Financial Stress and Farm Bankruptcies in U.S. Agriculture

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Abstract

We evaluate farm financial stress within the U.S. over the past twenty years and the agricultural and economic factors which have impacted farm businesses. We further evaluate the effect of the 2005 Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) on farm financial stress. In particular, Chapter 12 bankruptcies -- which can only be filed by farmers -- were only a temporary measure until BAPCPA made Chapter 12 a permanent fixture in bankruptcy law. We utilize filings of Chapter 12 bankruptcies from 1997 until 2016 as a proxy for farm financial stress. Panel fixed effects models are used to determine relevant factors affecting financial stress for farmers from agricultural and macroeconomic perspectives. Further, models incorporating pre- and post-BAPCPA regimes are utilized. We find that macroeconomic factors (interest and unemployment rates) are strong predictors of farm bankruptcies for farms while agricultural land values are the only consistent strong predictor among the agricultural factors. When evaluating the post-BAPCPA regime, only agricultural land values continue to be a significant predictor of farm bankruptcies. Our findings also indicate a dynamic relationship with agricultural land values, where current year values are negatively related but previous year land values are positively related to bankruptcies. We provide an analysis of the post-BAPCPA regime on farm bankruptcies that was not previously evaluated. Further, our findings illuminate discussion on a potentially dynamic relationship with financial stress and agricultural land values.

Keywords: farm bankruptcies, financial stress

JEL Codes: Q14

Introduction

The increased widespread financial stress from the farm crisis of the 1980's required policy intervention from Congress, which enacted legislation to mitigate the damages to the agricultural sector. This crisis was partly due to a rapid rise in farmland values -- largely purchased on credit -- followed by a sudden drop in values coupled with high interest rates. Many farmers experienced financial stress, i.e. they struggled to generate enough cash flow to meet their debt service payments. Prior options of bankruptcy for farms generally required the liquidation of their farmland, a depressed asset at the time, which would result in cessation of operation. With the passage of the Family Farmer Bankruptcy Act of 1986, Chapter 12 bankruptcy became the preferable option for family farms as it helped ease financial stress and allowed for continued operation of their farm following a debt restructuring plan. Chapter 12 was originally set to expire in October 1993 but Congress extended the expiration date eleven times (Harl, 2006). In 2005, the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) amended Chapter 12 bankruptcy to be a permanent option, allowed for higher debt limits, and implemented less strict income requirements than before.[1]

Trends in declining net farm income, increasing debt use, and declining land values are projected to continue beyond 2017 and pose a problem to the agricultural sector (Patrick et al., 2016). These factors place financial stress on farms, which may or may not be able to sustain these levels of stress (Briggeman, 2010). The current trends followed a period of rapid appreciation of land values and net farm incomes, which parallels the 1980's farm crisis. While the farm sector debt-to-asset ratio peaked above 20% in 1985, debt-to-asset ratios have not been above 15% since 1995 which helps illustrate that the magnitude of financial stress today is not as severe as the 1980's farm crisis (Ellinger et al.,

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[1] Chapter 12 from 1986 to 2005 was only available to family farms. The BAPCPA extended Chapter 12 coverage to family fishermen, although family fishermen did not receive the increased debt limits or less strict income requirements that went to family farms.

2016). One critical difference between the 1980's farm crisis and the current economic climate of the agricultural sector is a farm's ability to seek financial relief through Chapter 12 bankruptcy. The option to file for Chapter 12 bankruptcy changes the farmer-lender relationship with the legal consensus being that the relationship favors the farmer and that this relationship strengthened with passage of BAPCPA (Bromley, 1987; Flaccus and Dixon, 1988; Harl, 2006). While the existence of Chapter 12 bankruptcy affects this farmer-lender relationship, the bankruptcy filing rate for farms has been used as a proxy for financial stress over periods in which bankruptcy laws have not substantially changed (Dixon et al., 2002; Stam et al., 1991).

We provide a quantitative approach to examining factors that affect the financial stress of the agricultural economy with particular interest in the post-BAPCPA climate. Using Chapter 12 bankruptcy filing rates from 1997 to 2016 as our proxy for financial stress, we use panel fixed-effects models to evaluate how macroeconomic factors and farm financial sector performance affects farm bankruptcy rates across the United States and the extent to which, if any, BAPCPA has impacted the agricultural sector. Our study utilizes the Agricultural Resource Management Survey (ARMS) to provide regional level estimates of variables which are hypothesized to affect the agricultural sector of the economy. We contribute to the literature by providing a recent analysis of Chapter 12 bankruptcies and the first evaluation of how BAPCPA affected farm's financial standing. To our knowledge, the most recent econometric analysis utilizing Chapter 12 bankruptcies is Dixon et al. (2002) which used state-level filing rates from 1986 to 2002.

Our findings indicate that macroeconomic factors (interest rates and unemployment rates) have strong, positive influence over the bankruptcy filing rates while measures of the regional agricultural economy do not appear to have a significant effect except for agricultural land values. The agricultural land values indicate a potentially dynamic relationship as current year values are negatively related to farm bankruptcies but lagged values are positively related to farm bankruptcies. Further, we evaluate the effects of BAPCPA -- which made Chapter 12 a permanent fixture in bankruptcy law and increased debt limits and coverage for farmers. Our findings indicate that there was not a significant rise (or fall) in bankruptcies post-BAPCPA when controlling for agricultural and

macroeconomic factors. However, there does appear to be a regime shift in the relationship between farm bankruptcies post-BAPCPA with respect to the interest and unemployment rates that would suggest these rates are no longer predictive indicators of farm bankruptcies post-BAPCPA. The result for agricultural land values remains post-BAPCPA, although their magnitudes are lessened.

The article proceeds as follows: the next section overviews previous literature relevant to this article which entails a brief history of bankruptcy law as it pertains to farms and further includes a description of relevant economic research. Next we describe the data used in the article as it relates to the judicial system, macro-economy, and agriculture. Then we outline the methodology we use to address the factors which affect farm bankruptcies as well as how this might be affected by BAPCPA. Next, we present the results of our models and interpret them. And finally, we conclude the article with policy implications from our research.

Bankruptcy Overview

Modern United States bankruptcy law began with The National Bankruptcy Act of 1898, the first permanent U.S. bankruptcy law. Previously, the United States loosely followed the existing English law at the time and only enacted bankruptcy provisions on a temporary basis to combat financial crises. The prevailing laws were a pro-creditor regime as the laws were described as "relief was not *for* debtors, but *from* debtors" (Tabb, 1995, p. 8). From 1898 onward, farmers received special benefits within the bankruptcy laws that were not afforded to other occupations and these benefits have steadily increased over time. Their first special treatment was that farmers -- defined as someone earning at least 80% of their gross income through farming operations -- could not be involuntarily forced into bankruptcy by creditors. Later, the Frazier-Lemke Act in 1934 gave farmers filing for bankruptcy the privilege of re-purchasing their farm at an appraised value, over a period of six years although this was subsequently revised downward to three years due to concerns of unconstitutionality. This policy was aimed as a temporary measure to halt banks from repossessing farms and lasted until its expiration in 1949 (Leibell Jr, 1940). In addition,

twenty-five states passed various legislation throughout the 1930s which provided a moratorium on farm foreclosures in response to agricultural distress (Alston, 1984).

Although there were other changes in the bankruptcy laws -- with the Chandler Act of 1938 signaling wide-spread changes in procedural and administrative policies -- the next large-scale change in bankruptcy law occurred with the Bankruptcy Reform Act of 1978. Particularly of note, the previous 1898 Act artificially capped the amount of fees that lawyers and other professionals could receive in court proceedings under the "economy" principle. This was abolished with 1978 Act, which allowed for competitive fees and created incentives for lawyers and other bankruptcy related professions to provide services for businesses and individuals in financial stress (Tabb, 1995). Also, the 1978 Act consolidated the previous Chapters X and XI to form the modern day Chapter 11 bankruptcy, commonly referred to as the reorganization plan. This act further encouraged Chapter 13 bankruptcy (the wage earner's plan) over the Chapter 7 (liquidation) under the assumption that a Chapter 13 plan would pay more towards creditors and debtors would emerge with better credit afterwards. Previously all states recorded the primary occupation of the filer, but this practice abruptly ended for most states with the 1978 Act thus limiting the ability to effectively track bankruptcies for farmers after 1978.

