Insolvency After the 2005 Bankruptcy Reform

ONLINE APPENDIX

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In this online appendix, we report a number of auxiliary results based on individual and district level data, in support of various components of the analysis discussed in the paper. Most of the analysis consists in relating the incidence of new delinquency, Chapter 7 and Chapter 13 bankruptcy filings and foreclosure to dummies relating to BAPCPA, district level fixed effects, interactions between district effects and the BAPCPA dummies, a large set of time varying zip code level demographic and economic controls, and individual controls when available. The regression equation corresponds to equation (2) in the paper. We consider four dummies indicating various periods around BAPCPA:

1. Post-Reform: equal to 1 if $t \geq 2005Q4$ and 0 otherwise

2. Anticipation: equal to 1 if $t \in \{2005Q2, 2005Q3\}$ and 0 otherwise

3. Pre-Recession: equal to 1 if $t \in [2005Q4, 2006Q4]$ and 0 otherwise

4. Credit Slump: equal to 1 if $t \geq 2007Q1$ and 0 otherwise

The time varying zip code level controls include IRS personal income, Corelogic house price index, unemployment rate, share white, share black, share with less than 9th grade, share 9th-12th grade, share high graduates, share some college, share associate's degree, share bachelors degree, and the share of urban population, obtained from the Census.

1 Incidence of New Spells of Financial Distress

We use individual level Experian data to document the incidence of new delinquencies before and after BAPCPA.

We estimate a regression in which the dependent variable is the fraction of individuals with a new 90 day or more delinquency after 4 quarters with no delinquencies, foreclosures,

bankruptcies or collections. This notion of new delinquency is slightly broader than the new insolvency definition we use in the main text due to data limitations, but similarly captures the onset of a new spell of financial distress. In addition to the zip code level controls previously described, district level fixed effects, reform dummies and interactions, we also include individual level controls, including a borrower's total debt balances, their total monthly payment on debt, their total number of inquiries in the last quarter. The estimates for the reform dummy and the individual level controls are reported in Table 1. Each column corresponds to a specification in which a different reform dummy is used. Column (1) includes the Post-Reform dummy, while column (2) separately includes the Anticipation dummy and the two dummies for the post reform periods. The average new delinquency rate is about 18% prior to BAPCPA. The estimates suggest that without separately considering the Anticipation phase, the new delinquency rate is approximately 0.5 percentage points lower after BAPCPA. However, including the Anticipation dummy and separating the two phases of the post reform period, reveals that the new delinquency rate is approximately 0.2 percentage points lower in the Anticipation phase but virtually unchanged in the post-reform period. Even when the estimated coefficients are statistically significant, the small magnitude of the implied differences in the new delinquency rate after the reform suggests that BAPCPA had little impact on the incidence of new delinquency. We also find that a higher Vantage Score is associated with a lower new delinquency rate, with a 50 point increase in the Vantage Score reducing the new delinquency rate by approximately 1 percentage point. Higher household income is associated with a higher new delinquency rate, though the magnitude of this effect is very small. The other individual controls are not significant.

These results suggest that incidence of new spells of financial distress as captured by the onset of a new delinquency did not respond to BAPCPA, and the relation between possible individual drivers of delinquency, such as income, monthly debt payments, total balances, credit score and inquiries, was also stable around the return. This is consistent with a stable selection of borrowers into new spells of financial distress prior and after BAPCPA.

2　Unconditional Transitions

We now examine the patterns driving the BAPCPA related changes in conditional transitions to bankruptcy by chapter, new delinquency and foreclosure. While the focus of our analysis is the resolution of new spell of financial distress, as captured by the conditional transitions examined in detail in the paper, we examine the behavior of unconditional transitions to corroborate our main analysis. We also repeat the analysis below with zip code level data. Since the zip code level results are broadly consistent with the district level results, we omit them for brevity.

