

# Survival Analysis of Farm Bankruptcy Filings:

evaluating the time to completion of chapter 12 bankruptcy cases

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## Abstract

We examine trends in bankruptcy completion times and financial characteristics for farmers filing for chapter 12 bankruptcy after it became a permanent fixture in bankruptcy law to assess justifications for the recently enacted Family Farmer Bankruptcy Clarification Act of 2017 (FFBCA) and Family Farmer Relief Act of 2019 (FFRA). Since 2007, chapter 12 filers have seen noticeable increases in their debt levels whereas alternative business bankruptcies have either stagnated or declined in their debt. Using survival analysis methods to correct for the censored nature of open cases, we find that the average time to completion has consistently been longer for chapter 12 than the comparable chapters (7, 11, and 13) of business bankruptcies. Although chapter 12 completion times have not been increasing over time, we find that chapter 7 and 11 completion times have been declining over time for comparable businesses and that debt levels are a significant factor in increased completion times. Our results are consistent with claims that farmers have had rising debt levels in comparison to similar businesses filing for bankruptcy and provide evidence that farmers with increasing debt have had a more difficult time restructuring through chapter 12.

**JEL Codes:** G33, K35, Q14, Q18

**Keywords:** chapter 12, farm bankruptcy, survival analysis, Family Farmer Bankruptcy Clarification Act of 2017, Family Farmer Relief Act of 2019

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## Introduction

Since the National Bankruptcy Act of 1898, farmers have been afforded beneficial aspects in bankruptcy procedures which has included immunity from being involuntarily forced into bankruptcy for their business, protection for being able to re-acquire land in the event they file for bankruptcy, and moratoria placed on foreclosure of farms (Tabb 1995; Leibell Jr 1940; Alston 1984). Of particular note for the preference of farmers in bankruptcy law is the Family Farmer Bankruptcy Act of 1986, the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCPA) of 2005, the Family Farmer Bankruptcy Clarification Act of 2017 (FFBCA), and the Family Farmer Relief Act of 2019 (FFRA). The first enacted legislation which created chapter 12 bankruptcy, initially as a temporary measure, to combat the 1980s farm crisis (White 1987). Chapter 12 is a form of bankruptcy exclusive to farmers and modeled after chapter 13 bankruptcy but with less stringent income requirements and higher debt limits to account for the unique nature of farming (see tables 1 and 2). The initial sunset date of chapter 12 was October of 1993 although Congress extended its expiration date multiple times until 2005 when BAPCPA made chapter 12 a permanent form of bankruptcy. BAPCPA further loosened the income requirements, increased the debt limits, and expanded coverage to include fishermen for chapter 12 (Harl 2006). At the heart of the stated justifications of FFBCA and FFRA has been farmers struggling with debt levels in their completion of bankruptcy proceedings. Both of these acts attempted to correct the concerns that farmers have been struggling to make and complete an acceptable chapter 12 bankruptcy repayment plan. FFBCA dealt with how capital gains taxes were classified which hindered the ability for farmers to file an acceptable repayment plan within the debt limits of chapter 12 while FFRA was concerned with raising the literal debt limit level to allow for more bankruptcy plans to qualify.

To date, the claims of farmers struggling to meet debt limits of chapter 12 and farmers struggling to successfully complete chapter 12 filings because of their debt levels have not been tested nor addressed in non-anecdotal settings. Time to completion is an important aspect to consider in bankruptcy proceedings as both debtors and creditors prefer to have a shorter time to completion in order to reduce costs associated with bankruptcy. For creditors, these costs involve legal fees, internal staff resources for oversight, and outstanding

fees and payments. For debtors, being under a bankruptcy filing hinders access to credit which may limit the ability to rent land and/or marketing opportunities, increases the length of time to rebuild their credit score, and increases psychological stress (Branch 2002). Both sides have an incentive to reduce the time in bankruptcy and it is argued that longer completion times are a result of increased complexity of a case and/or financial difficulties in the proceedings which trigger delays to payment plan deadlines (Bris, Welch, and Zhu 2006). Further, one of the main tenets of BAPCPA was to reduce completion times and correspondingly the caseloads of bankruptcy proceedings (White 2009). As seen in figure 1, caseloads for business bankruptcies have greatly declined since the peak of The Great Recession except for chapter 12.

insert table 1 here

This study formalizes the claims to test: 1) if completion time for chapter 12 have increased over time and relative to other forms of bankruptcy and 2) if debt has been a factor associated with an increase in completion times for chapter 12. While the policy issues raised by FFBCA and FFRA are related to chapter 12 eligibility, no data exist which include farmers who would like to file for chapter 12 but are ineligible. Instead, we utilize individual level filings of all business bankruptcies filed from October 1, 2007 through September 30, 2019 in order to construct our survival analysis of chapter 12 cases (Federal Judicial Center 2019). With individual level filing data, we are able to exploit financial characteristics of filers who are required to submit a schedule of their assets and liabilities at the time of filing. Our study uses survival analysis techniques to address whether trends in completion times of chapter 12 cases are specific to farmers or apply to other bankruptcy chapters as well. Survival analysis is used to correct for the right censored nature of bankruptcy cases which are still open at the end of the sample period.

While there has been research on national, regional, and industry specific economic factors affecting the filing rate of chapter 12 bankruptcies (Dinterman, Katchova, and Harris 2018; Stam and Dixon 2004; Dixon et al. 2003; Shepard and Collins 1982) there is limited research focused on the individual filings that addresses duration to completion of the chapter 12 restructuring plan and its outcome.<sup>1</sup> Stam, Dixon, and Rule (2003) follows the filing procedure of bankruptcies by examining the time to termination of chapter 12 bankruptcy

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<sup>1</sup>A chapter 12 completes with either a discharge or dismissal where a discharge absolves unsecured debt from the debtor's responsibility while a dismissal provides no such benefits and allows creditors to seek repayment of debts.

cases and their outcome (discharge versus dismissal)<sup>2</sup> since the passage of the 1986 Family Farmer Bankruptcy Act until 2001. In the period of their study, the average time to completion of chapter 12 cases increased over time and also trended towards a higher rate of dismissals instead of discharges. Their study only focused on chapter 12 and it is not clear if the increased duration of open chapter 12 cases is indicative of a similarity or difference from general bankruptcy trends for chapters 7, 11, or 13. Further, their data are aggregated to the national level which masks additional information that can be gained through tracking individual cases over time.

Our results indicate a steady rise in the debt levels for chapter 12 filers in comparison to other filers which have had either stagnating or declining debt levels. We find evidence that increased debt levels are associated with longer completion times across all chapters which supports claims that increased debts have negatively affected chapter 12 procedures. Our results also indicate that non-chapter 12 filings have had decreased completion times since 2007 while chapter 12 completion times have stagnated, which indicates a relative increase in chapter 12 cases compared to the national trend. These trends are further evident when subsetting bankruptcy filers by similar debt levels and entity characteristics. To our knowledge, this is the first study to indicate increased bankruptcy completion times post-2007 through the use of individual bankruptcy filings.

We continue by first providing an overview of the bankruptcy procedure and then describing our data. Next, we provide an overview of survival analysis as it applies to bankruptcies. We then present our results and provide robustness checks with respect to the type of business filing for bankruptcy. We then conclude by describing how our results corroborate the justifications for passage of FFBCA as well as FFRA.

## Bankruptcy Procedures For Farmers

If a business finds its current debt payment obligations exceed its current cash flow the business may consider filing for bankruptcy to lessen their debt obligations. Depending on the business structure, its total debt levels, and whether or not the business intends to continue its operation, a business has four chapters of

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<sup>2</sup>Receiving a discharge implies that the unsecured debts in a bankruptcy case are forgiven and these occur with the successful completion of a bankruptcy repayment plan whereas a dismissal does not forgive any debts and allows creditors to freely pursue repayment of their claims.

bankruptcy to choose from: 7, 11, 12, and 13 (Morrison 2007). Chapter 7 is a liquidation of the business which necessarily requires cessation of operation (Kunkel and Peterson 2015c). There are no debt limits associated with a chapter 7, however all non-exempt assets will be sold off and the resulting funds distributed to creditors in the order of priority of their claims. Chapter 7 results in cessation of operation and is only used for a business if there is no viable business model that can result in a positive cash flow in the foreseeable future. Chapter 7 is by far the most common filing and has represented approximately 65% of all business bankruptcies since 2001 with an average of around 23,000 filed annually. All other chapters represent a form of reorganization for a business which allows for continued operation which has been a stated goal for chapter 12 to protect the family farm. Recent legislative changes to chapter 12 have attempted to address concerns related to the ability for farmers to file for bankruptcy.

