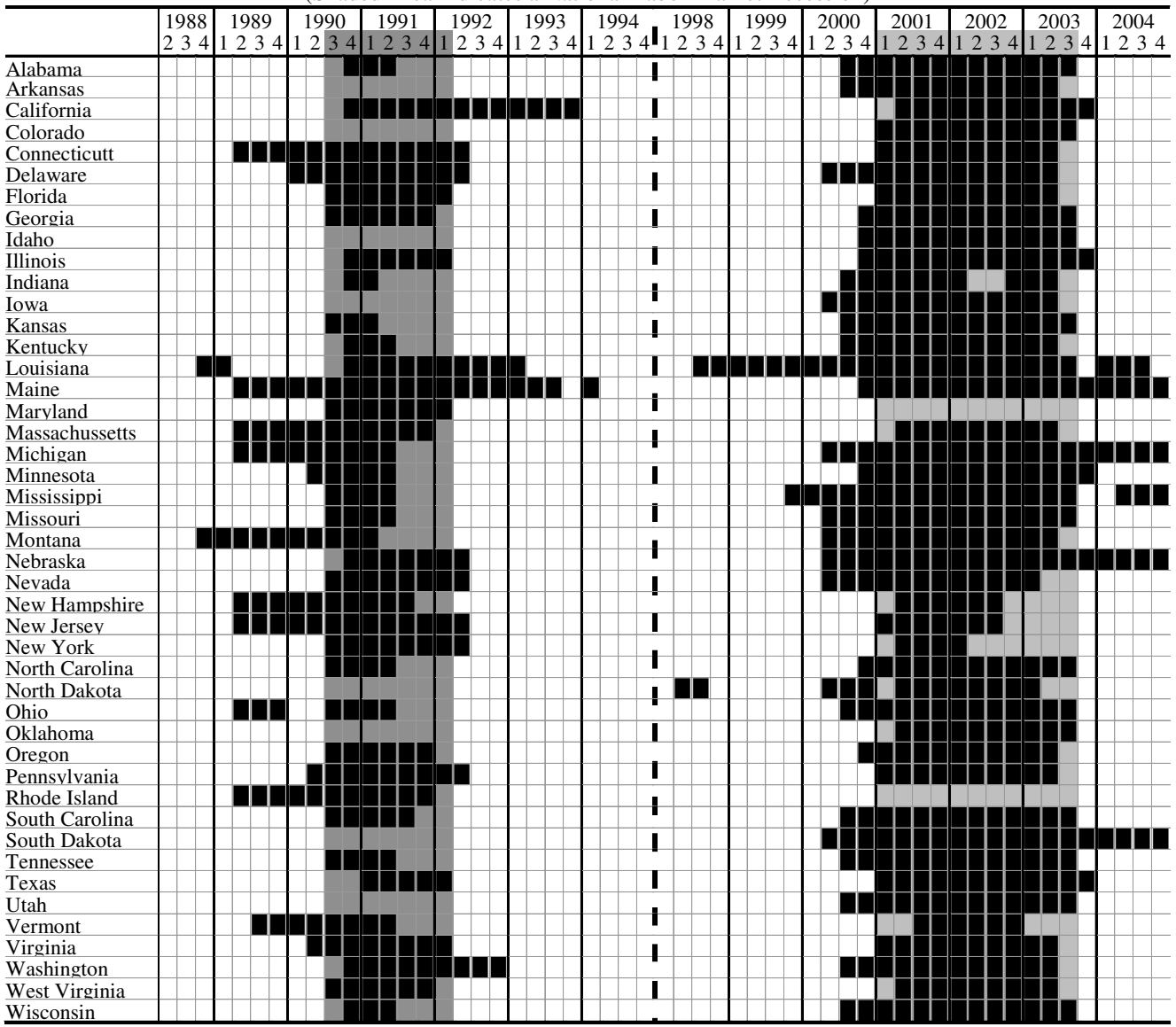


Figure 3

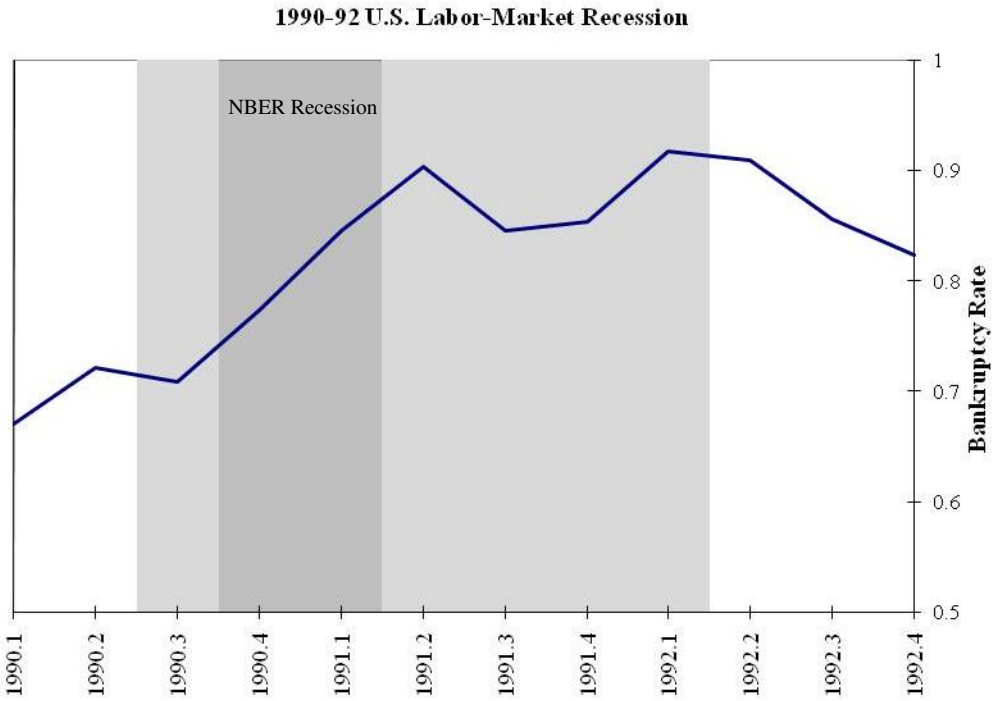