These particular Chapters (7, 11, and 13) have largely remained the same in terms of their intended targets, although specifics associated with these Chapters have varied over time. Chapter 7 is the liquidation of a filer's nonexempt assets[2] where the proceeds of such assets are used to pay holders of claims (creditors) in accordance with the provisions of the Bankruptcy Code. Chapter 7 is the most common form of bankruptcy across both business and personal filings with 64.3% and 70% of total filed respectively since 1996. Chapter 11 is a reorganization plan for a debtor that allows the filer to continue operations

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[2] Assets that are exempt from liquidation have varied over time and also vary across states. The types of assets that have been exempt range from home, car, pension, personal belongings, or other property.

subject to its major creditors' approval of said plan. The filing fees are highest for this option and considered the most complex of all options since it requires approval of multiple creditors. Chapter 11 is generally used by large corporations and the majority of its filings are by businesses (with businesses representing 88.9% of all Chapter 11 filings since 1996), although individuals are permitted to file for Chapter 11. Chapter 13 allows for the restructuring of debts of the filer to be paid out to creditors over a period of time -- generally three to five years although this has varied -- subject to the filer having a regular stream of income, their level of income, and a limit on their amount of debt.[3] Chapter 13 is predominantly filed by individuals, although there are also businesses which file for Chapter 13.

The Family Farmer Bankruptcy Act of 1986 marked the largest change in bankruptcy law for farmers as a new Chapter in the bankruptcy code was created -- Chapter 12 which was modeled after Chapter 13 -- and gave farmers four options for filing for bankruptcy. The Act was meant as a temporary measure for Congress to provide financial relief for farmers during the 1980s farm crisis[4] and represented a shift from the previous farm-lender friendly towards farm-debtor friendly (White, 1987). While after the 1978 Act the primary occupation for a filer was generally ended by most states, North Dakota did maintain records of primary occupation of filers. Smith (1987) notes that from 1974 to 1980, farm related bankruptcies accounted for 3.1% of bankruptcies in North Dakota but increased to 11% between 1981 and 1987. The peak of farming bankruptcies in North Dakota reached 46.6 bankruptcies filed per 10,000 farms in 1987.

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[3] For example, in 1986 their debt could not to exceed $350,000.

[4] Farm real estate values were high, farm products brought relatively good prices, interest rates were high, and farms tended to be highly leveraged (Agriculture, 1979). Shortly thereafter, the bubble burst on the farm economy, with farm product prices dropping sharply and real estate values tumbling but with interest rates remaining high and credit becoming increasingly hard to obtain. Many farms faced significant financial difficulty.

To qualify for a Chapter 12 filing, a family farmer must pass the debt and income tests. The initial debt test stated that aggregate debts could not exceed $1,500,000 and at least 80% of aggregate non-contingent, liquidated debts arises from a farming operation. The income test required that the farmer receive more than 50% of their gross income from farming operations in the preceding tax year. If the tests are passed, a farmer is able to submit a Chapter 12 plan which could reduce the amount of secured claims to the value of the underlying collateral and pay those claims over three to five years (Dull, 1986). The advantage to farmers is that filing for bankruptcy may reduce the amount owed, extend the payment period, and/or lower the interest rate on existing loans due to the write down of secured debt if the current fair market value is less than the original loan value. O'Neill (2006) lays out the procedures for filing a Chapter 12 bankruptcy.

A farm in financial stress might not file for Chapter 12 bankruptcy if they cannot pass the debt or income tests, or if they are unaware that Chapter 12 is an option for their family business. Under these scenarios, a farm then has Chapters 7, 11, and 13 available to them. Matthews et al. (1992) studied all farm bankruptcies in Missouri from 1987--89 and found that the majority of filings were of Chapter 7, although Chapter 12 did make up 44% of the filings. While farms may file for other Chapters of bankruptcy -- and thus we do not have a completely measured value for farm bankruptcies -- only farms can file for Chapter 12 which serves as a lower-bound estimate for the total number of farm bankruptcies.

Chapter 12 was originally set to expire in October of 1993, but it was subsequently extended by Congress eleven times (Harl, 2006). Chapter 12 became a permanent fixture in bankruptcy law and its coverage expanded with the passage of the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005. The 2005 Act increased coverage of Chapter 12 to include family fisherman, who were subject to the same debt and income tests from the 1986 Act.[5] For family farmers, the debt and income tests became more favorable to the farmer. The percentage of debt arising from farming operations

[5] The debt limit is adjusted for inflation every three years.

requirement decreased from at least 80% to at least 50% and the debt limit increased from $1,500,000 to $3,237,000. The debt limit is adjusted for inflation every three years with the limit at $4,031,575 in 2016. The income test, which previously required at least 50% of gross income via farming operation in the preceding tax year, was relaxed so that this test could be satisfied if the 2nd and 3rd prior tax years had at least 50% of gross income through the farming operation (O'Neill, 2006).

While there are clearly different regimes in bankruptcy law, figure 1 displays the historical trends for farmer bankruptcies as well as the farming population. Prior to 1979, all farm bankruptcies are tracked as bankruptcy filings required the debtor list their primary occupation. Changes in reporting make it infeasible to track every debtor's occupation since 1979 and thus there is a gap in historical bankruptcy rates until 1986 when Chapter 12 serves as a proxy for farm bankruptcies. Both the Great Recession and the 1980s farm crisis coincide with a rise in farm bankruptcies, although it should be noted that the post-1986 farm bankruptcy rate only tracks Chapter 12 bankruptcies. Farmers can still file for Chapters 7, 11, and 13 but those would not show up in the post-1986 farm bankruptcy rate. Thus, it is very likely that the true farm bankruptcy rate in the 1980s was higher than that of the Great Recession.

Previous Economic Research

Research on farm bankruptcies is sparse within agricultural economics. Legal scholars have indicated that the immediate effects of Chapter 12, and its subsequent broadening of scope with BAPCPA, transferred wealth from creditors to debtors. The initial effect is that more debtors now have the ability to write down a larger portion of their debt to repay over a longer period of time and at a lower interest rate (Bromley, 1987; Dull, 1986; White, 1987). The loanable funds market in agriculture is symmetric in that a benefit to debtors will have a corresponding cost to the creditors which includes commercial banks, the farm credit system, government credit programs, and other lenders. The short-term benefit to the debtors may not translate to a positive long-term outlook as creditors may leave the market or adapt their loan policies to reduce the risk associated with the creditor (Barry and Lee, 1983; Jensen, 1989). While legal analyses point out a tilted

relationship towards debtors in the short run, a long run analysis is needed to determine the welfare implications of BAPCPA on the farm economy.

The most similar analysis on Chapter 12 filing rates to this paper is from Dixon et al. (2002) which uses a state-panel model from 1987 to 2000 with USDA-ARMS data to determine factors affecting Chapter 12 filing rates. They find unemployment rate to be a positive predictor of farm bankruptcies, that several measures of the ability to pay current liabilities (debt-to-asset, debt-servicing ratio, net farm income, and real value of farm) are significant predictors in filing rates, and that government payments reduce the filling rates for a given state over this time period. Throughout this time period, Chapter 12 was a temporary policy which is an important change which calls for an extension of their panel model to after the 2005 BAPCPA.

Stam et al. (2003) looked at Chapter 12 bankruptcies from 1986 to 2002 and compared these rates to previous historical bankruptcy rates.[6] They determined that the farm bankruptcy rates of the 1990s were high by historical standards in spite of similar real net farm income levels to the 1950s, 1960s, and 1970s as well as the relatively high land values at that time. They reach a similar conclusion as previous legal analysis in that Chapter 12 is a more advantageous form of bankruptcy for farms than the previous Chapter 7, 11, and 13 options available to them prior to 1986. Stam and Dixon (2004) extends the analysis of Chapter 12 bankruptcies from 1986 to 2002 and looks at the discharge, conversion, and dismissal rates[7] throughout this time period and provides a larger

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[6] Prior to 1978, each bankruptcy required the filer to denote their primary occupation which is how bankruptcy rates from 1898 until 1978 were compiled for farms.