In order to file for a chapter 12 bankruptcy, the entity must fall under the definition of a family farmer.<sup>3</sup> For an individual or an individual and spouse, the US Courts defines a family farmer as one which derives at least 50% of gross income from farming in the previous year.<sup>4</sup> In the case of a corporation or partnership, these can also be defined as farmers if more than one-half the outstanding stock or equity in the corporation or partnership is owned by one family or by one family and its relatives and more than 80% of the value of its assets are related to the farming operation. Both of these income related qualifications are referred to as the income test. While any commercial agriculture producer is eligible for chapter 12, Sadovi (2019) examined each individual chapter 12 filing in the 2018 year in an attempt to classify the farm type of each filer based on their scheduled assets. She found that the farm type ran the gamut involving row crops, specialty crops, vegetables and produce, livestock, dairy, and even aquaculture with a similar distribution to national agricultural producers.

In addition, the family farmer must also have at least 50% of their debts derived from farming and their debts cannot exceed the corresponding debt limit, which is referred to as the debt test. The debt limit has changed over time, as seen in table 1, with the level initially being \$1,500,000 when chapter 12 was formed.

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<sup>3</sup>Fishermen were initially not included in the definition of a family farmer in 1986. The 2005 BAPCPA expanded the definition to include fishermen but with less favorable treatment. Fishermen need at least 80% of their debt related to their operation and have a lower debt limit. While the US Courts data do not document the occupation of filers, Sadovi (2019) examined all publicly available chapter 12 filings for the 2018 year and determined that no more than 37 of the 474 examined filings involved fisheries.

<sup>4</sup>If filed after October 17, 2005, then the qualification can be satisfied for each of the prior 2nd and 3rd years instead of only the previous year.

The limit expanded in 2005 and has been adjusted once every 3 years for inflation. The majority of debts must arise from farming operations which implies that any chapter 12 filing is necessarily a business filing as opposed to a consumer filing (Jeweler 2002; O’Neill 2006).

insert table 1 here

Once a chapter 12 case is filed, a meeting of creditors must be held within 60 days where the secured and unsecured claims are prioritized. The filer must then submit a repayment plan where payments of fixed amounts are determined and set to be paid over the course of 3 to 5 years, although the time to repay can exceed 5 years in certain circumstances. Payments are made by the farmer to the appointed trustee who then distributes the funds to creditors in order of the priority claims (Kunkel and Peterson 2015b). Only debts which have been incurred by the time of the filing can be discharged. In general, a farmer prefers to receive a discharge of their debts which occurs after successful completion of payments to their agreed upon plan. Failure to meet the payment schedule may result in a dismissal of the bankruptcy filing and creditors are free to pursue debts.<sup>5</sup> The classification of secured and unsecured claims has been a significant issue in chapter 12 bankruptcy proceedings and has at various times made it more or less complicated to complete a bankruptcy filing.

FFBCA overturned a previous court ruling of *Hall v. United States*, 566 U.S. 506 (2012) which classified governmental claims as secured claims within a chapter 12 bankruptcy proceeding and allowed for the Internal Revenue Service (IRS) to have priority of claims over other creditors and indirectly gave the IRS the ability to halt a bankruptcy proceeding. Typically, capital gains taxes arise in a chapter 12 plan due to a farmer selling off land as part of its repayment plan. Because agricultural land has low turnover along with consistent increases in values, the selling of land as a part of a repayment plan lead to substantial capital gains and its resulting tax (Zhang et al. 2018). FFBCA reclassifies debts arising from governmental claims as non-priority which allows the claims to be discharged under successful completion of a chapter 12 filing (Peiffer 2017). Part of the justification for the passage of FFBCA is that “many [farmers] are precluded from using chapter 12 because the debt limit, although adjusted for inflation, has not kept pace with current asset values” (Tidgren

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<sup>5</sup>A farmer may prefer a dismissal if they have accumulated more debts after their initial filing and would like to refile a chapter 12 case instead of receiving a discharge on their current debts.

2017). The official legislation related to FFBCA relates to not just capital gains tax but any tax from the sale of farm assets put towards the bankruptcy plan:

Sec. 1232. Claim by a governmental unit based on the disposition of property used in a farming operation (a) Any unsecured claim of a governmental unit against the debtor or the estate that arises before the filing of the petition, or that arises after the filing of the petition and before the debtor's discharge under section 1228, as a result of the sale, transfer, exchange, or other disposition of any property used in the debtor's farming operation - (1) shall be treated as an unsecured claim arising before the date on which the petition is filed; (2) shall not be entitled to priority under section 507; (3) shall be provided for under a plan; and (4) shall be discharged in accordance with section 1228.

Increases in debt due to capital gains tax can push farmers over the debt limits for chapter 12 which would force the farmer to convert their bankruptcy to either chapter 7 or 11 and complicate their legal process. Changes in how taxes are prioritized for farmers, in comparison to non-farm business filers, further brings up concerns about the priority of tax claims in bankruptcy proceedings as taxes are now eligible to be discharged and how this may have future effects on the filing strategies of farmers. Fisher, Martel, and Gavius (2016) indicates that filers will substitute claims across government payments when the government is a poor monitor of overdue taxes but still remains as priority claims. In the case of the new legislation, taxes arising from the sale of farm assets would be shifted to unsecured claims and allow farmers to repay secured claims potentially leading to more successful bankruptcy proceedings at the expense of government revenues.

In April of 2019, the Family Farmer Relief Act was introduced in the US House of Representatives to increase the debt limit for chapter 12 bankruptcies to \$10,000,000. The arguments for the bill were similar to FFBCA and largely based on rapidly increasing land values, the likewise increase in farm real estate debt, and low farm incomes since 2013 (Delgado 2019). The bill was passed by the House on July 26th, then the Senate on August 2nd, and finally signed into law on August 23rd.<sup>6</sup> However, as pointed out in a letter by the American Bankers Association (ABA) to Congress in opposition of the bill, there was limited survey or statistical

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<sup>6</sup>The period between August 23rd and September 30th of 2019 had a total of 64 chapter 12 filings of which only 5 cases involved a filing with debts between the old limit and the new limit. This further calls into question what kind of statistical analysis, if any, was performed to determine the specific \$10 million debt limit value that was chosen.

justification for the nearly \$6 million increase in the debt limit (Ballentine 2019).

ABA's opposition to the debt limit increase was largely due to the "mortgage cramdown" that chapter 12 uniquely affords filers. In a chapter 12 proceeding, filers are allowed to write down their secured debt to the underlying asset value whereby the difference is converted to unsecured debt and discharged in a successful filing. Creditors clearly bear the cost of a successful chapter 12 filing and are especially susceptible to large declines in land values which make up the largest portion of farm debt. Increasing the debt limit exposes more farmland loans to the potential of a cramdown, a cost which will surely be borne by creditors and further passed on to debtors in the form of higher interest rates to some degree.