Figure 4

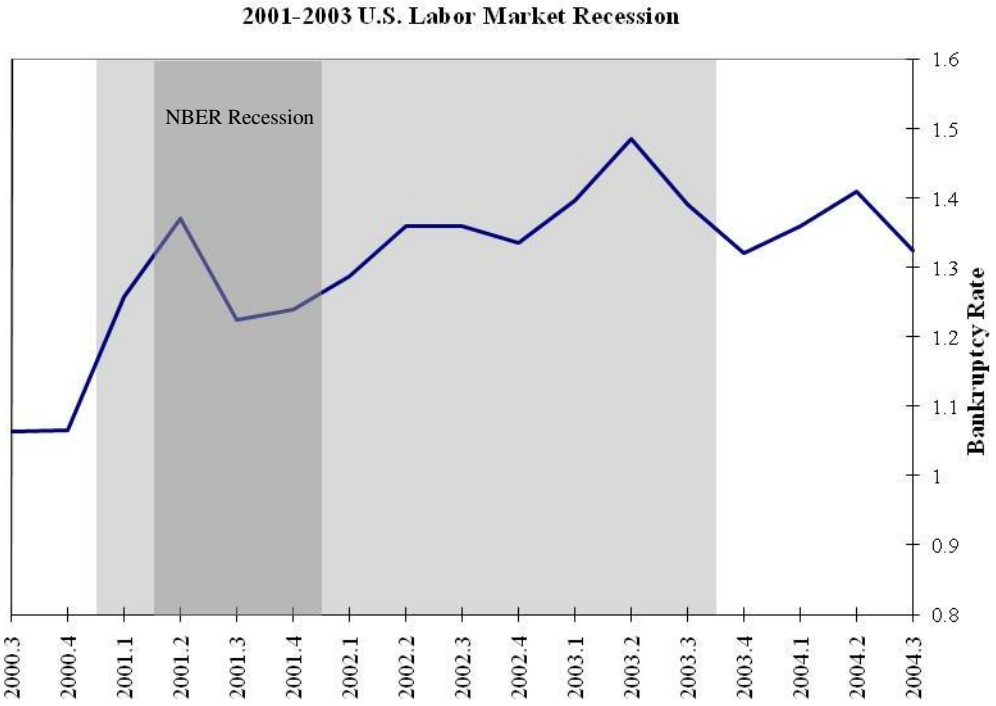