2.1　Change in Attorney Fees

We first examine the relation between the BAPCPA related change in the unconditional transitions and the change in attorney fees. Using district level data, we regress the district-tXreform dummy interactions on the district level log change in Chapter 7 and Chapter 13

Table 1: New Delinquency Rate

	(1)	(2)
	(1)	(2)
Constant	0.185 ***	0.181***
	(58.91)	(60.80)
Post-Reform	-0.00439 ***	
	(-54.22)	
Anticipation		-0.00207***
		(-6.42)
Pre-Recession		-0.000179
		(-0.66)
Credit Slump		0.000366
		(1.23)
Vantage Score	-0.000224 ***	-0.000224***
	(-86.75)	(-86.72)
Income	0.00000184 ***	0.00000184***
	(9.47)	(9.47)
Balance	1.29E-09	1.33E-09
	(1.60)	(1.65)
Monthly Payment	7.27E-09	7.22E-09
	(1.59)	(1.58)
Inquiries	0.0000789	0.0000708
	(1.22)	(1.09)
Observations	10422574	10422574
R^2	0.03	0.03
Adjusted R^2	0.03	0.03

Selected estimates for individual level regressions of the new delinquency on individual level controls, zip code level time varying demographic and economic controls, district fixed effects, various versions of the BAPCPA dummy and interactions between the dummy and district fixed effects. T-statistics in parentheses, robust standard errors, $***p < 0.01$. Source: Author's calculations based on Experian Data.

attorney fees and the square of the log change. We adopt a quadratic specification since the scatter plots of the district level change in the outcome of interest and the change in fees show a non-linear relation in most cases. The estimates are displayed in Tables 2-5.

Table 2 reports the estimates for Chapter 7. The district level change in Chapter 7 bankruptcies only shows a statistically significant relation with the change in Chapter 7 fees in the entire Post-Reform period. Given the quadratic specification, the relation is best displayed graphically, so we plot the implied relation between the change in Chapter 7 fees and the change in Chapter 7 bankruptcies in figure 1. The figure shows that the relation between the change in Chapter 7 fees and the change in Chapter 7 bankruptcy filing rates is non-monotonic. For negative fee changes there is a positive relation, while there is a negative relation for positive fee changes. The magnitude of the relation is sizable with a 0.3 log points change in fees- which is close to the median change- from zero corresponding to a 0.0025 log point variation in the dependent variable. There is no relation between the change in Chapter 7 fees and the change in Chapter 7 bankruptcies in any of the sub periods and no relation with the change in Chapter 13 fees.

Table 2: Relation to Change in Fees: New Chapter 7 Bankruptcies

	(1) Post-Reform	(2) Anticipation	(3) Pre-Recession	(4) Credit Slump
Change in Log Ch 7 Fees	0.0145**	0.00245	0.0122	0.0117
	(2.16)	(0.34)	(1.06)	(1.44)
Square of	-0.0254**	-0.00420	-0.0201	-0.0201
	(-2.33)	(-0.45)	(-1.33)	(-1.63)
Change in Log Ch 13 Fees	-0.0109	-0.00489	-0.00926	-0.00273
	(-1.06)	(-0.98)	(-1.27)	(-0.24)
Square of	0.0139	0.00638	0.0115	0.00554
	(1.06)	(1.01)	(1.32)	(0.37)
Constant	-0.00402*	-0.00599***	-0.00923***	-0.00427*
	(-1.93)	(-4.38)	(-4.42)	(-1.83)
Observations	89	89	89	89
R^2	0.042	0.012	0.042	0.021
Adjusted R^2	-0.004	-0.036	-0.003	-0.025

Dependent variable is the districtXreform interactions from district level regressions with district level time varying economic controls. T-statistics in parentheses, robust standard errors. $*p < 0.10, **p < 0.05, ***p < 0.01$. Source: Author's calculations based on Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.

We perform the same analysis for Chapter 13. The estimation results are presented in Table 3 and displayed graphically in figure 1. There is a statistically significant relation only

in the Post-Reform and Credit Slump periods and only with Chapter 13 fees. The estimates for the two sub periods are nearly identical and they point to a non-monotonic relation between the change in Chapter 13 fees and the variation in the change in Chapter 13 filings, which is positive for changes in fees below 0.45 log points and negative for larger changes in fees. This implies that for the bottom 80% of the realized change in fees, an increase in fees corresponds to an increase in Chapter 13 bankruptcies. The magnitude of the relation is sizable with a 0.3 log points change in fees from zero corresponding to a 0.0025 log point variation in the dependent variable.