## **Alternative Forms of Bankruptcy**

A farmer in financial stress might not file for chapter 12 bankruptcy if they cannot pass the debt test or income test or if they are unaware that chapter 12 is an option for their family business (Kunkel and Peterson 2015d). Under these scenarios, a farmer then has chapters 7, 11, and 13 available to them although only 11 and 13 can allow for continued operation of the farm. For farmers that wish to continue operation, it is not clear if they have a preference between chapters 11 or 13 although more farmers will fit within the chapter 11 limitation than the 13 limitations since 13 has debt limits while 11 does not. Occupational information for bankruptcy filers has not been readily available since 1978, which makes it difficult to identify farmers filing for chapters other than 12. Matthews, Kalaitzandonakes, and Monson (1992) tracked 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.<sup>7</sup>

The chapter 12 bankruptcy is modeled after chapter 13 but adjusted to the economic realities of farming where land costs are significant and income is typically lower than other occupations and less stable (Dull 1986). A filer of chapter 13 is subject to lower debt limits than a chapter 12 filer and subject to additional restrictions of secured versus unsecured debts as seen in table 2. A chapter 13 filer must also provide evidence of consistent expected disposable income to meet their repayment obligations determined in their repayment

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<sup>7</sup>It is unclear how representative Missouri is of the entire United States and whether or not this distribution of chapters filed by farmers has held steady since 1987–89. However, there is no comprehensive data source of all farmers and whether or not they file for bankruptcy. There is no systematic collection of filer occupation by the US Courts after 1978.



plan which is a restriction that a farmer may not be able to fulfill due to uncertainty in their future income. Only sole proprietorships can file for chapter 13 as a small business and the typical chapter 13 filer is a consumer due to the relatively low debt limits. It is unclear why a farmer would prefer to file for chapter 13, however if they have failed the income test and are therefore not eligible for chapter 12 then they may prefer chapter 13 to 11.

insert table 2 here

The other form of reorganization for bankruptcy is chapter 11. A debtor filing for chapter 11 must submit a plan of reorganization within 120 days of initiation where the debtor attempts to restructure debts and their business plan. The debtor's plan must receive acceptance by at least one class of impaired claims<sup>8</sup> creditors. There are no debt limits associated with a chapter 11 filing, which is the primary reason a farmer would file as a chapter 11 bankruptcy as opposed to the preferred chapter 12 option (Kunkel and Peterson 2015a). However, chapter 11 plans typically involve a large number of creditors and coordination of a plan makes chapter 11 more complicated. There are also no strict timelines for a chapter 11 filer to receive a discharge unlike the 3 to 5 year timeline associated with chapters 12 and 13.

A clear hierarchy of filing options and groupings emerge if a farmer filing for bankruptcy wishes to continue farming whereas a chapter 7 liquidation is preferred for farmers that wish to exit agriculture. Chapter 12 is the preferred option as long as their debts are below the chapter 12 debt limit and they can pass the income test. If the debts exceed this amount, then chapter 11 is the only option available for a farmer that wishes to continue operations. However, if their debts are within the debt limits of a chapter 13 and the filer cannot pass the income test of qualifying as a farmer, then the farmer would prefer a chapter 13 filing over a chapter 11 filing. We now turn to a description of the bankruptcy filing data for our empirical analysis.

## Data

Data on bankruptcy filings come from the Federal Judicial Center's Integrated Database (FJC IDB) and includes all active cases between October 1, 2007 and September 30, 2019 which is the end of the 2019

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<sup>8</sup>An impaired claim involves creditors that will not be paid in full or whose legal rights are adjusted by the plan.

governmental fiscal year. Each fiscal year provides a snapshot of all bankruptcy filings that were active at some point in that time period, although the filer information is anonymous. Of particular interest for our study are characteristics that include the original filing chapter, the closing chapter, filing date, closing date (which may be open as of September 30, 2019), the result of the case (discharged versus dismissed), the financial standing (assets, liabilities, real property), whether they were a previous filer, categories for the number of creditors (1-49, 50-99, 100-199, etc.), business status (corporation, partnership, sole proprietorship), and if they are filing *pro se* (representing themselves versus retaining an attorney). Data limitations exist in examining cases filed prior to October 1, 2007 because of inconsistencies across the filing software for District courts (see FJC data description) therefore all bankruptcies filed prior to October 1, 2007 are removed for analysis involving financial characteristics. Further, because no more than 50% of debts can be consumer related for chapter 12 bankruptcies we limit our sample to only business related bankruptcies instead of consumer bankruptcies.

Table 3 denotes the number of cases filed and closed in the corresponding governmental fiscal year for all cases filed after September 30, 2007. Bankruptcy filings increase during downturns of the business cycle which are evident in the high number of filings around 2010 that coincide with The Great Recession (Berger and Udell 1998; Fairlie 2013). While the stated intention of BAPCPA was to limit abuse of consumer bankruptcies, most businesses also felt the pressure of more strict requirements for the filing of bankruptcy which led to an abrupt drop in the previous upward trend in bankruptcies prior to 2006 (White 2009). Albanesi and Nosal (2018) noted that chapter 7 filings had a 50% drop in filings since the passage of BAPCPA while chapter 13 filings were largely unaffected.

insert table 3 here

Every bankruptcy filed must provide a schedule of assets (real and personal property, schedule A/B), exemptions (schedule C), creditors that hold a secured claim (schedule D), unsecured creditors (schedule E/F), executory contracts and unexpired leases (schedule G), co-debtors (schedule H), income (schedule I), and monthly expenses (schedule J). All of these are provided at the time of filing and if the case is converted to another chapter, however they are at the point of origination and are not tracked over the bankruptcy

process. These schedules are available for all cases filed after September 30, 2007 which allows for an analysis of trends in the financial characteristics of filers at the time of filing. In relation to the claims of lawmakers related to FFBCA and FFRA, the debt levels of farmers filing for bankruptcy can be examined along with examining their assets broken down by personal and real property.

Figure 2 displays the median financial characteristics of filers for chapter 12 for each quarter since October 1, 2007. The median instead of the mean is used to reduce the influence of outliers. There is a pronounced upward trend in liabilities for filers over the time from roughly \$500,000 to over \$750,000, which gives credence to the concern that lawmakers had for the characteristics of filers. On the other side, the median of real property values does not have a particular trend aside from a slight uptick and it is in-determinant that capital gains tax has been a concern of filers. This does not provide definitive evidence that farmers are running into issues potentially exceeding the debt limits of chapter 12 as we cannot identify farmers who file for other chapters because they exceeded debt limits. A helpful comparison summary is the financial characteristics of business filers for other reorganization forms of bankruptcy (chapter 11 and 13).

insert figure 2 here

The trend for both chapters 11 and 13 filer's liabilities is a slight decline since around 2012. The median filer of chapter 13 has significantly less in liabilities (consistently below \$400,000) than both chapter 11 and 12 whereas the median chapter 11 typically has the highest liabilities (around \$1,000,000). While these are general trends involved in bankruptcy filings, the crux of the arguments for FFBCA and FFRA relies on increasing level of debts negatively affecting the outcomes for farmers. Presumably, a farmer filing for chapter 12 desires a discharge of their debts – although this is not unequivocally true – and the following section tests claims that increases in debt levels negatively affect the length of completion for farmers filing for bankruptcy. We utilize survival analysis techniques for a more rigorous framework in the following section.

## Survival Analysis

Social scientists use survival analysis in evaluating models of time to completion which, for economists, largely involve unemployment length, time to default on a loan, or length of a worker's strike for example, Cameron and Trivedi (2005). Survival analysis is generally defined as a set of methods for analyzing data where the outcome variable is the time until the occurrence of an event of interest. In the context of bankruptcies, the duration can be thought of as the time from the filing of a bankruptcy case until it has closed via either a discharge, dismissal, or conversion to another chapter (Morrison 2007). For example, Gómez and Sánchez (2018) uses survival analysis to determine how the length of case completions were affected by changes in Spanish bankruptcy law from their Great Recession.