[7] The termination of a Chapter 12 plan is typically through a discharge, dismissal, or conversion to another Chapter (7, 11, or 13). Discharge is seen as the favorable outcome for the debtor as it implies that the remaining unsecured debt from their filing plan is removed from their obligation to pay. A dismissal results in loss the protection of the automatic stay and creditors are free to collect their debts, which is an unfavorable outcome.

historical context of farm bankruptcies. They found that time to termination of Chapter 12 cases and the discharge rate has decreased over time while the dismissal rate increased over this time. Since their analysis concluded before BAPCPA made Chapter 12 a permanent fixture of bankruptcy law, these effects may indicate Chapter 12's impact were transitory in the credit market.

One of the first studies to directly evaluate farm bankruptcies is Shepard and Collins (1982), which uses national US farm bankruptcy data from 1910 until 1978 (omitting 1940 -- 46 due to World War 2). Their results indicate that non-agricultural bankruptcy rates, real net farm income, farm debt-to-asset ratio, and average farm acreage affect farm bankruptcy rates while they fail to find evidence that government support payments affect farm bankruptcy rates. Their results cannot be extrapolated to a regional conclusion due to limitations of time-series data, which leaves the possibility that variations in government payments across the US may have an aggregated null effect but is a significant predictor in farm bankruptcies. In a similar time-series analysis but for consumer bankruptcy rates, Shepard (1984) found that unemployment rates were positively related while real estate equity was negatively related for Chapter 7 bankruptcies across 1945 to 1981.

To the extent that Chapter 12 is thought of as an indicator for farm failure, Davies (1996) addresses the question of whether bad managers or agricultural policy are at play for insolvency of farms with a focus on land values. They utilize data from England and Wales form 1969 to 1985 and find that the rate of insolvency was negatively related to the current land prices but the lag structure of their model suggests that the rate of insolvency could be positively related to land prices two years prior. Their results suggest that managers are increasing debt loads during periods of rising land values and that a period of falling land values following a rise in land values exacerbate financial stress for farms.

Rucker and Alston (1987) utilized state legislation which implemented a moratorium of farm foreclosures in the 1930s and found that the government programs successfully alleviated farm distress during this time. They found that these programs

reduced the number of farm failures[8] by between 146,000 and 278,000 in the early 1930s. A follow-up analysis by Rucker (1990) assessed the welfare implications of these policies, finding that the 1930s moratoria led to a decrease in the supply of loanable funds for farms as private lenders left the market due to falling interest rates and principal reductions. These moratoria were temporary and it is unclear how these results would extend to a permanent change in bankruptcy legislation, like Chapter 12 in BAPCPA.

Settlage et al. (2001) evaluates the loss claim levels for farm loans of operating and ownership from 1990 to 1998 of 40 US states. They find that debt-to-asset ratio, rate of return, net farm income, debt servicing, and interest rates are important determinants of loss claim levels. Their government payments variable was not significant, which may indicate that government assistance does not affect farm financial position although this claim cannot be thoroughly evaluated from their study. Further, Settlage et al. (2001) do not account for land values which may have an impact on a farm's financial position and affect the default of loans.

Data Description

Data on Bankruptcy Filings and Rates

Business and personal bankruptcy filings are public records and every bankruptcy is filed to a district court based on either the business location or primary filer's residence. There are ninety-four district courts[9] across the United States, of which none of these district courts cross state boundaries. Each state has at least one district and at most four

[8] There were approximately 6 million farms in existence in the 1930s.

[9] The ninety-four districts includes Alaska, DC, Guam, Hawaii, Northern Marianas Islands, Puerto Rico, and the Virgin Islands which we do not have agricultural data on and omit in our main results.

districts.[10] Every state belongs to one of the twelve circuit courts. All of the circuit courts are under the jurisdiction of the federal bankruptcy court, which demonstrates the hierarchy of bankruptcy courts: it starts at the federal level, next is the circuit level, then the state level, and finally the district level. There is variation of law, policies, and judge tendencies across circuits, states, and districts although none of the lower courts can overstep their jurisdiction afforded to them from the higher courts (Chang and Schoar, 2006; Lopucki and Eisenberg, 1999).

We use data on aggregated bankruptcy filings which are publicly available from the US Courts website. Their Bankruptcy Filings publication contains Table F-2, which provides quarterly level filings of all bankruptcy Chapters for each district starting with the quarter ending on 31 March 2001. The Judicial Business publication also contains an F-2 Table of bankruptcy filings for every district starting in 1996, although these data are at the annual level for each fiscal year.[11] Figure 2 plots the quarterly number of business bankruptcy filings from 2001 to 2016 where the vertical striped line indicates the quarter when BAPCPA began applying to bankruptcy filings (17 October 2005).

Figure 2 displays the effects of the passage of BAPCPA across all types of bankruptcies: personal (non-business), business, and farm bankruptcies (Chapter 12). It is clear that BAPCPA reduced the number of bankruptcy filings for businesses and non-businesses across the United States, although its immediate effect is muddied by The Great Recession (approximately 2007-2011) which led to a run-up in all types of bankruptcies. It is not as clear that farms had a similarly pronounced decline in filing rates after the passage

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[10] There are twenty-six states plus the District of Columbia with only one district while California, New York, and Texas are the only states with four districts. Even within a district, there may be multiple physical courts that one may file to.

[11] The US government's fiscal year begins the fourth quarter of the calendar year that starts on October 1. By example, the Judicial Business F-2 data begins with the twelve-month period prior to 30 September 1997 and represents the 1997 fiscal year.

of BAPCPA because the pre-BAPCPA regime does not exhibit a clear trend in farm bankruptcies. The post-BAPCPA regime appears to stabilize the quarterly farm bankruptcy rates while also exhibiting a run-up in farm bankruptcy filing rates around The Great Recession. Although there is substantial temporal variation of farm bankruptcy rates, a regional inspection of farm bankruptcy rates highlights another important aspect of the farm economy (Figure 3).

There is substantial variation in the state and district level rates across the country with an average bankruptcy rate of 2.33 farm bankruptcies filed per 10,000 farms from October 1996 to December 2016. Many states, particularly in the Midwest and the Plains, have experienced low bankruptcy rates. Of particular interest is the Middle Georgia district, which has substantially higher bankruptcy rates than its neighboring Northern and Southern Districts in Georgia. The Northern District of Georgia contains much of the metro Atlanta area, which may lend greater access to financial intermediaries for farms while it is not clear what distinguishes the Southern District from the Middle District. Of other interest is the outlier of Massachusetts, which has a much elevated bankruptcy rate than the rest of the country. This mainly stems from the relatively few number of farms (average of 6,725) and the outlier of Bristol County Massachusetts, which had 206 bankruptcies from 2013 to 2016. It is unclear what the cause of this elevated number of bankruptcies is for a county which had 717 farms in the 2012 Agricultural Census.

Factors Affecting Bankruptcy

While a bankruptcy filing is an individual occurrence which represents a series of events that led to a poor financial position for a farm, our data on bankruptcies is aggregated and not at the farm level. Instead, we utilize regional variables which act as proxies for the financial conditions that the average farm would face. We group these variables into agricultural factors and macroeconomic factors in order to distinguish the degree to which policy makers could affect farm bankruptcy rates. The implication is that US government policy actions can affect agricultural factors more so than macroeconomic factors as only 1% of US GDP comes from agriculture while macroeconomic policy is

implemented across all sectors of the economy. Table 1 contains summary statistics for all variables used in the regression analysis.

Agricultural Factors

The USDA Agricultural Resource Management Survey (ARMS) is a comprehensive survey on financial characteristics on farms across the US that is conducted by the Economic Research Service (ERS) and National Agricultural Statistics Service (NASS) beginning in 1996. ARMS is a non-random annual survey sent to approximately 30,000 farms in the US, although this varies across years. The survey utilizes a multi-phase, multi-frame, stratified, probability-weighted sampling design. The USDA selects farms into ARMS with the goal of constructing a nationally representative population of farms. Part of the survey design of ARMS is that certain variables are calibrated to match official state level estimates (e.g. acreage, number of farms, total harvest, etc.).