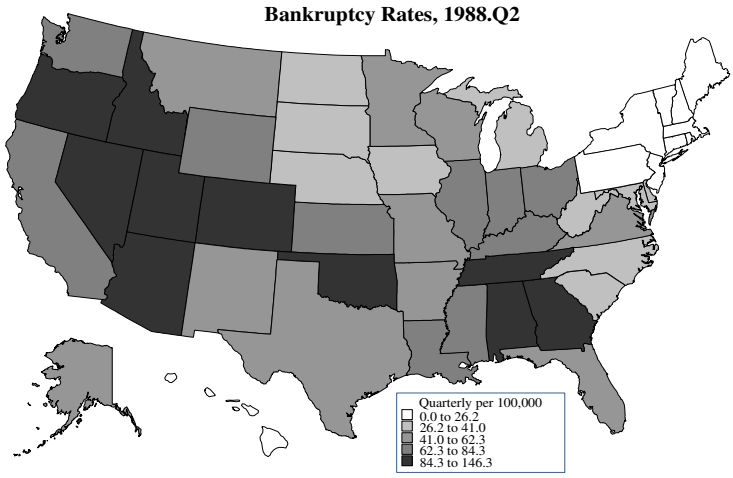
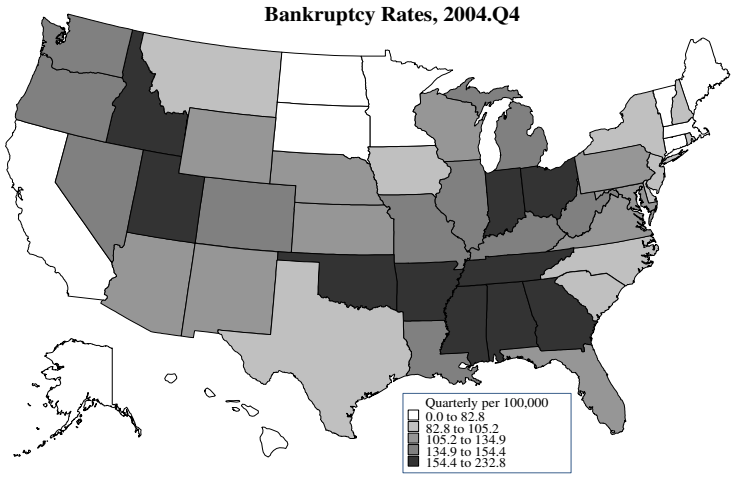