Let  $T$  be a non-negative random variable representing the completion time of a bankruptcy filing (Rodríguez 2008). The basic survival function,  $S(t)$ , indicates the probability that a case will still be open until or beyond time period  $t$  and can be defined as:

$$S(t) = Pr(T > t) = 1 - F(t) = 1 - \int_0^t f(s)ds \quad (1)$$

which gives the probability of a case remaining open during duration  $t$ , or more generally, the probability that the case has not been closed by the end of duration  $t$ .  $F(t)$  represents the cumulative distribution function and  $f(s)$  the probability density function of an unspecified distribution. An alternative characterization of the distribution of  $T$  is given by the hazard function, or instantaneous rate of occurrence of the event, defined as:

$$\begin{aligned} \lambda(t) &= \lim_{dt \rightarrow 0} \frac{\Pr\{t \leq T < t + dt | T \geq t\}}{dt} \\ &= \frac{f(t)}{S(t)} \end{aligned} \quad (2)$$

the numerator of this expression is the conditional probability that the case has closed in the interval  $[t, t + dt)$  given that it has not closed before, and the denominator is the width of the interval. Dividing one by the

other we obtain a rate of case completion per unit of time. Taking the limit as the width of the interval goes down to zero, we obtain an instantaneous rate of case completions, i.e. the hazard rate. The second expression in equation 2 is an alternative structuring which expresses the rate of case completions during duration  $t$  equals the density of cases completed during time  $t$ , divided by the probability of a case still being open at the end of the duration without completing. The survival function can be estimated through non-parametric or parametric methods, the purpose depending on the intent of the researcher.

## Non-Parametric Estimation

A common non-parametric estimator is the Kaplan-Meier estimator which corrects for censored data in a distribution (Borgan 2005). The estimator takes the form of:

$$\hat{S}(t) = \prod_{t_j \leq t} \left(1 - \frac{d_j}{r_j}\right) \quad (3)$$

where  $r_j$  is the open cases prior to time  $t_j$  and  $d_j$  are the number of cases which close during that time. If there are no censored observations, then equation 3 reduces to one minus the empirical distribution function. Of interest is the survival distributions of the different chapters of bankruptcy.

insert figure 3 here

In evaluating the time to completion, it is clear from the Kaplan-Meier curves produced in figure 3 that chapter 7 filings close faster than all other chapters on average with half of the chapter 7 filings closing at the 7 month mark. In comparison, half of the chapter 11 filings close within 16 months (about 1.3 years) and the equivalent is 25 months (about 2.2 years) for chapter 13 and 41 months (about 3.3 years) for chapter 12. The result of chapter 7 is clear and intuitive as the liquidation process does not have an associated repayment plan to creditors and after one year more than half of the filed chapter 7 cases have been closed. Also evident is that the chapter 12 filings consistently take the longest time to completion. Pairwise log-rank tests of no statistical difference between each chapter's survival curve are all rejected at less than the 1% level which indicates a clear difference in the unconditional completion times across all chapters of bankruptcy.

The chapter 11 and 13 completion times are similar for the first year and then the curve for chapter 13 continues to remain flat while for chapter 11 drops rapidly. This is a result of filers needing to make payments to their confirmed repayment plans for between 3 and 5 years in order to receive a discharge of their debts. Around the 3 year (36 months) and 5 year (60 month) marks, chapter 13 cases rapidly close as seen with their pronounced declines in its survival curve. Lawton (2015) notes the shift in small business bankruptcies from chapter 13 towards chapter 11 post-BAPCPA by evaluating the percentage of chapter 13 eligible filers that still file for chapter 11 the year before and after the passage of BAPCPA.

insert figure 4 here

A further focus in the differences in the completion times for bankruptcies is on the completions of different forms of reorganization for whether or not a dismissal or discharge is achieved, which figure 4 displays. Pairwise log-rank tests of no statistical difference between each chapter's survival curve are all rejected at less than the 1% level which indicates a clear difference in the unconditional completion times across dismissals and discharges for chapters 11, 12, and 13 of business bankruptcy. Dismissals occur faster for all forms of reorganization, although chapter 12 dismissals consistently have longer duration while chapter 11 and 13 are similar in duration to dismissal. Dismissals occur for various reasons while discharges occur because of a successful completion of a repayment plan and therefore have different shapes for their survival functions. Chapter 11 cases have a smoother decline for discharge rates and are faster than chapter 12 or 13 plans. Chapters 12 and 13 cases which result in discharges have similar shapes and both exhibit strong declines around the 3 year mark although chapter 13 cases have a more pronounced decline in probabilities to remain open after the 5 year mark. Although the median time to completion for discharges of chapter 12 and 13 are similar (62 and 63 months), the upper quartile of completion time drastically diverges (6.2 years for chapter 12 and 5.5 years for chapter 13). In this largely descriptive analysis, chapter 12 has longer time to completion than other reorganization forms of bankruptcy. What is not clear is if this is a consistent result over time. Further, the impact that debt has on completion times is not clear either. To address these concerns, we turn to parametric analysis.

## Parametric Estimation

Let  $T_i$  be a random variable representing the (possibly unobserved) survival time of the  $i$ -th unit. Since  $T_i$  must be non-negative, we might consider modeling its logarithm using a conventional linear model:

$$\log T_i = \mathbf{x}'_i \boldsymbol{\beta} + \epsilon_i \quad (4)$$

where  $\epsilon_i$  is a suitable error term, with a distribution to be specified. This model specifies the distribution of log-survival for the  $i$ -th unit as a simple shift of a standard or baseline distribution represented by the error term. Exponentiating this equation, we obtain a model for the survival time itself:

$$T_i = \exp\{\mathbf{x}'_i \boldsymbol{\beta}\} T_{0i} \quad (5)$$

where we have written  $T_{0i}$  for the exponentiated error term. Different models result from assumptions on the distribution of the error term where the censored nature of the dependent variable is accounted for through contributions of the error term. We consider the exponential, log-logistic, log-normal, and Weibull distributions in our analysis and models are estimated through maximum likelihood methods which are programmatically implemented through the “survival” package in R (Therneau 2019).

In addition, we control for other factors which affect completion times and are possibly correlated with filing year and liabilities: quarterly dummies for the filing date are included to account for the cyclical nature of filing, a dummy for whether or not the filer had more than 50 creditors in their filing, a dummy if the filing business is structured as a corporation, a dummy for whether or not the filer has previously filed for bankruptcy, and a dummy for whether the filer is filing pro se. Cases with more creditors tend to last longer due to coordination issues between competing parties who have claims on debt. Relatedly, corporations pose a more complex decision structure on bankruptcy filings although this may be an ambiguous effect as corporations are more likely to have staff with more knowledge of bankruptcy procedures than alternative business structures. Filers who have previously filed for bankruptcy tend to better understand the process

and have faster completions while filers who are representing themselves (i.e. filing pro se) are less likely to understand the bankruptcy process and are more susceptible to dismissals which have faster completion times than a discharge. The average characteristics of each chapter at their time of filing are presented in table 4 along with the median liabilities of the filer. All the values except for the liabilities measure are binary variables. Since there are no debt limits for chapter 7 or 11, the respective percentage of filers of chapter 7 or 11 those categories that would have fit the debt limits of chapter 12 are 91% and 65%.

Our main interest in modeling bankruptcy completion times is related to the trends since 2007 as well as the role of debt in relation to the duration of bankruptcy filings. Therefore, our covariates of interest involve a filer's liabilities at the time of filing and dummy variables for the governmental fiscal year. We further include controls for the filing quarter to account for cyclical trends but these coefficients are not of direct interest. If the FFBCA and FFRA reasoning is justified, then we expect to see two results for chapter 12 filings: 1) filing completion times are increasing over time and 2) the amount of debt is a significantly increases completion times of chapter 12. The first result would arise from dummy variables with a reference category in 2008 trending towards larger coefficients over time to indicate lengthening in case times for chapter 12. And for the amount of debt to matter, these would indicate significantly positive coefficients for chapter 12 cases implying that higher debt levels are associated with longer completion times. As a crude measure of time to completion, a greater percentage of chapter 12 filers have bankruptcy cases which are open as of September 30th, 2019 which additionally provides justification for survival methods to handle these censored observations.