Table 3: Relation to Change in Fees: New Chapter 13 Bankruptcies

	(1) Post-Reform	(2) Anticipation	(3) Pre-Recession	(4) Credit Slump
Change in Log Ch 7 Fees	-0.00416	-0.00121	0.000465	-0.00385
	(-0.53)	(-0.31)	(0.07)	(-0.66)
Square of	0.00175	0.00552	0.00297	0.000139
	(0.15)	(0.97)	(0.31)	(0.02)
Change in Log Ch 13 Fees	0.0139***	0.00243	0.00493	0.0132***
	(2.87)	(1.06)	(1.50)	(2.89)
Square of	-0.0157**	-0.00372	-0.00696*	-0.0144*
	(-2.00)	(-1.32)	(-1.74)	(-1.87)
Constant	-0.0118***	-0.00332***	-0.00600***	-0.0106***
	(-9.03)	(-4.72)	(-5.25)	(-10.20)
Observations	89	89	89	89
R^2	0.074	0.064	0.042	0.088
Adjusted R^2	0.030	0.019	-0.003	0.045

Dependent variable is the districtXreform interactions from district level regressions with district level time varying economic controls. T-statistics in parentheses, robust standard errors. $*p < 0.10, **p < 0.05, ***p < 0.01$. Source: Author's calculations based on Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.

For new delinquencies, we find that there is a statistically significant relation with the change in Chapter 13 fees in the Anticipation phase and the change in Chapter 7 fees in the Pre-Recession phase. The estimated relation is plotted in figure 2. New delinquencies in the Pre-Recession phase increase with the change in Chapter 7 fees for changes smaller than approximately 0.35 log points and decrease for higher changes, though the magnitude of the relation is very small. New delinquencies in the Anticipation phase decrease with the change in Chapter 13 fees for changes smaller than approximately 0.45, and then rise. Once again, the magnitude is too small to reflect an economically significant relation. We also find that there is no statistically significant relation between the change in fees and the change
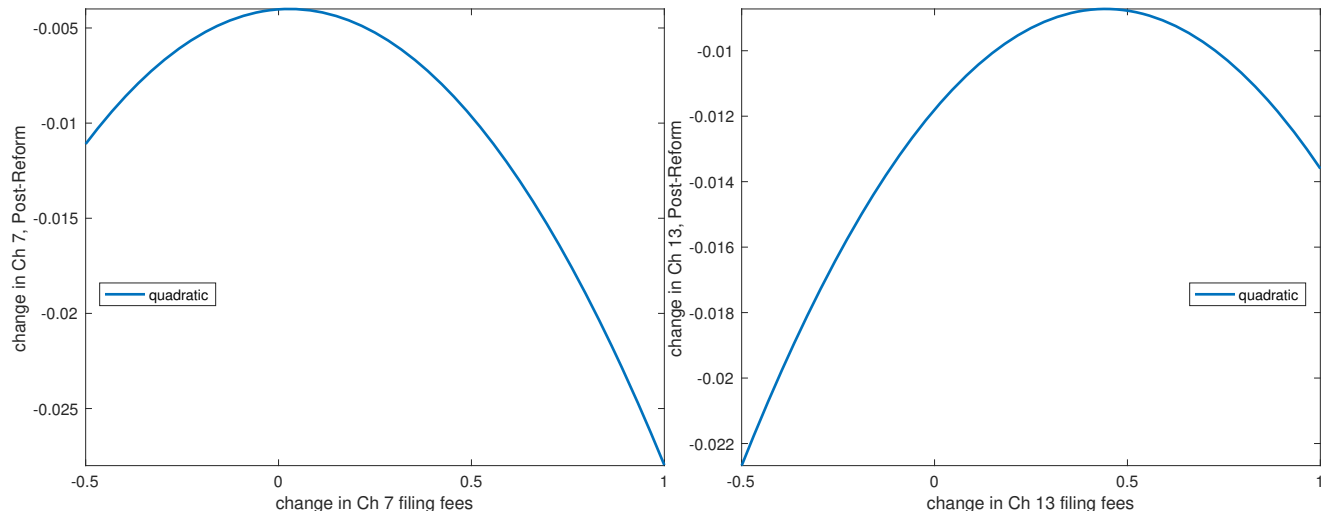
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Figure 1: Estimated relation with change in filing fees. Source: Author's calculation based on FRBNY CCP/Equifax Data.

in foreclosures rates in any period.