We utilize ARMS to calculate regional values for average acreage per farm, average farm assets, average net farm income, average government payments received, average debt-to-asset ratio, average working capital to expense ratio, average servicing debt ratio, and average share of off-farm income. Each of these statistics are evaluated at the region's (district or state) weighted median value where the weights are provided by NASS and account for probability of selection into the survey and are calibrated to match other official USDA estimates. We choose median values to minimize the impact of outlier farms since we are interested in the financial standing of what an average farm would face. The survey weights are necessary for our purposes because these variables represent the conditions that an average farm in a region encounters for a given year.

The ARMS weights are not designed to represent a smaller geographical scale than the state level. If within-state sampling for ARMS approximates a random sample conditioned on the use of survey weights, then creating district-level estimates of agricultural conditions is a justified method with the added note that there is an inherent

loss of precision for these measurements.[12] However, if there is within-state correlation in ARMS observations that is not accounted for with the survey weights, then it is not clear what district-level estimates of the calculated statistics represent.[13] If this is the case, then it is appropriate to use state level estimates of the statistics from ARMS in an analysis. We do not have enough information on the sampling procedures of ARMS from 1996 to 2015 to determine if there is within-state bias with the ARMS observations. We therefore utilize state level ARMS estimates as a robustness check on the assumption that within-state sampling for ARMS approximates a random sample.

In addition to utilizing state level values, we also leverage the sampling design of ARMS for more precise district level values. ARMS consistently over-samples 15 core states[14] which are chosen due to their high values of agricultural production. Because ARMS over-samples these states, it is more likely that the sampling scheme within districts of these states more closely resembles a random sampling and should reflect more precise estimates of our agricultural variables of interest. This subset of the United States reflects the majority of agricultural production, which can alleviate any issues involved with the modifiable areal unit problem that may arise due to the arbitrary distinction of the political boundaries for states.

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[12] This loss of precision can also be thought of as measurement error on our right-hand side. This would lead to attenuation bias where the estimated coefficients in a regression would be biased towards 0. The implication here is that one would find fewer significant coefficient estimates than a sample with no-measurement error.

[13] Further, regression coefficient estimates may be biased in an unknowable direction under this scenario.

[14] The core states in ARMS are Arkansas, California, Florida, Georgia, Illinois, Iowa, Indiana, Kansas, Minnesota, Missouri, Nebraska, North Carolina, Texas, Washington, and Wisconsin.

We also utilize the June Area survey, which is produced by NASS, to obtain estimates of the value of an acre of agricultural land. The June Area survey is an annual survey which samples from approximately 85,000 agricultural and non-agricultural land use tracts across the conterminous United States to determine land usage data. Approximately 35,000 farmers are surveyed and estimates for land value is provided at the state level, which is available from NASS since 1910. Figure 4 displays the county level value of agricultural land from the 2012 Agricultural Census, which utilizes spatial kriging to interpolate land values across all locations. The value of agricultural land across the United States is clearly higher around urban centers, mainly on the east and west coast. There is also elevated land values across the Corn Belt which were not as prevalent in the 2007 Agricultural Census. The Corn Belt benefited from high corn prices around this time that were likely captured within land values.

All financial values have been converted to real 2015 dollars using the GDP deflator to account for inflationary issues that may confound our results across the years of 1996 to 2016. The ARMS data are lagged one year and bankruptcies correspond to the government's fiscal year.

Macroeconomic Factors

The Federal Deposit Insurance Corporation (FDIC) provides Reports of Condition and Income (Call Reports) and Uniform Bank Performance Reports (UBPRs) for FDIC-insured institutions. These data provide total loan amounts for an institution and further break this down by agricultural production loans and agricultural real estate loan values. For each of these categories, the Call Reports indicate the value of delinquent loans for each quarter. These data are publicly available online from the 4th quarter of 1992 until present. We utilize these Call Reports to calculate state level values of agricultural and non-agricultural loan delinquency rates, which is mainly motivated because US banking is regulated at the state level. Although we have the address of each FDIC institution and could potentially look at a finer geographical scale for delinquency rates, this would not be appropriate because bank size within a state is a right-skewed variable that is not equally distributed across a state's geography.

Annual data on one-year and ten-year treasury constant maturity rates were acquired from the Federal Reserve Economic Data (FRED) that is maintained by the Federal Reserve Bank of St. Louis. The one-year rates proxy the cost of financing short-term projects for a farm while the ten-year rates should approximate this cost for long-term projects.

The Bureau of Labor Statistics provides annual level values of employment and unemployment for each county since 1990 through their Local Area Unemployment Statistics program. We aggregate these county level values to the district level and calculate each district's unemployment rate to create a macroeconomic variable that also has regional variation. We consider this a macroeconomic variable in that it is mainly affected by factors outside of the agricultural sector.

And finally, we utilize the bankruptcy filings data and the Census Bureau's County Business Patterns (CBP) data to calculate the bankruptcy filing rate for non-agricultural businesses at the district level. CBP provides data on the number of establishments at the county level since 1986 and further breaks this down by industry classification.[15] We use the total of Chapter 7, 11, and 13 business filings (excluding Chapter 12 farm bankruptcies) for each district and divide this by the non-agricultural establishments in the district as a way to proxy for financial health of the region that may affect farm bankruptcy filings.

Panel Models

Previous econometric models for analyzing Chapter 12 generally use the filing rates for a particular region, which is calculated as Chapter 12 filings divided by the number of farms within the region. A motivation for this particular variable is that bankruptcy filings rates act as a proxy for financial conditions of a region and one needs to normalize the

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[15] From 1986 to 1997, the Census Bureau uses the Standard Industrial Classification (SIC) system for industries. For 1998 and beyond, the Census Bureau uses the North American North American Industry Classification System (NAICS) to group establishments into industries.

variable so it is comparable across regions. If one does not adjust for the number of farms and simply uses the number of bankruptcies, then the areas with a high number of bankruptcies will reflect areas with a high number of farms. As such, we adopt a linear panel model as our baseline for understanding farm bankruptcies:

$$y_{it} = \alpha + \alpha_i + \beta_1 BAPCPA_t + \beta_2 X_t + \beta_3 X_{it} + \beta_4 AG_{it} + \varepsilon_{it}$$

Where i denotes the region (district or state) and t denotes the time period. The dependent variable, y_{it}, is the number of bankruptcies divided by the number of farms (as measured through ARMS) which is meant to proxy financial stress for farms. There is substantial regional and temporal variation in the variable, which helps motivate the choice of explanatory variables we use to better examine the factors affecting financial stress. Further, because of the described sampling design of ARMS we subset our data for each of these regressions to only the core states (with the highest values of agricultural production) so as to reduce the potential sampling design errors which may bias estimates of coefficients of interest. There is a clear trade-off in using the core states in that the ARMS variables should be more precise but the cost is losing over 60% of the observations. These two effects have opposite relationships with the power of standard t-tests, so the impact of hypothesis testing is unclear from restricting the sample to core states.

The α parameter is an overall constant for the model; α_i is a regional fixed effect used to control for unobservable fixed effects which are time invariant; $BAPCPA_t$ is a dummy variable taking the value of 1 for the post-BAPCPA period aiming to test if BAPCPA had a significant effect on farm bankruptcy rates as well as its transitory and permanent effects; X_t is a set of macroeconomic controls believed to affect farm bankruptcy rates; X_{it} are non-agricultural control variables related to the macro-economy which vary across time and regions; and AG_{it} are agricultural related variables used to proxy a region's farm

financial climate.[16] See the preceding section on data for details on the covariates included in each set.

The agricultural variables are lagged one year, meaning that the bankruptcy filings across October 1996 to September 1997 are explained by ARMS observation in 1996, which explain farm financial characteristics from January 1996 to December 1996. Lagging the agricultural variables by one year is done for three reasons: income for a particular year has a fair amount of uncertainty at the beginning of the year when we do count bankruptcies, lumpiness in farm incomes imply that the previous year's income is a better proxy of the capital stock of a farm, and it produces a better fit. And finally, because Davies (1996) indicates the dynamic relationship of agricultural land values over time we include current year and previous year values for agricultural land -- which is only available at the state level.