## Parametric Results

Our primary focus is to evaluate claims specifically related to chapter 12 filings in that completions have trended to longer times in recent years and that debt levels are a concern. We therefore limit our sample to only chapter 12 cases filed after September 30, 2007 and vary our primary models by the assumed distribution between exponential, log-logistic, log-normal, and Weibull. The results are presented in table 5.

insert table 5



All models produce similar coefficient estimates, although the Weibull distribution is our preferred specification as it is the best fit according to both the Akaike information criterion (AIC) and maximized log-likelihood criteria (Rodríguez 2008). Across all models, higher level of liabilities is associated with an increase the completion times for chapter 12 filers which is a central issue with respect to FFBCA and FFRA. Farmers with more liabilities are in bankruptcy for longer times, the magnitude of which is an additional million dollars worth of liabilities results in about a 4% increase in average completion time.

With respect to other coefficients of interest for chapter 12 filers, it appears that corporations, previous filers, and *pro se* filers all experience significantly shorter time in bankruptcy while having more than 50 creditors is associated with longer times to completion. All of these results have expected signs with a note that the coefficient on corporations has an ambiguous sign.

There does not appear to be any cyclical trends to the filing of chapter 12 cases and their completions as noted by the quarterly dummies which are not distinguishable from zero.<sup>9</sup> Similarly, the time trends of the filing year do not exhibit an obvious trend or have coefficients that are statistically different from zero.<sup>10</sup> While the justifications for the FFBCA and FFRA were related to increased completion times, we do not find supportive evidence from evaluating only chapter 12 cases. However, general trends in all bankruptcy filings are not captured in the current model. On this aspect, it is not clear if farmers have been struggling in their bankruptcy filings over time prior to the FFBCA or FFRA. To test these claims, we turn to analyzing other forms of bankruptcy to serve as a relative measure for chapter 12 performance which is also subject to economy-wide effects that may be a potential confounding factor in addressing increased difficulties in completing bankruptcies for farmers.<sup>11</sup> Our subsequent models for other chapters use a Weibull distribution to look at economy-wide trends in bankruptcy completions. Our results are not sensitive to the assumed distribution as they all produce similar estimates.

insert table 6

Across different forms of bankruptcy chapters, increased liabilities are consistently a significant predictor of

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<sup>9</sup>F-test for joint significance of quarterly coefficients are not rejected with p values ranging from 0.101 to 0.563 across all models.

<sup>10</sup>F-test for joint significance of Weibull results in a p value of 0.241, however the test is rejected for the three other models which would indicate a positive trend due to the positive statistical significance for fiscal year coefficients.

<sup>11</sup>To the extent that the data do not include all relevant factors, the analysis may also suffer from an omitted variable bias. However, if the correlation between farm factors and general economy factors is low, the omitted variable bias may be mitigated.

increased completion time as seen in table 6. Further, the expected signs for number of creditors, previous filers, and *pro se* filers are all met across chapters with fairly similar magnitudes with the exception of over 50 creditors of chapter 11 filers which have a substantial increase in completion times. The one ambiguous sign, which is corporation status, is associated with decreased completion times for chapters 11, 12, and 13 while it is associated with a lengthened completion time for chapter 7 filers. An alternative specification for addressing differences across the chapters is to pool all of the bankruptcy filings together and create a dummy variable for bankruptcy chapter filed and further interacting this dummy variable with each of the covariates as opposed to modeling each chapter individually. The omitted chapter category is chapter 12 as this is the chapter of interest and the second, third, and fourth columns are interactions of the covariates with chapter 7, 11, and 13 respectively in table 7.

insert table 7

The first column in table 7 effectively represents the baseline case, which would be a chapter 12 category as it is omitted and its coefficient estimates are similar to the chapter 12 only regression in table 6. The coefficients for each of the dummy values of non-chapter 12 cases are all negative and statistically significant which confirm the previous finding that chapter 12 takes longer to complete than the other forms of bankruptcy. Of particular note testing differences between chapter 12 and other chapters is that higher debt levels for chapter 11 cases are associated with reduced time to completion than chapter 12 while the opposite is the case for chapter 13.

While chapter 12 completion times had an indistinguishable trend for completion time, chapters 7 and 11 have obvious trends to faster completion times since the reference period of the 2008 fiscal year while chapter 13 has similarly indistinguishable trends like chapter 12. The chapter 7 and 11 decreased times are likely a result of the emphasis on streamlined bankruptcy procedures that resulted from BAPCPA although it is interesting that chapters 12 and 13 did not see similar declines in completion times. The completion times of chapter 7 and 11 are statistically shorter than chapter 12 while chapter 13 completion times cannot be distinguished from chapter 12 cases as seen in the pooled regression table 7. However, the types of business which file for chapters 7 and 11 are likely to be vastly different from chapters 12 and 13 due to the nature

of lower debt limits as well as their form of reorganization. Clearly, chapter 7 is not a reorganization of a business and a business filing for chapter 7 is not able to continue operations which may skew results. In order to correct for this, we turn to different grouping bankruptcy filings in a similar fashion.

## **Trends Post-BAPCPA (Robustness)**

In order to control for the general bankruptcy trends, we construct additional samples through chapter 11 and chapter 13 filings of businesses which have similar levels of debts as chapter 12 filings. The chapter 12 procedure is modeled after chapter 13, which provides a natural comparison group for the time trends of general bankruptcies across the same period of interest. One issue is that the debt limits for chapter 12 are consistently higher than chapter 13 over this time period (seen in tables 1 versus 2).

A selection bias issue potentially arises if all chapter 12 filers are compared to chapter 13 because some chapter 12 filers may not have been eligible to file for chapter 13 in the first place. Chapter 11 filers also pose a problem in comparing them to chapter 12 filers in that there are no debt limits associated with chapter 11. Therefore, it would not be appropriate to compare a chapter 11 filers with debts exceeding the chapter 12 debt limits. We therefore construct three different sample sets to have a more homogeneous group of debt filers:

1. All chapter 12 filers plus chapter 11 filers that would not have exceeded chapter 12 debt limits at the time of filing. Highest average level of debts and 41,232 observations.
2. All chapter 13 filers plus chapter 12 filers that would not have exceeded chapter 13 debt limits at the time of filing. Lowest average level of debts and 25,822 observations.
3. All chapter 13 filers plus chapter 11 and 12 filers that would not have exceeded chapter 13 debt limits at the time of filing. Slightly higher average level of debts than category 2 and 43,109 observations.

By grouping debt levels of small businesses, the subsets represent a more homogeneous grouping of bankruptcy filers which helps in interpreting trends in bankruptcy filings. The first grouping has the highest levels of debt while the second and third are lower due to the small debt level qualifications of chapter 13. Baird, Bris, and Zhu (2007) establishes that chapter 11 business filers have a stark change in their bankruptcy outcomes

and length at approximately the \$5 million cut-off in assets, further indicating that larger business filers may not be a comparable group to farmers.<sup>12</sup> Table 8 displays the results of these subsets of data with the additional dummy variable indicating if a filing was chapter 12.

insert table 8

Chapter 12 consistently take longer to complete when compared to similar sized small businesses as evidenced by the dummy variable which ranges in magnitude of 22.9% to 62.1% with the highest increase of length for chapter 12 in the subset with the highest average debt level. Grouping of similarly sized debts helps alleviate concerns related to potentially heterogeneous effects on bankruptcy filings and provides support to the claim that chapter 12 bankruptcies take longer to complete. However, subsetting the data based on liabilities creates difficulties in interpreting the coefficient on liabilities because liabilities can only increase up to a certain level before a bankruptcy filing will not be within the subset. For the most stringent debt limits involving the chapter 13 subsets, an increase in liabilities results in a shorter bankruptcy duration while the higher liabilities levels involving only chapter 11 and chapter 12 result in longer completion times. The change in direction of liabilities on completion times based on the subset of the data may point to potential non-linearities in liabilities effect, which is left as future research.

The bankruptcies with larger debt limits have trended to faster completion times since 2008 with the exception of the most recent fiscal year of 2019. At the same time, the subset with the more stringent debt limits (including only chapters 12 and 13) had a blip of increased completion times between 2013 and 2015 while the subset including all reorganization chapters lies in-between the two subsets. While conclusions for potential trends in bankruptcy completion times is mixed, an important aspect of these coefficients is that they control for potential trends and the results still maintain chapter 12 bankruptcies last longer than other similar forms of bankruptcy.