Taken together, these results confirm that a rise in Chapter 7 fees is primarily associated with a decline in Chapter 7 bankruptcies. For changes in Chapter 13 fees that are small enough Chapter 13 bankruptcies respond positively to a change in Chapter 13 fees, but negatively for higher changes. This is consistent with the notion that Chapter 13 filers are typically positively selected relative to Chapter 7 filers, and Chapter 13 filings are less sensitive to cost.

2.2 Substitution From Bankruptcy

We next consider substitution from bankruptcy filing. For new delinquency rates, we find a significant negative relation between the change in Chapter 7 filing rates and the change in Chapter 13 filing rates for the Post-Reform and Credit Slump periods. The estimated coefficients suggest that a 0.25 log point decline in Chapter 7 corresponds to a 0.002 rise in new delinquencies in the Post-Reform period. The elasticity is about twice as large for Chapter 13 than for Chapter 7. We also find a positive and significant relation between the change in new delinquency rates and the change in Chapter 7 filing rates in the Anticipation and Pre-Recession phases. The magnitude of the response in the Anticipation phase is about half as large is in the Post-Reform period, and negligibly small for the Pre-Recession period. We find a positive relation between the change in Chapter 7 bankruptcy rates and Chapter 13 bankruptcy rates, which suggests that district level factors not capture in the controls may be driving a rise in both rates. We also find a positive relation between the change in Chapter 7 and Chapter 13 bankruptcies and foreclosures, which is also consistent with common drivers of the change in these rates. We also consider a quadratic specification which we omit as it confirms the results from the linear regression.

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Table 4: Relation to Change in Fees: New Delinquencies

	(1) Post-Reform	(2) Anticipation	(3) Pre-Recession	(4) Credit Slump
Change in Log Ch 7 Fees	-0.00162	0.000253	0.00154***	-0.00176
	(-0.68)	(0.21)	(2.81)	(-0.76)
Square of	0.00251	-0.000284	-0.00279***	0.00285
	(0.78)	(-0.18)	(-3.74)	(0.93)
Change in Log Ch 13 Fees	-0.00144	-0.00163**	-0.000167	-0.00141
	(-0.97)	(-2.42)	(-0.36)	(-1.04)
Square of	0.000912	0.00199*	0.000329	0.000654
	(0.48)	(1.75)	(0.52)	(0.38)
Constant	0.00148***	0.000891***	-0.000266**	0.00148***
	(3.54)	(4.09)	(-2.19)	(3.68)
Observations	89	89	89	89
R^2	0.043	0.055	0.140	0.067
Adjusted R^2	-0.003	0.010	0.099	0.023

Dependent variable is the districtXreform interactions from district level regressions with district level time varying economic controls. T-statistics in parentheses. $*p < 0.10, **p < 0.05, ***p < 0.01$. Source: Author's calculations based on Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.
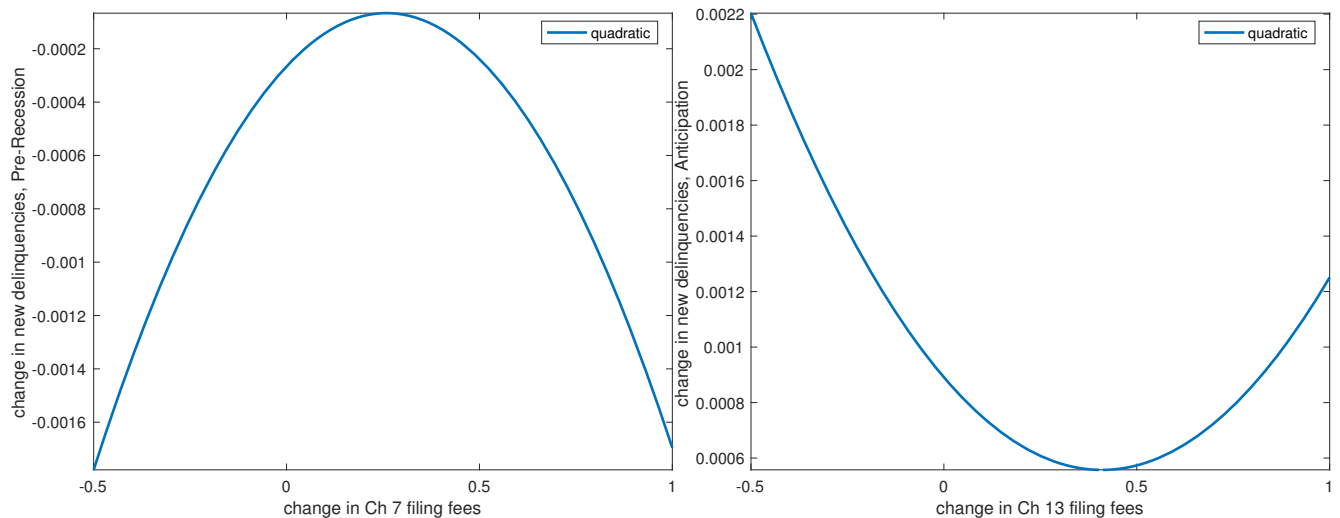