Of additional focus is BAPCPA and its potential impact on the agricultural sector's financial performance as well as its transitory and permanent effects. In the above specification, the coefficient β_1 will show any mean difference in the filing rates for farms after BAPCPA passed in 2005, controlling for agricultural and macroeconomic factors. This is one way to evaluate how BAPCPA affected farms and can be interpreted as the overall long-run effect of BAPCPA's effect on bankruptcies since pre-2005 Chapter 12 was only a temporary policy. However, there may be a myriad of effects that BAPCPA had on farms which affected the bankruptcy filing rate both positively and negatively, which may result in an aggregated null effect. To check for this possibility and to assess between potential transitory and permanent effects of Chapter 12, we interact the $BAPCPA_t$ variable with each of the other control variables to further evaluate how BAPCPA may have had other effects on farms as follows:

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[16] We omit time fixed effects in all models because of the number of variables which do not vary across regions and only by time ($BAPCPA_t$ and X_t).

$$y_{it} = \widetilde{\alpha} + \widetilde{\alpha_i} + \widetilde{\beta_1}\, BAPCPA_t + \widetilde{\beta_2}\, X_t + \widetilde{\beta_3}\, X_{it} + \widetilde{\beta_4}\, AG_{it} + \gamma_2 BAPCPA_t \times X_t + \gamma_3 BAPCPA_t \times X_{it} + \gamma_4 BAPCPA_t \times AG_{it} + \tilde{\varepsilon}_{it}$$

The interaction coefficients, denoted as γ, reflect the change in a marginal effect due to Chapter 12 becoming a permanent bankruptcy option due to BAPCPA. If the transitory and permanent effects of a particular variable are identical -- and assuming pre-BAPCPA represents only the transitory effects and post-BAPCPA the permanent effects-- this would lead to a null finding in the interaction coefficient. Or in other words, there would be no change in the marginal effect of X on Y across regimes and so there would be no change due to BAPCPA occurring (ie $\beta_2 = \widetilde{\beta_2}$).

Results

Table 2 provides regression results for the first panel model with districts in the first column, districts from only the core states in the second column, state level variables in the third column and state level variables for only the core states in the fourth column. The standard errors are clustered at the regional level for all. Across all models, it is clear that restricting the analysis to only the core states from ARMS improves the fit of the models as measured through the adjusted r-squared statistic. The sharp increase from a negative adjusted r-squared -- which is only possible due to the large number of covariates in the model -- from the model using all districts to one above 0.12 using only the districts within the core states suggests that the ARMS sampling design has a poor fit for proper inference at regional levels below the state. However, this assertion is tempered due to the increase in model fit from the state level regressions which restricts the sample to only the core states -- which are states of high production and likely more homogeneous than the entire 50 states.

The only predictor of farm bankruptcies which is significant across all four specifications is the lagged value of agricultural land (measured at the state level) which has a negative relationship with bankruptcy rates. The current value of agricultural land is negatively associated with bankruptcy rates across all regressions and statistically significant for all but the state level regression. This relationship of near term negative

association but lagged positive association is a similar result to Davies (1996) which posited that the relationship between agricultural land value and financial stress may evolve dynamically due to differing managerial strategies under times of rising or falling land values. Since our data are not at the farm level, we are unable to comment on managerial strategies that farmers use but can acknowledge that these results appear to highlight a potentially dynamic relationship between agricultural land values and farm bankruptcies.

If one ignores the district level model using data from all states on the basis that ARMS may not accurately define the farm conditions at the district level, then the one-year constant maturity interest rate and regional unemployment rate are positive and significantly related to farm bankruptcies. The one-year interest rate is positively associated with bankruptcy rates, which is an intuitive result that increasing the cost of near-term borrowing will have adverse effects on farms' ability to repay current debts. However, the ten-year constant maturity interest rate is negatively associated with bankruptcy rates (and statistically significant with the core states subset) which is somewhat puzzling. As long-term debt costs rise, farms become less likely to file for bankruptcy which may be because of confounding macroeconomic factors. Interpreting the two interest rate highlights the dynamic relationship of near-term and long-term effects associated with financial stress for farms as the two effects have opposite signs.

We view the positive association between regional unemployment rates and bankruptcy rates as reflecting the local labor market conditions which proxy for regional economic performance and find this result intuitive and clear. As local economies fare worse, the likelihood of a farm experiencing these effects increases which would then result in higher levels of economic stress. A one percentage point increase in the unemployment rate leads to 0.366 more farm bankruptcies per 10,000 farms at the district level and 0.46 at the state level for the core states subset. In our sample, the unemployment rate ranges from 2.06% to 14.9% with a standard deviation of 1.9%. While this is a statistically significant effect, it is probably an economically small effect.

The delinquency rates, which are for consumer loans and agricultural loans in both the current and lagged period, have mixed results across the specifications. The agricultural delinquency rates do not appear to have a significant relationship with the agricultural bankruptcy rate with the exception of current value at the state level showing a positive relationship. The consumer delinquency rate has consistent signs across both the current (negative) and lagged (positive) values, although the statistical significance is mixed. It is important to note that the delinquency rates vary at the quarterly level while our framework only accounts for annual level variables which may partially explain the mixed significance results. A more refined temporal model may be more appropriate to assess the potential relationship between delinquency rates and farm bankruptcies. A similar argument could be made for the non-agricultural bankruptcy rate, although these are consistent insignificant findings across all specifications.

Among the null findings consistent across the district and state level regressions of Table 2 are for the non-agricultural bankruptcies, government payments, and working capital to expense ratio. Our finding that the non-agricultural bankruptcy rates do not affect farm bankruptcy rates is in conflict with the results of Shepard and Collins (1982). However, their analysis is based on time-series data at the national level while we are able to exploit cross-sectional variation as well as temporal variation in our panel setting. This result appears to indicate independence of the financial stress in the agricultural sector to that in the rest of the economy, controlling for interest rates and unemployment rates, which is of policy importance for those concerned with farm bankruptcies. This is of two-fold importance: 1) policies targeted to reduce farm bankruptcies should not be expected to have an effect on the rest of the economy and 2) policies aimed at reducing total number of bankruptcies should not be expected to affect the farm economy.

While only two variables have consistent insignificant effects across all specifications, the majority of the agricultural variables are null findings within these regressions (with the exception of agricultural land variables). We emphasize that our agricultural measures are at the regional level and not at the farm level, therefore these results may be due to data limitations as well. While it may be the case that government payments, for example, are a strong predictor that a particular farm will file for bankruptcy,

it is not the case that these regional indicators have predictive power for bankruptcy rates. While this result may seem unexpected, we find this to be helpful for policymakers in terms of targeting particular areas of the farm economy to alleviate financial stress. Targeting these agricultural factors may not result in improvements in the financial stress levels of farms insofar as financial stress is measured through bankruptcies.

An additional emphasis with Table 2 is that Chapter 12 was both a temporary and a permanent measure across the years of interest. This is problematic for disentangling transitory and permanent effects from having a chapter of bankruptcy available to farmers. To the extent that the passage of BAPCPA signaled the change from transitory effects to permanent, we turn to interacting all covariates with the post-BAPCPA dummy to evaluate which variables may have disproportionate transitory and permanent effects. The results are only presented for the core states subset due to the better fit of models.

BAPCPA Results

Table 3 presents the results of the models which also interact the passage of BAPCPA with the main variables of interest. The first and third columns represent the non-interacted effects of each variable, which would be the transitory effects of Chapter 12. The second and fourth columns are the interaction terms of the main variables with the post-BAPCA dummy, which represent the permanent effects of farmer bankruptcy post-BAPCPA. A Wald test that the interaction terms are not jointly different from zero is strongly rejected across both the district and state level regressions, which would indicate that there are both transitory and permanent effects due to Chapter 12 legislation that can be identified.

As seen previously, the variables which had consistently significant impacts on bankruptcy rates were the one-year interest rate, unemployment rate, and agricultural land values. Evaluating these variables from the pre- and post-BAPCPA context illustrates that the one-year interest rate and unemployment rate have had inverse impacts as both are positively related to bankruptcy rates prior to BAPCPA and yet negatively related post-BAPCPA. Their aggregate effects were both positive in model 1, which captures a mixture of

the transitory and permanent effects. The post-BAPCPA effects (which can be calculated as $\widetilde{\beta} + \gamma$) across the interest rates and unemployment rates do not significantly differ from 0 for either the districts or state regressions as measured through an F-Test (all F statistics are less than 1.6). The mechanism for interest and unemployment rates no longer having a statistically significant effect on farm bankruptcies post-BAPCPA cannot be identified within our model and beyond the scope of this paper. Further research on this changing relationship should be pursued.