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<sup>12</sup>While all of these filings are classified as business bankruptcies, it is important to note that Lawless and Warren (2005) indicates that the Administrative Office of the US Courts is conservative in their classification of business versus consumer filings where the Administrative Office is more likely to omit entrepreneurs, self-employed individuals, and independent contractors from the business filers.

## Conclusion

Our study uses survival analysis techniques to address whether trends in completion times of chapter 12 cases is a farmer specific problem while also providing a framework to better understand which farmer characteristics affect the time to completion of chapter 12 cases. We find a steady rise in the debt levels for chapter 12 filers in comparison to other filers which have had either stagnating or declining debt levels over our sample period of 2007 to 2019. We find evidence that debt levels affected the completion times of chapter 12, although this is not a chapter 12 specific issue as other chapters also see increased completion times due to increased liabilities. While we do not find that chapter 12 cases are taking longer to complete over time, our study indicates that comparable businesses filing for chapters 7 and 11 have seen decreased completion times which brings up a concern that chapter 12 (and 13) have not seen similar decreases in completion times over the same period. All of our results are at least supportive of the justifications for FFBCA and FFRA and we have no findings in direct conflict of their stated objectives.

Chapter 12 has always been intended for a different type of filer as farming has peculiar aspects as a business. Farming has lumpy income streams and is highly dependent on land if it is to continue operations for multiple years. Agricultural land markets are a great source of debt for farmers whether or not they are purchasing or renting the land. In the case of farmers purchasing land, they will likely be financing the purchase and using the land itself as collateral. As this occurs, farmers' finances become heavily tied to the land markets which presents possible risks in farming. Dinterman, Katchova, and Harris (2018) note that decreases in land values trigger a higher rate of farm bankruptcies in a region and is exacerbated if the preceding years had rapid appreciation in land values. This dynamic in the farmland market brings to light a potentially more important aspect in the bankruptcy proceedings than simply the classifications of claims as a bubble in land values may result in a run of farm bankruptcies. Intuitively this makes economic sense as the mortgage cramdown is one of the largest benefits of filing for chapter 12 as the underlying debt can be written down to current market value and save the farmer substantial debt payments at the expense of creditors.

This study utilizes the best publicly available bankruptcy data on individual filers, yet many characteristics of importance are lacking in the data. Data on how frequently farmers decide to sell off land in order to fulfill

their repayment plans and the amount of their capital gains taxes, two crucial aspects of the FFBCA and FFRA legislation, are not readily available. Acquiring better data on the characteristics of not only chapter 12 bankruptcies but all chapters with a specific interest in identifying whether or not a filer is actively engaged in agriculture would go a long way to helping better understand the financial stress that farmers face and how it differs from the general population. Aside from acquiring better data on farm related bankruptcies, continued tracking of chapter 12 filing trends in light of FFRA can help better understand the economic realities of farmers in distress.

Addressing these data limitations would provide a more robust inspection of the claims stemming from FFBCA and FFRA. Although the findings of this study do not contradict the claims that farmers have had a more difficult time in completing bankruptcy and debts have contributed towards this increase in completion time, the study is limited in fully evaluating the acts for two main aspects. The data limitations as previously referenced hinder further evaluation of the effects of debts on completion times while both acts need an appropriate amount of time after passage to evaluate their effects on completion times. As the repayment plan for chapter 12 is intended to be between three and five years, the earliest that a possible positive impact from FFBCA could be found is between late 2020 and 2022 while FFRA would not be detected until 2022. Timing and data issues aside, it is not clear that the best path of reducing potential financial distress of farmers would be through the channel of debt limit. Increasing debt limits solves a potential problem related to eligibility, however it does not address any issues related to mediation between debtor and creditor, establishing adequate lines of credit for the filer, identifying new or better streams of income for the filer, nor reviewing business practice of the filer. Reviewing or evaluating the procedures involved in a chapter 12 filing is out of the scope of this article although it is left open for future research.

## References

- Albanesi, Stefania, and Jaromir Nosal. 2018. "Insolvency After the 2005 Bankruptcy Reform." Working Paper 24934. Working Paper Series. National Bureau of Economic Research. <https://doi.org/10.3386/w24934>.
- Alston, Lee J. 1984. "Farm Foreclosure Moratorium Legislation: A Lesson from the Past." *The American Economic Review* 74 (3): 445–57.
- Baird, Douglas G, Arturo Bris, and Ning Zhu. 2007. "The Dynamics of Large and Small Chapter 11 Cases: An Empirical Study." *American Law & Economics Association Annual Meetings Conference Paper, Cambridge*.
- Ballentine, James C. 2019. "ABA Letter to Express Opposition to H.r. 2336, the Family Farmer Relief Act." <https://www.aba.com/advocacy/policy-analysis/aba-letter-opposition-hr-2336>.
- Berger, Allen N, and Gregory F Udell. 1998. "The Economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle." *Journal of Banking & Finance* 22 (6-8): 613–73.
- Borgan, Ørnulf. 2005. "Kaplan–Meier Estimator." *Encyclopedia of Biostatistics*.
- Branch, Ben. 2002. "The Costs of Bankruptcy: A Review." *International Review of Financial Analysis* 11 (1): 39–57.
- Bris, Arturo, Ivo Welch, and Ning Zhu. 2006. "The Costs of Bankruptcy: Chapter 7 Liquidation Versus Chapter 11 Reorganization." *The Journal of Finance* 61 (3): 1253–1303.
- Cameron, A Colin, and Pravin K Trivedi. 2005. *Microeconometrics: Methods and Applications*. Cambridge university press.
- Delgado, Antonio. 2019. "Delgado Leads Bipartisan Bill to Ease Chapter 12 Bankruptcy Rules Amid Farm Economy Slump," April. <https://delgado.house.gov/media/press-releases/delgado-leads-bipartisan-bill-ease-chapter-12-bankruptcy-rules-amid-farm>.
- Dinterman, Robert, Ani L Katchova, and James Michael Harris. 2018. "Financial Stress and Farm Bankruptcies in Us Agriculture." *Agricultural Finance Review*.
- Dixon, Bruce L, Nan Ma, Bruce L Ahrendesen, and Latisha Settlege. 2003. "Factors Affecting State-Level Chapter 12 Filing Rates: A Panel Date Model." *Bankr. Dev. J.* 20: 401.
- Dull, Jeffrey L. 1986. "Bankruptcy Chapter 12: How Many Family Farms Can It Salvage." *UMKC L. Rev.* 55: 639.
- Fairlie, Robert W. 2013. "Entrepreneurship, Economic Conditions, and the Great Recession." *Journal of Economics & Management Strategy* 22 (2): 207–31.
- Federal Judicial Center. 2019. "Integrated Data Base." <https://www.fjc.gov/research/idb/>; Administrative Office of the U.S. Courts.
- Fisher, Timothy CG, Jocelyn Martel, and Ilanit Gavious. 2016. "Tax Claims, Government Priority, Absolute Priority and the Resolution of Financial Distress." *International Review of Law and Economics* 48: 50–58.
- Gómez, Miguel García-Posada, and Raquel Vegas Sánchez. 2018. "Bankruptcy Reforms in the Midst of the Great Recession: The Spanish Experience." *International Review of Law and Economics* 55: 71–95.
- Harl, Neil E. 2006. "Bankruptcy Reform and the Effects on Chapter 12 Bankruptcy for Farmers (and Fishermen)." *Agricultural Finance Review* 66 (1): 7–16.
- Jeweler, Robin. 2002. *Bankruptcy Reform Legislation in the 107th Congress: A Comparison of H.r. 333 as Passed by the House and the Senate*. Congressional Research Service, Library of Congress. <https://www.everycrsreport.com/reports/RL30865.html>.