Figure 5
Bankruptcy Rates across the States,
1988-2004





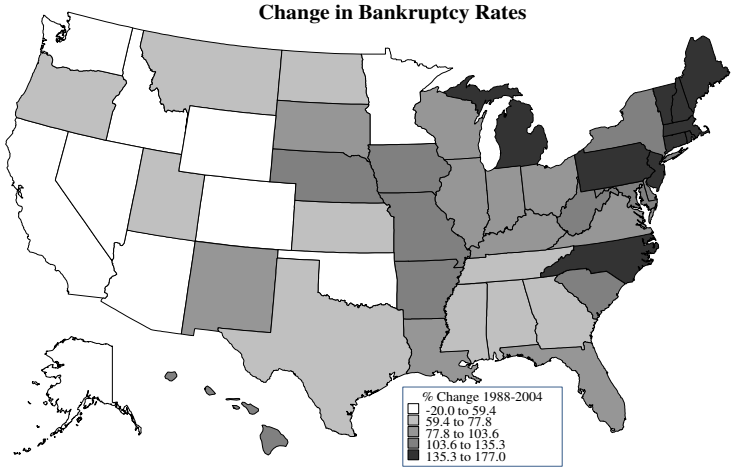


Figure 6
Model I Percent Differences in Bankruptcies
with Confidence Intervals

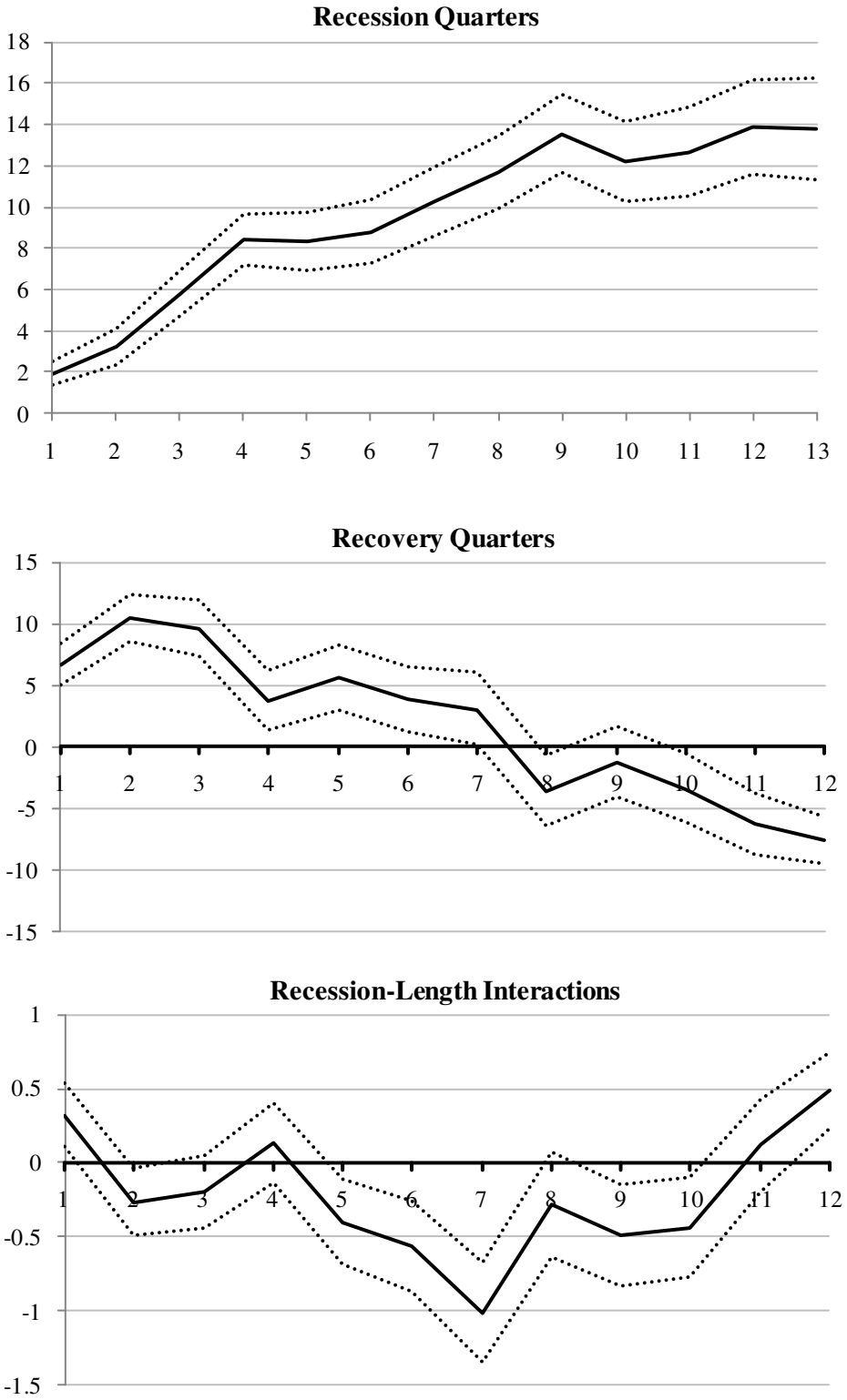


Figure 7

Percent Difference in Bankruptcy Rate During Recovery
Conditional on the Length of the Recession