Across both specifications in Table 3, the agricultural land value coefficients have the same sign for both district and state level regressions based on the BAPCPA interaction. The pre-BAPCPA regime coefficients are not significantly different from zero -- with the exception of current value based on the district level -- while the post-BAPCPA coefficients are all statistically significant (all F statistics are greater than 5.2). Further, a potentially dynamic relationship between the current land values (negative association) and the lagged land values (positive association) is exhibited on bankruptcy rates as seen in Table 2 across pre- and post-BAPCPA periods. The coefficients are of similar magnitudes yet in opposite directions, which would suggest that stagnant land values from year-to-year would have a null effect on the bankruptcy rate. A further implication that a rise in lagged land values along with a fall in current land values would put upward pressure on bankruptcy rates. This dynamic relationship merits more research into modelling how land values changes over time affect the farm bankruptcy rate.

Across all agricultural variables post-BAPCPA, the one variable which has consistent significance across both district and state specifications is the debt-to-asset ratio which is negatively related to bankruptcies post-BAPCPA. This result is puzzling and would indicate that areas which have higher debt-to-asset ratios after 2005 have lower bankruptcy rates for farms. One explanation is that the high debt-to-asset ratios correspond with years of increased farm incomes which helped lower financial stress. Another explanation is that the average levels of debt-to-asset ratios may not be indicative of the tails of the distribution of highly indebted and vulnerable farms. It may be the case that regions with low levels of debt-to-asset ratios may still have a few farms which are in financial distress due to their high debt-to-asset ratios and need to file for bankruptcy.

Conclusion

This article examines the factors which affect the financial stress of a farm as well as addressing a new question: how BAPCPA affected farm's financial stress. Using Chapter 12 bankruptcy filings from 1997 to 2016, we found that it is largely macroeconomic factors (interest rates and unemployment rate) which affect the financial position of farms although land values appear to also affect farm bankruptcy rates among the agricultural factors. From a policy perspective, our findings show that policies aimed at improving agricultural indicators (debt-to-asset ratio, working capital to expense ratio, government payments, etc.) for all farms may not be able to alleviate financial stress for individual farms. Our results are only at the state and district level and do not extend to the farm level, whereby there may be specific farms which may have financial stress lessened due to a change in one of the agricultural indicators that we could not find evidence for an association with bankruptcy filing rates.

Our results also indicate that agricultural land values are highly related to bankruptcy filing rates and that this relationship is dynamic and long-term. Our models only use a current and lagged value, but it may be the case that there is a more complex relationship with the two than we posit. Further research is merited in evaluating how the land values, which make up over 80% of a farm's equity, can affect a farm's likelihood of filing for bankruptcy. It appears the relationship is dynamic in that a rise and fall in land values has a larger impact than a continual decrease in land values.

Our model fits appear to indicate that regional ARMS analysis may not be appropriate below the state level unless the core states are utilized. The sampling design of ARMS is complex and does not necessarily conform to the political boundaries of counties. Therefore, there should be caution for analysts when attempting to utilize ARMS for sub-state regional issues.

There does appear to be a regime shift in the relationship between farm bankruptcies post-BAPCPA with respect to the interest and unemployment rates that would suggest these rates are no longer predictive indicators of farm bankruptcies post-BAPCPA. The result for agricultural land value remains post-BAPCPA, although its

magnitudes are lessened. However, many of the predictors had similar impacts in both periods indicating that farmers were likely taking advantage of Chapter 12 even when it was temporary and not permanent Act. Making farmers aware of the Chapter 12 helps them to increase their options in reducing financial stress for their farms.

As the farm sector has recently experienced downturn with declining farm income and land values, it is important to note a concern that financial distress and bankruptcy rates will be on the rise. A prolonged period of low commodity prices and falling land values may increase the distress of very indebted farmers who may have taken on more debt to expand their operations. Bankruptcies seem to be a lagging indicator of financial stress and indeed there was a small uptick in bankruptcy rates in the last quarter of 2016. However, the farm sector seems to still have strong equity positions which mitigates the effects of the current downturn so farm bankruptcy rates are still near historic lows.

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Tables

Table 1 Descriptive Statistics

	State		District	
	Mean	Standard Deviation	Mean	Standard Deviation
Farm Bankruptcy Rate (per 10,000 Farms)	2.904	3.868	3.609	15.283
Non-Ag Bankruptcy Rate (per 10,000 establishments)	54.55	61.65	53.233	51.321
Consumer Delinquency Rate	2.50%	1.79%	2.56%	1.86%
Unemployment Rate	5.60%	1.95%	5.82%	1.99%
Value of Agricultural Land (per acre)	$3,638	$3,302	$3,488	$2,711
Acreage of Operation	124	138	112	117
Total Assets	$517,012	$247,971	$546,003	$956,450
Net Farm Income	$5,320	$7,132	$8,923	$105,316
Share of Income from Government Payments	1.23%	3.51%	1.30%	4.07%
Debt-to-Asset Ratio	1.257	3.117	1.325	3.42
Working Capital to Expense	38.46	45.86	43.52	79.37
Repayment Capacity	0.559	4.716	1.118	16.364
Ratio of Off-Farm to Total Income	0.986	0.139	1.02	1.8
Share of Farmers with Bachelor's Degree	25.20%	11.00%	25.00%	13.40%

Table 2 Panel Data Models for Farm Bankruptcy Rates

Farm Bankruptcy Rates per 10,000 Farms	District Level[a]		State Level[a]	
	All States	Core States	All States	Core States
Post-BAPCPA Dummy	-1.059	-0.834*	-0.388	-0.408
	(1.198)	(0.440)	(0.437)	(0.312)
1-year Interest Rate	0.274	0.78***	0.483***	0.541***
	(0.259)	(0.236)	(0.117)	(0.104)
10-year Interest Rate	-0.612	-0.849***	-0.313	-0.512**
	(0.514)	(0.322)	(0.239)	(0.205)
Non-Ag Bankruptcy Rate	0.001	0.004	0.0002	-0.006
(per 10,000 establishments)	(0.004)	(0.006)	(0.002)	(0.007)
Consumer Delinquency Rate	-0.923***	-0.179	-0.499***	-0.282
	(0.307)	(0.169)	(0.141)	(0.198)
Lagged Consumer Delinquency Rate	0.896**	0.277	0.294***	0.165
	(0.443)	(0.233)	(0.095)	(0.208)
Agricultural Delinquency Rate	0.389	-0.094	0.142**	0.367***
	(0.341)	(0.375)	(0.067)	(0.117)
Lagged Agricultural Delinquency Rate	-0.576	0.113	-0.107	-0.189
	(0.424)	(0.377)	(0.081)	(0.254)
Unemployment Rate	0.303	0.366**	0.58***	0.46**
	(0.193)	(0.155)	(0.140)	(0.204)
Value of Agricultural Land (per acre)	-2.331***	-2.157***	-1.721	-1.4**
($1,000s)	(0.848)	(0.588)	(1.058)	(0.633)
Lagged Agricultural Land	2.151***	2.076***	1.868*	1.744***
($1,000s)	(0.831)	(0.473)	(0.999)	(0.469)
Acreage of Operation	0.009	0.007**	0.005	0.01***
	(0.006)	(0.003)	(0.001)	(0.002)
Total Assets	0.468***	0.314	-0.165	-0.493***
($100,000s)	(0.081)	(0.311)	(0.139)	(0.109)
Net Farm Income	-2.494***	-3.933	-2.584	-1.27
($100,000s)	(0.563)	(3.234)	(2.836)	(5.349)
Share of income from Government Payments	0.017	-0.033	-0.077	-0.055
	(0.048)	(0.065)	(0.051)	(0.057)
Debt-to-Asset Ratio	-0.006	0.358	0.176**	-0.003
	(0.233)	(0.271)	(0.084)	(0.062)
Working Capital	-0.015	0.004	0.003	0.004
	(0.010)	(0.005)	(0.005)	(0.003)
Repayment Capacity	-0.024	-0.002	-0.003	-0.073**
	(0.030)	(0.007)	(0.038)	(0.029)

Ratio of Off-Farm to Total Income	-0.291***	3.064	-1.314	3.82*
	(0.106)	(2.547)	(1.744)	(2.205)
Share of Farmers with Bachelor's Degree	-0.07	0.081**	0.008	-0.033
	(0.059)	(0.034)	(0.015)	(0.025)
Number of Observations	1740	700	960	300
Adjusted R-Squared	-0.015528	0.12822	0.11169	0.28585

Notes: All standard errors are clustered at the state level. * indicates significance at the 0.1 level, ** indicates significance at the 0.05 level, and *** indicates significance at the 0.01 level.