- Kunkel, Phillip L., and Jeffrey A. Peterson. 2015a. “Bankruptcy: Chapter 11 Reorganizations.” *Farm Legal Series*. University of Minnesota Extension; <http://www.extension.umn.edu/agriculture/business/taxation/farm-legal-series/bankruptcy-chapter-11-reorganizations/docs/bankruptcy-chapter-11-reorganizations.pdf>.
- . 2015b. “Bankruptcy: Chapter 12 Reorganization.” *Farm Legal Series*. University of Minnesota Extension; <http://www.extension.umn.edu/agriculture/business/taxation/farm-legal-series/bankruptcy-chapter-12-reorganizations/docs/bankruptcy-chapter-12-reorganization.pdf>.
- . 2015c. “Bankruptcy: Chapter 7 Liquidations.” *Farm Legal Series*. University of Minnesota Extension; <http://www.extension.umn.edu/agriculture/business/taxation/farm-legal-series/bankruptcy-chapter-7-liquidations/docs/bankruptcy-chapter-7-liquidations.pdf>.
- . 2015d. “Bankruptcy: The Last Resort.” *Farm Legal Series*. University of Minnesota Extension; <http://www.extension.umn.edu/agriculture/business/taxation/farm-legal-series/bankruptcy-the-last-resort/docs/bankruptcy-the-last-resort.pdf>.
- Lawless, Robert M, and Elizabeth Warren. 2005. “The Myth of the Disappearing Business Bankruptcy.” *Cal. L. Rev.* 93: 743.
- Lawton, Anne. 2015. “The Individual Chapter 11 Debtor Pre-and Post-Bapcpa.” *The American Bankruptcy Law Journal* 89 (3): 455.
- Leibell Jr, Vincent L. 1940. “Chandler Act—Its Effect Upon the Law of Bankruptcy, the.” *Fordham L. Rev.* 9: 380.
- Matthews, SF, NG Kalaitzandonakes, and MJ Monson. 1992. “Missouri Farm Bankruptcies, 1981-89.” *Mimeograph, Dept. Of Agr. Econ., University of Missouri at Columbia*.
- Morrison, Edward R. 2007. “Bankruptcy Decision Making: An Empirical Study of Continuation Bias in Small-Business Bankruptcies.” *The Journal of Law and Economics* 50 (2): 381–419.
- O’Neill, Barbara. 2006. “Permanent and Expanded: Chapter 12 Bankruptcy Regulations Following BAPCPA.” *Agricultural Finance Review* 66 (1): 17–25.
- Peiffer, Joseph A. 2017. “Thirty Years of Asking, ‘Are We There yet?’” *American Bankruptcy Institute Journal* 36 (12): 8–69.
- Rodríguez, Germán. 2008. “Multilevel Generalized Linear Models.” In *Handbook of Multilevel Analysis*, 335–76. Springer.
- Sadovi, Maura Webber. 2019. “Bitter Harvest: Debt and the Bankrupting of the American Family Farm.” <http://investigations.debtwire.com/bitter-harvest-debt-and-the-bankrupting-of-the-american-family-farm/>.
- Shepard, Lawrence E, and Robert A Collins. 1982. “Why Do Farmers Fail? Farm Bankruptcies 1910–78.” *American Journal of Agricultural Economics* 64 (4): 609–15.
- Stam, Jerome M, and Bruce L Dixon. 2004. *Farmer Bankruptcies and Farm Exits in the United States, 1899-2002*. US Department of Agriculture, Economic Research Service.
- Stam, Jerome M, Bruce L Dixon, and William Rule. 2003. “Sixteen Years of Chapter 12 Bankruptcy: Evolution of Filing and Disposition Rates.” *Agricultural Finance Review* 63 (1): 93–108.
- Tabb, Charles Jordan. 1995. “History of the Bankruptcy Laws in the United States, the.” *Am. Bankr. Inst. L. Rev.* 3: 5.
- Therneau, Terry M. 2019. *A Package for Survival Analysis in R*. <https://CRAN.R-project.org/package=survival>.
- Tidgren, Kristine A. 2017. “President Trump Signs Family Farmer Bankruptcy Clarification Act into Law.” *The Ag Docket*. Iowa State University Center for Agricultural Law; Taxation; <https://www.calt.iastate.edu/blogpost/president-trump-signs-family-farmer-bankruptcy-clarification-act-law>.



White, James J. 1987. "Taking from Farm Lenders and Farm Debtors: Chapter 12 of the Bankruptcy Code." *J. Corp. L.* 13: 1.

White, Michelle J. 2009. "Bankruptcy: Past Puzzles, Recent Reforms, and the Mortgage Crisis." *American Law and Economics Review* 11 (1): 1–23.

Zhang, Wendong, Alejandro Plastina, Wendiam Sawadgo, and others. 2018. "Iowa Farmland Ownership and Tenure Survey 1982-2017: A Thirty-Five Year Perspective." Food; Agricultural Policy Research Institute (FAPRI) at Iowa State University.

## Tables

Table 1: Chapter 12 Debt Limits Over Time

Date Effective	Farmer Debt Limit	Fishermen Debt Limit
1986-11-26	\$1,500,000	NA
2005-10-15	\$3,237,000	\$1,500,000
2007-04-01	\$3,544,525	\$1,642,500
2010-04-01	\$3,792,650	\$1,757,475
2013-04-01	\$4,031,575	\$1,868,200
2016-04-01	\$4,153,150	\$1,924,550
2019-04-01	\$4,411,400	\$2,044,225
2019-08-23	\$10,000,000	\$2,044,225

Table 2: Chapter 13 Debt Limits Over Time

Date Effective	Unsecured Debt Limit	Secured Debt Limit
1979-10-01	\$100,000	\$350,000
1994-10-22	\$250,000	\$750,000
1998-04-01	\$270,000	\$807,000
2001-04-01	\$290,525	\$871,550
2004-04-01	\$307,675	\$922,975
2007-04-01	\$336,900	\$1,010,650
2010-04-01	\$360,475	\$1,081,400
2013-04-01	\$383,175	\$1,149,525
2016-04-01	\$394,725	\$1,184,200
2019-04-01	\$419,275	\$1,257,850

Table 3: Bankruptcy Cases Closed and Filed

Year	Chapter 7		Chapter 11		Chapter 12		Chapter 13	
	Closed	Filed	Closed	Filed	Closed	Filed	Closed	Filed
2008	16,504	27,623	6,957	8,240	381	342	8,393	3,897
2009	27,330	41,586	7,948	13,916	358	499	6,016	4,570
2010	38,045	41,759	10,540	12,742	427	728	5,531	4,388
2011	37,607	35,619	11,773	10,571	468	697	4,458	3,867
2012	33,546	28,910	11,877	9,323	464	555	4,010	3,436
2013	28,608	23,000	11,337	7,974	533	393	3,944	2,788
2014	23,922	18,669	9,517	6,316	487	371	3,627	2,321
2015	19,854	16,038	7,976	5,661	531	368	3,331	2,059
2016	17,079	14,852	6,849	5,909	454	439	2,936	2,253
2017	16,173	14,140	6,514	5,526	530	484	2,827	1,999
2018	14,377	13,585	7,183	5,328	482	440	2,375	1,771
2019	14,933	13,699	5,964	5,825	437	564	2,134	1,719

<sup>a</sup> Year refers to the government fiscal year, which spans from October 1st to September 30th.

Table 4: Characteristics of Bankruptcy Filers

Chapter	>50 Creditors	Corporation	Previous Filer	Pro Se	Liabilities	Total	Open
7	21%	27%	5%	4%	\$500,335	304,493	6%
11	29%	80%	7%	4%	\$905,553	83,615	13%
12	6%	15%	16%	5%	\$770,500	5,355	28%
13	8%	1%	24%	9%	\$308,657	30,830	14%

<sup>a</sup> For all business bankruptcies filed between October of 2007 and September of 2018 with Open representing case status as of September 30th, 2018. Liabilities represents the median value. Standard deviation of binary variables can be calculated via  $\sqrt{n * P * (1 - P)}$  where P is the mean and n is the number of observations.