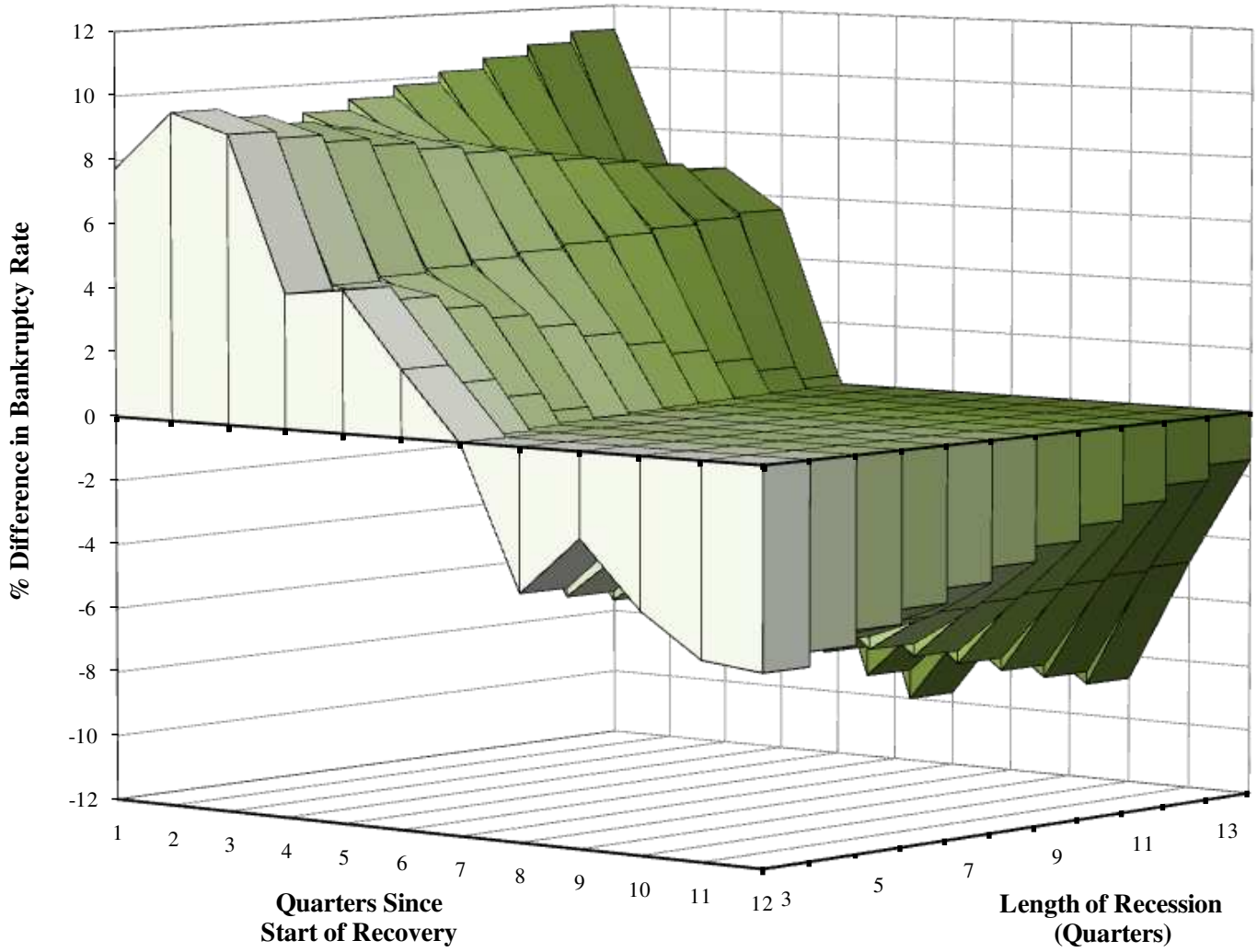


Figure 8

Percent Difference in Bankruptcy Rate During Recession and Recovery, 1988-2004
Conditional on the Length of the Recession