Figure 2: Estimated relation with change in filing fees. Source: Author's calculation based on FRBNY CCP/Equifax Data.

Table 5: Relation to Change in Fees: New Foreclosures

	(1) Post-Reform	(2) Anticipation	(3) Pre-Recession	(4) Credit Slump
Change in Log Ch 7 Fees	-0.00587	0.00427	0.00551	-0.00626
	(-0.44)	(0.55)	(0.74)	(-0.40)
Square of	0.00848	-0.00819	-0.00983	0.00986
	(0.52)	(-0.85)	(-1.03)	(0.51)
Change in Log Ch 13 Fees	0.00556	-0.000901	0.00110	0.00858
	(1.01)	(-0.27)	(0.33)	(1.09)
Square of	-0.00597	0.00230	0.000782	-0.00951
	(-0.77)	(0.51)	(0.17)	(-0.86)
Constant	0.000581	-0.00259*	-0.00340***	-0.000879
	(0.26)	(-1.98)	(-2.72)	(-0.32)
Observations	89	89	89	89
R^2	0.013	0.028	0.039	0.015
Adjusted R^2	-0.034	-0.018	-0.007	-0.032

Dependent variable is the districtXreform interactions from district level regressions with district level time varying economic controls. T-statistics in parentheses. $*p < 0.10, **p < 0.05, ***p < 0.01$. Source: Author's calculations based on Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.

These results broadly confirm a substitution from Chapter 7 bankruptcies to delinquency post BAPCPA. They also highlight how unconditional transitions may be driven by common district level economic factors, which lends support to the notion that changes in conditional transitions are a better measure of the impact of BAPCPA on default behavior.

Table 6: Relation to Change in Chapter 7 Bankruptcy: New Delinquency

	(1) Post-Reform	(2) Anticipation	(3) Pre-Recession	(4) Credit Slump
$\Delta Ch7$	-0.0848***			
	(-8.31)			
$\Delta Ch7$		0.0407***		
		(3.03)		
$\Delta Ch7$			0.0160**	
			(2.00)	
$\Delta Ch7$				-0.0622***
				(-6.51)
Constant	0.000653***	0.000981***	-0.0000179	0.000776***
	(6.55)	(9.44)	(-0.23)	(7.69)
Observations	89	89	89	89
R^2	0.410	0.099	0.058	0.263
Adjusted R^2	0.404	0.089	0.048	0.255

Dependent variable is the districtXreform interactions for new delinquency from district level regressions with district level time varying economic controls. Explanatory variable is the districtXreform interactions for Chapter 7 bankruptcy from district level regressions with district level time varying economic controls. T-statistics in parentheses, robust standard errors. $*p < 0.10, **p < 0.05, ***p < 0.01$. Source: Author's calculations based on Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.