[a] District-level models aggregate data at the district level, while state level models aggregate data at the state level.

[b] Either all states were used in the estimation or only the 15 core states with highest value of agricultural production.

Table 3 Panel Data Models for Farm Bankruptcy Rates with Interaction Terms

	District Level, Core States		State Level, Core States	
	Main Variables	Interaction Terms with Post-BAPCA Dummy	Main Variables	Interaction Terms with Post-BAPCA Dummy
Post-BAPCPA Dummy	9.142	---	2.57	---
	(9.993)	---	(5.262)	---
1-year Interest Rate	0.455*	-0.477	0.609***	-0.418
	(0.237)	(0.461)	(0.222)	(0.355)
10-year Interest Rate	-0.206	-0.122	-0.661***	0.376
	(0.653)	(0.861)	(0.248)	(0.511)
Non-Ag Bankruptcy Rate	-0.006	0.043**	-0.008	0.007
(per 10,000 establishments)	(0.009)	(0.020)	(0.008)	(0.013)
Consumer Delinquency Rate	0.149	-0.495	-0.657	0.479
	(0.703)	(0.783)	(0.549)	(0.510)
Lagged Consumer Delinquency Rate	-0.753	0.957	-0.453	0.661*
	(0.619)	(0.669)	(0.433)	(0.351)
Agricultural Delinquency Rate	-1.301	1.516	0.082	0.381
	(1.297)	(1.357)	(0.333)	(0.352)
Lagged Agricultural Delinquency Rate	0.452	-0.531	0.027	-0.297
	(0.663)	(0.809)	(0.323)	(0.344)
Unemployment Rate	0.667*	-0.759**	1.062***	-0.967**
	(0.369)	(0.375)	(0.403)	(0.457)
Value of Agricultural Land (per acre)	-2.119***	0.386	-1.468	-0.121
($1,000s)	(0.760)	(1.110)	(0.738)	(1.004)
Lagged Agricultural Land	1.307	0.074	1.443	0.145
($1,000s)	(0.905)	(1.206)	(0.970)	(1.323)
Acreage of Operation	0.005	-0.01**	0.011***	-0.01
	(0.004)	(0.005)	(0.003)	(0.007)
Total Assets	0.307	-0.034	-0.642***	0.43***
($100,000s)	(0.360)	(0.294)	(0.111)	(0.161)
Net Farm Income	-4.065	1.268	1.332	-4.055
($100,000s)	(4.458)	(5.549)	(6.531)	(7.840)
Share of income from Government Payments	-0.014	0.114	-0.034	0.115
	(0.086)	(0.126)	(0.074)	(0.109)
Debt-to-Asset Ratio	0.362	-0.29**	0.033	-0.573***
	(0.271)	(0.147)	(0.058)	(0.186)
Working Capital	-0.001	0.005	-0.004	0.006
	(0.009)	(0.008)	(0.006)	(0.008)

Repayment Capacity	-0.005	0.022	-0.06***	0.204
	(0.009)	(0.078)	(0.022)	(0.131)
Ratio of Off-Farm to Total Income	3.302	-5.192	5.597*	-1.173
	(2.760)	(5.979)	(3.324)	(5.453)
Share of Farmers with Bachelor's Degree	0.124**	-0.11*	-0.021	-0.002
	(0.051)	(0.061)	(0.026)	(0.027)
Number of Observations	700	---	300	---
Adjusted R-Squared	0.15638	---	0.32811	---

Notes: All standard errors are clustered at the state level. * indicates significance at the 0.1 level, ** indicates significance at the 0.05 level, and *** indicates significance at the 0.01 level.

Figures

Figure 1 Historical Farm Bankruptcies

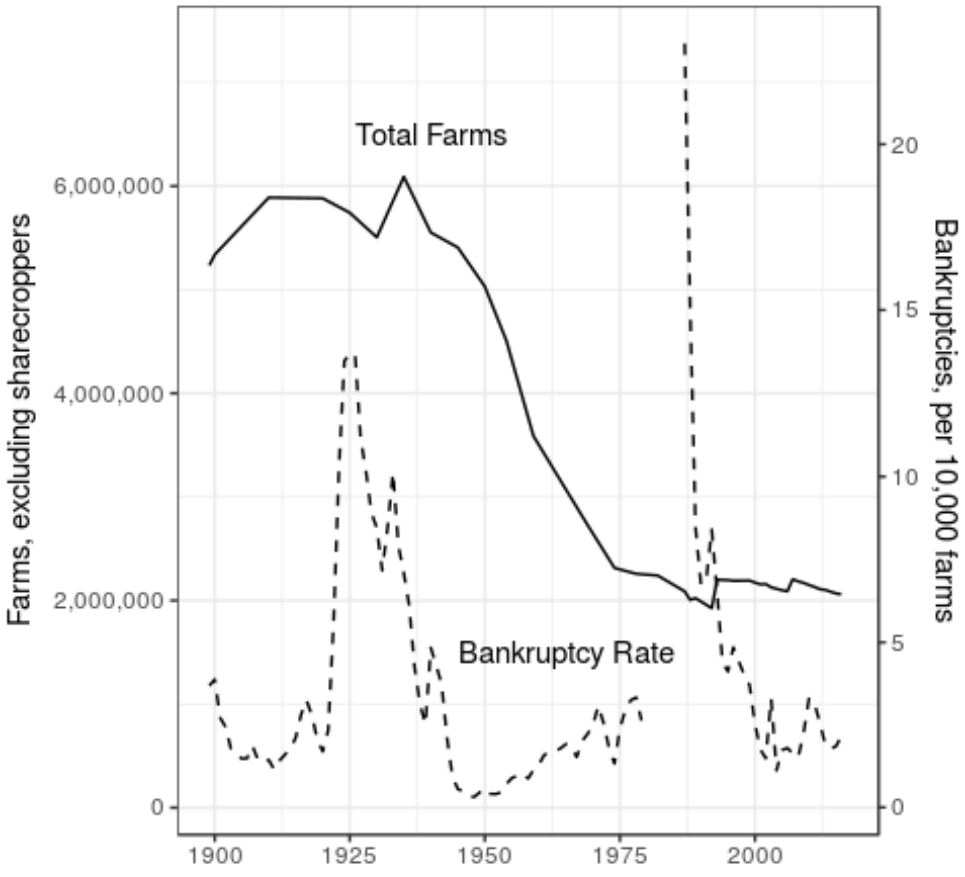


Figure 2: Bankruptcy Filings: Total, Total Personal, Total Business, and Farm Bankruptcies