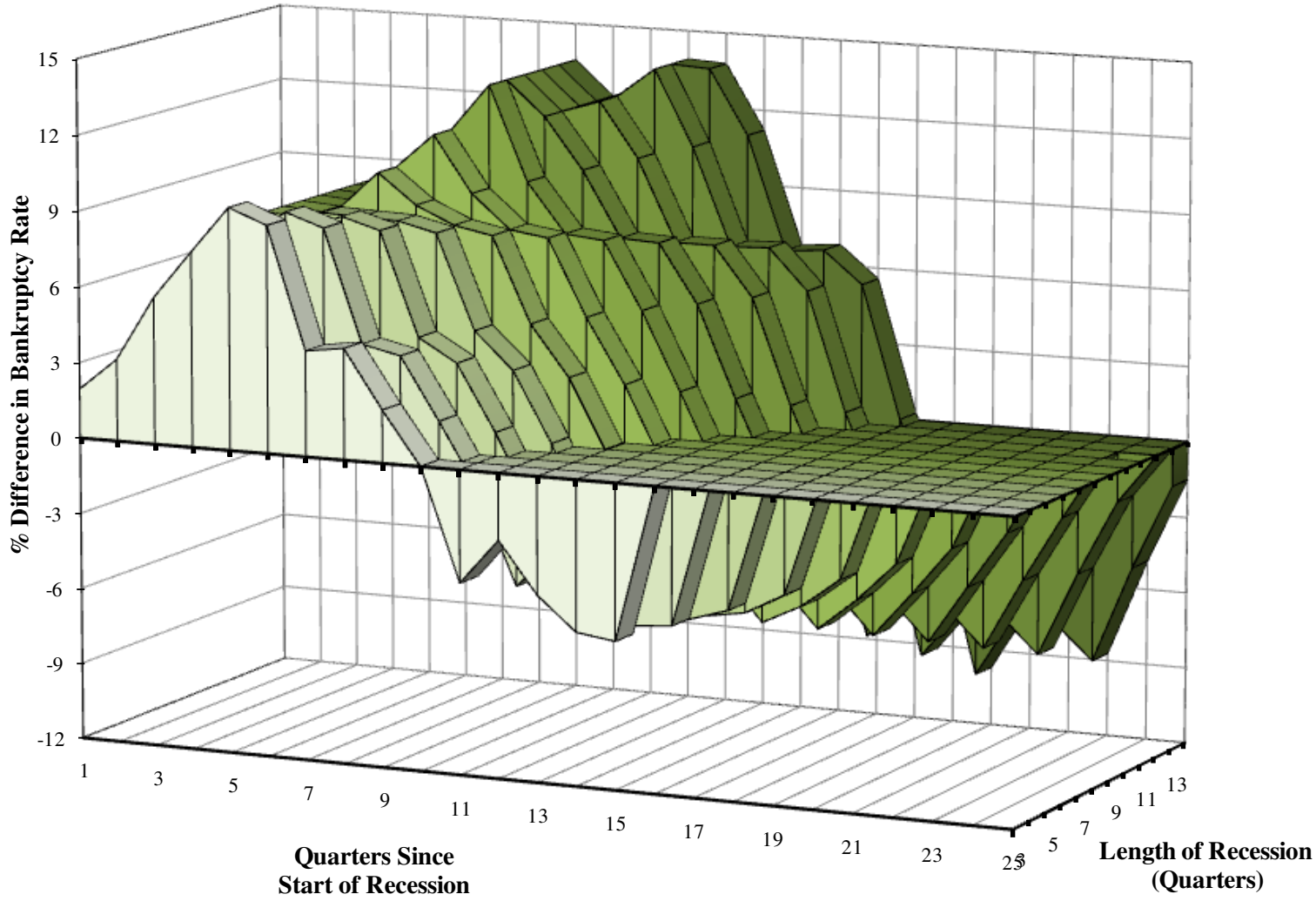


Figure 9

Average Effect of the Bankruptcy Cycle on State Bankruptcy Rates

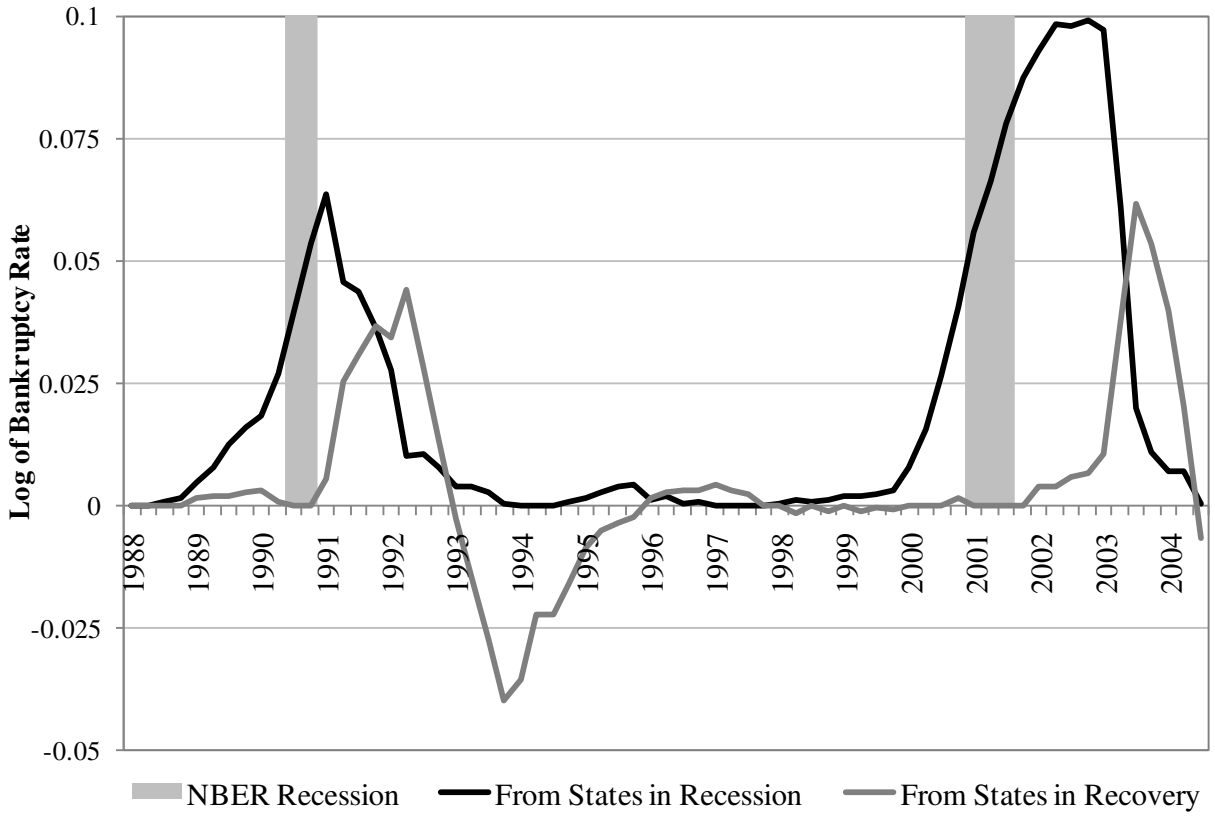