Table 7: Relation to Change in Chapter 13 Bankruptcy: New Delinquency

	(1) Post-Reform	(2) Anticipation	(3) Pre-Recession	(4) Credit Slump
$\Delta Ch13$	-0.168***			
	(-6.45)			
$\Delta Ch13$		0.0175		
		(0.72)		
$\Delta Ch13$			0.0102	
			(0.62)	
$\Delta Ch13$				-0.136***
				(-6.52)
Constant	-0.000836***	0.000769***	-0.000116	-0.000371*
	(-2.79)	(9.45)	(-1.55)	(-1.75)
Observations	89	89	89	89
R^2	0.444	0.005	0.006	0.307
Adjusted R^2	0.437	-0.006	-0.006	0.299

Dependent variable is the districtXreform interactions for new delinquency bankruptcy from district level regressions with district level time varying economic controls. Explanatory variable is the districtXreform interactions for Chapter 13 bankruptcy from district level regressions with district level time varying economic controls. T-statistics in parentheses, robust standard errors. $*p < 0.10, **p < 0.05, ***p < 0.01$. Source: Author's calculations based on Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.

Table 8: Relation to Change in Chapter 7 Bankruptcy: Chapter 13 Bankruptcy

	(1) Post-Reform	(2) Anticipation	(3) Pre-Recession	(4) Credit Slump
$\Delta Ch7$	0.261***			
	(6.66)			
$\Delta Ch7$		0.303***		
		(9.53)		
$\Delta Ch7$			0.318***	
			(10.04)	
$\Delta Ch7$				0.270***
				(8.60)
Constant	-0.00987***	-0.000773**	-0.00195***	-0.00903***
	(-20.07)	(-2.39)	(-4.00)	(-21.43)
Observations	89	89	89	89
R^2	0.249	0.334	0.434	0.302
Adjusted R^2	0.241	0.327	0.427	0.294

Dependent variable is the districtXreform interactions for Chapter 13 bankruptcy from district level regressions with district level time varying economic controls. Explanatory variable is the districtXreform interactions for Chapter 7 bankruptcy from district level regressions with district level time varying economic controls. T-statistics in parentheses, robust standard errors. $*p < 0.10, **p < 0.05, ***p < 0.01$. Source: Author's calculations based on Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.

Table 9: Relation to Change in Chapter 7 Bankruptcy: Foreclosure

	(1) Post-Reform	(2) Anticipation	(3) Pre-Recession	(4) Credit Slump
$\Delta Ch7$	0.177***			
	(2.76)			
$\Delta Ch7$		0.533***		
		(8.40)		
$\Delta Ch7$			0.362***	
			(7.23)	
$\Delta Ch7$				0.484***
				(5.51)
Constant	0.00144**	0.00107***	0.000771*	0.00134
	(2.10)	(2.74)	(1.67)	(1.57)
Observations	89	89	89	89
R^2	0.067	0.553	0.514	0.295
Adjusted R^2	0.057	0.548	0.508	0.287

Dependent variable is the districtXreform interactions for new foreclosures from district level regressions with district level time varying economic controls. Explanatory variable is the districtXreform interactions for Chapter 7 bankruptcy from district level regressions with district level time varying economic controls. T-statistics in parentheses, robust standard errors. $*p < 0.10, **p < 0.05, ***p < 0.01$. Source: Author's calculations based on Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.

Table 10: Relation to Change in Chapter 13 Bankruptcy: Foreclosure

	(1) Post-Reform	(2) Anticipation	(3) Pre-Recession	(4) Credit Slump
$\Delta Ch13$	0.142			
	(1.18)			
$\Delta Ch13$		0.673***		
		(3.46)		
$\Delta Ch13$			0.612***	
			(4.31)	
$\Delta Ch13$				0.548***
				(2.64)
Constant	0.00225	-0.000507	0.000409	0.00515**
	(1.60)	(-0.89)	(0.57)	(2.15)
Observations	89	89	89	89
R^2	0.012	0.242	0.342	0.092
Adjusted R^2	0.001	0.233	0.335	0.081

Dependent variable is the districtXreform interactions for new foreclosures from district level regressions with district level time varying economic controls. Explanatory variable is the districtXreform interactions for Chapter 13 bankruptcy from district level regressions with district level time varying economic controls. T-statistics in parentheses, robust standard errors. $*p < 0.10, **p < 0.05, ***p < 0.01$. Source: Author's calculations based on Federal Reserve Bank of New York Consumer Credit Panel/Equifax Data.