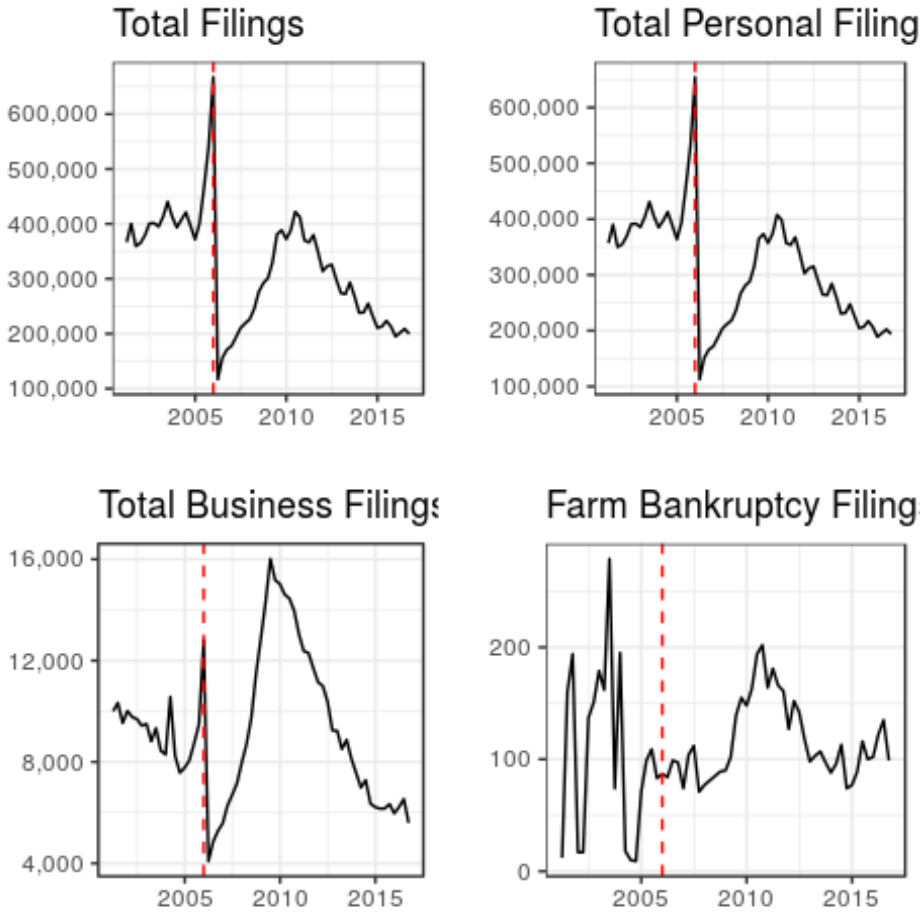
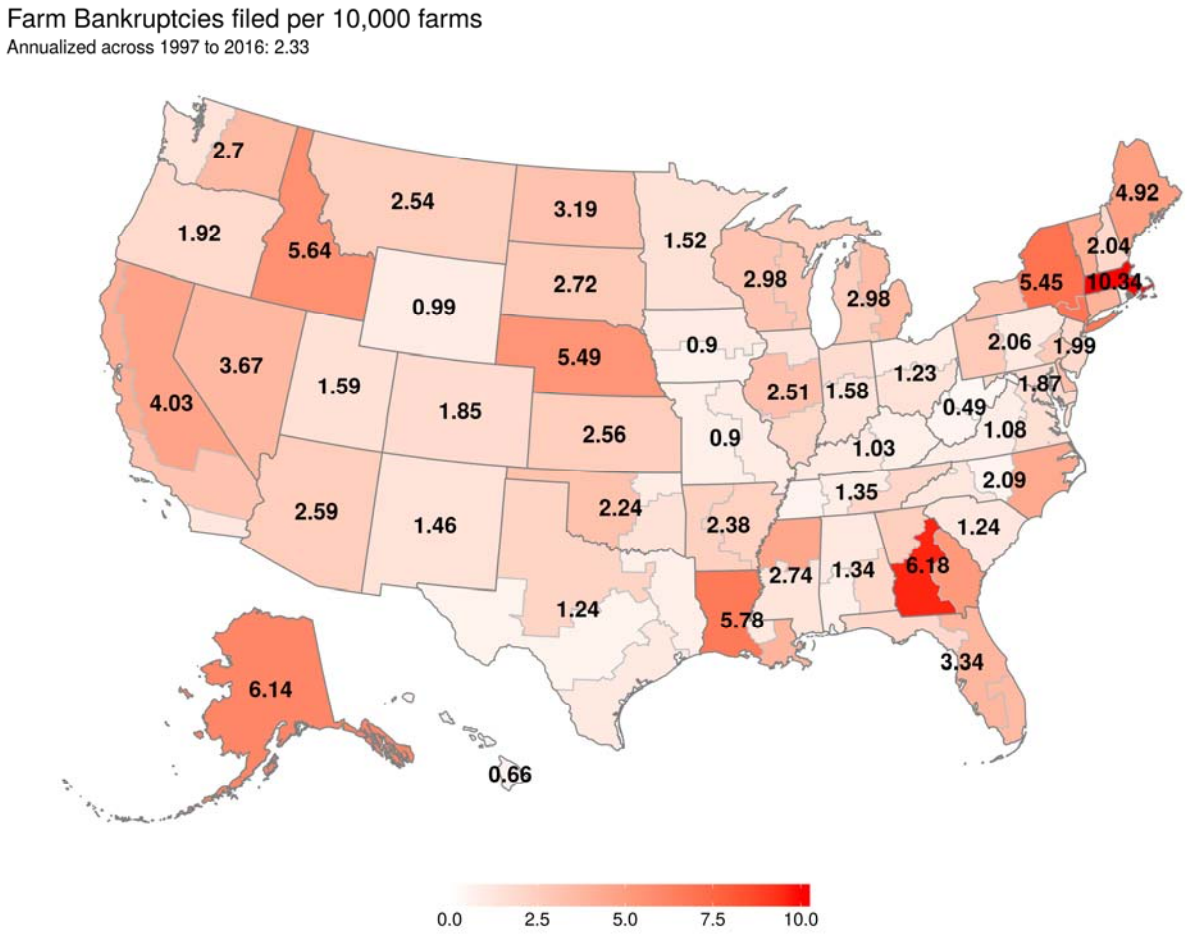
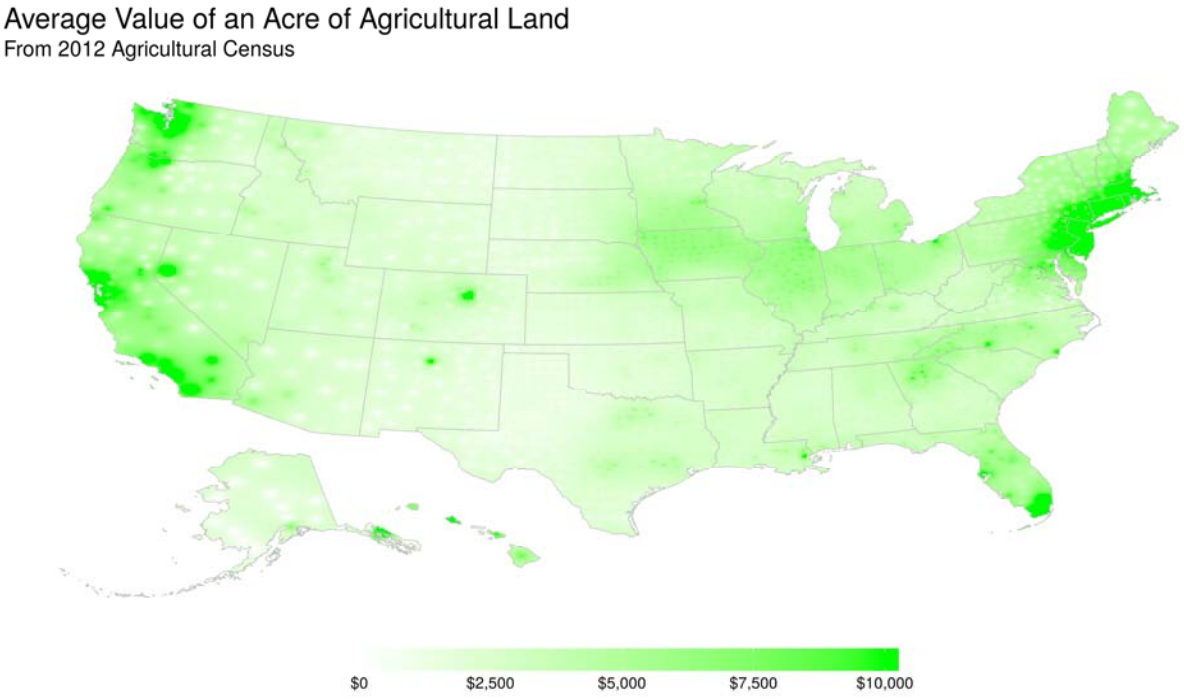


Figure 3 Farm Bankruptcy Rates by State and District



Note: Bankruptcy rates are shown as a number for each state and a shading for each district.

Figure 4 Agricultural Land Values



Note: Values are spatially smoothed via kriging with county level values evaluated at their county centroid.