Figure 10

Bankruptcy Rate with the Bankruptcy Cycle Removed

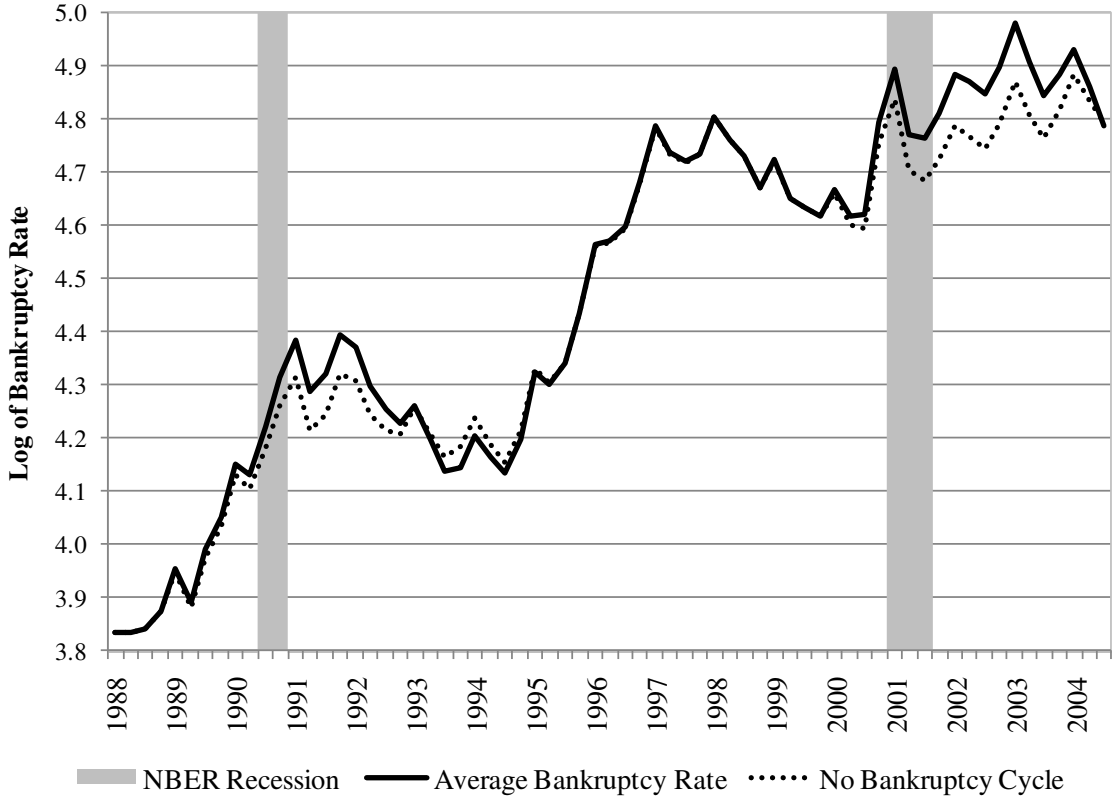


Figure 11
Model Comparisons in Percentages