Table 5: Chapter 12 Regression Results

	Chapter 12 Duration in Months			
	Distribution			
	<i>exponential</i> Exponential	<i>survreg: loglogistic</i> Log-Logistic	<i>survreg: lognormal</i> Log-Normal	<i>Weibull</i> Weibull
Liabilities (millions)	0.052*** (0.018)	0.052*** (0.017)	0.059*** (0.017)	0.047*** (0.015)
Over 50 Creditors	0.053 (0.065)	0.114* (0.066)	0.100 (0.067)	0.057 (0.054)
Corporation	-0.218*** (0.045)	-0.300*** (0.046)	-0.268*** (0.046)	-0.195*** (0.038)
Previous Filer	-0.451*** (0.042)	-0.558*** (0.045)	-0.512*** (0.045)	-0.403*** (0.035)
Pro Se	-0.897*** (0.066)	-1.280*** (0.075)	-1.187*** (0.072)	-0.803*** (0.056)
2009	0.021 (0.078)	0.156* (0.086)	0.182** (0.085)	0.009 (0.065)
2010	0.085 (0.073)	0.255*** (0.080)	0.272*** (0.079)	0.065 (0.060)
2011	0.084 (0.073)	0.219*** (0.080)	0.248*** (0.080)	0.064 (0.061)
2012	-0.041 (0.076)	0.071 (0.084)	0.111 (0.083)	-0.060 (0.063)
2013	-0.004 (0.081)	0.108 (0.088)	0.144* (0.088)	-0.036 (0.067)
2014	0.088 (0.086)	0.122 (0.091)	0.184** (0.090)	0.028 (0.071)
2015	0.076 (0.088)	0.124 (0.091)	0.216** (0.091)	-0.011 (0.073)
2016	0.265*** (0.090)	0.269*** (0.090)	0.355*** (0.089)	0.130* (0.075)
2017	0.212** (0.092)	0.209** (0.089)	0.338*** (0.088)	0.045 (0.077)
2018	0.255** (0.107)	0.148 (0.097)	0.280*** (0.094)	0.020 (0.090)
2019	0.265** (0.129)	-0.050 (0.114)	0.075 (0.106)	0.004 (0.108)
Q2	0.040 (0.046)	0.033 (0.046)	0.048 (0.047)	0.034 (0.038)
Q3	0.052 (0.046)	0.045 (0.046)	0.055 (0.046)	0.038 (0.038)
Q4	-0.0004 (0.047)	-0.042 (0.048)	-0.015 (0.048)	-0.005 (0.039)
Observations	5,355	5,355	5,355	5,355
Log Likelihood	-18,362.130	-18,462.170	-18,443.370	-18,268.310
AIC	36764.3	36966.3	36928.7	36578.6

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01  
Standard errors are clustered at the court district level.

Table 6: Weibull Regression Results

	<i>Dependent variable:</i>			
	Duration in Months			
	Chapter 7	Chapter 11	Chapter 12	Chapter 13
Liabilities (millions)	0.071*** (0.001)	0.001*** (0.00005)	0.047*** (0.015)	0.086*** (0.015)
Over 50 Creditors	0.224*** (0.005)	0.348*** (0.008)	0.057 (0.054)	0.059*** (0.020)
Corporation	0.530*** (0.004)	-0.340*** (0.009)	-0.195*** (0.038)	-0.779*** (0.060)
Previous Filer	-0.138*** (0.009)	-0.381*** (0.013)	-0.403*** (0.035)	-0.424*** (0.013)
Pro Se	-0.203*** (0.009)	-0.933*** (0.016)	-0.803*** (0.056)	-1.513*** (0.018)
2009	-0.055*** (0.008)	-0.034** (0.015)	0.009 (0.065)	0.016 (0.021)
2010	-0.121*** (0.008)	-0.232*** (0.015)	0.065 (0.060)	0.002 (0.022)
2011	-0.167*** (0.008)	-0.334*** (0.015)	0.064 (0.061)	-0.002 (0.022)
2012	-0.137*** (0.008)	-0.332*** (0.016)	-0.060 (0.063)	0.005 (0.023)
2013	-0.082*** (0.009)	-0.285*** (0.016)	-0.036 (0.067)	-0.003 (0.024)
2014	-0.085*** (0.009)	-0.207*** (0.017)	0.028 (0.071)	-0.010 (0.026)
2015	-0.024** (0.010)	-0.115*** (0.018)	-0.011 (0.073)	0.085*** (0.028)
2016	-0.031*** (0.010)	-0.142*** (0.018)	0.130* (0.075)	0.028 (0.028)
2017	-0.027** (0.011)	-0.164*** (0.019)	0.045 (0.077)	-0.063** (0.031)
2018	-0.078*** (0.012)	-0.172*** (0.020)	0.020 (0.090)	-0.256*** (0.034)
2019	-0.053*** (0.014)	0.112*** (0.028)	0.004 (0.108)	-0.157*** (0.047)
Q2	0.010* (0.005)	0.037*** (0.009)	0.034 (0.038)	0.00000 (0.015)
Q3	-0.026*** (0.005)	0.014 (0.009)	0.038 (0.038)	-0.013 (0.015)
Q4	-0.015*** (0.005)	-0.014 (0.010)	-0.005 (0.039)	-0.023 (0.015)
Observations	304,493	83,615	5,355	30,830
Log Likelihood	-1,058,390.000	-302,605.500	-18,268.310	-115,956.100
AIC	2116821.5	605253	36578.6	231954.2

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01  
Standard errors are clustered at the court district level.

Table 7: Pooled Weibull Regression Results (Interactions)

	<i>Duration in Months</i>			
	Baseline	Chapter 7	Chapter 11	Chapter 13
Chapter Dummy		-1.279*** (0.068)	-0.278*** (0.07)	-0.147** (0.072)
Liabilities (millions)	0.051*** (0.018)	0.019 (0.018)	-0.05*** (0.018)	0.034 (0.024)
Over 50 Creditors	0.053 (0.064)	0.159** (0.064)	0.302*** (0.065)	0.01 (0.068)
Corporation	-0.216*** (0.045)	0.738*** (0.045)	-0.126*** (0.046)	-0.554*** (0.08)
Previous Filer	-0.447*** (0.042)	0.315*** (0.042)	0.068 (0.044)	0.003 (0.044)
Pro Se	-0.889*** (0.065)	0.631*** (0.066)	-0.161** (0.068)	-0.679*** (0.069)
2009	0.02 (0.077)	-0.066 (0.077)	-0.05 (0.078)	0.001 (0.08)
2010	0.084 (0.071)	-0.195*** (0.072)	-0.301*** (0.073)	-0.078 (0.075)
2011	0.082 (0.072)	-0.24*** (0.072)	-0.403*** (0.074)	-0.081 (0.076)
2012	-0.043 (0.075)	-0.088 (0.075)	-0.273*** (0.077)	0.049 (0.079)
2013	-0.007 (0.08)	-0.068 (0.08)	-0.262*** (0.082)	0.006 (0.084)
2014	0.083 (0.085)	-0.161* (0.085)	-0.269*** (0.087)	-0.077 (0.09)
2015	0.068 (0.086)	-0.084 (0.087)	-0.157* (0.089)	0.052 (0.092)
2016	0.252*** (0.089)	-0.277*** (0.09)	-0.361*** (0.091)	-0.177* (0.094)
2017	0.197** (0.09)	-0.216** (0.091)	-0.317*** (0.092)	-0.196** (0.096)
2018	0.233** (0.105)	-0.309*** (0.106)	-0.342*** (0.108)	-0.406*** (0.112)
2019	0.238* (0.127)	-0.294** (0.127)	-0.018 (0.13)	-0.283** (0.137)
Q2	0.039 (0.045)	-0.028 (0.046)	0.007 (0.047)	-0.037 (0.049)
Q3	0.051 (0.045)	-0.076* (0.045)	-0.024 (0.046)	-0.061 (0.048)
Q4	-0.001 (0.046)	-0.013 (0.047)	-0.004 (0.047)	-0.019 (0.049)
Observations	397,214			
Log Likelihood	-1,386,600.604			
AIC	2,773,355.207			

Note:

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01  
Baseline category is chapter 12 filing. Standard errors are clustered at the court district level.

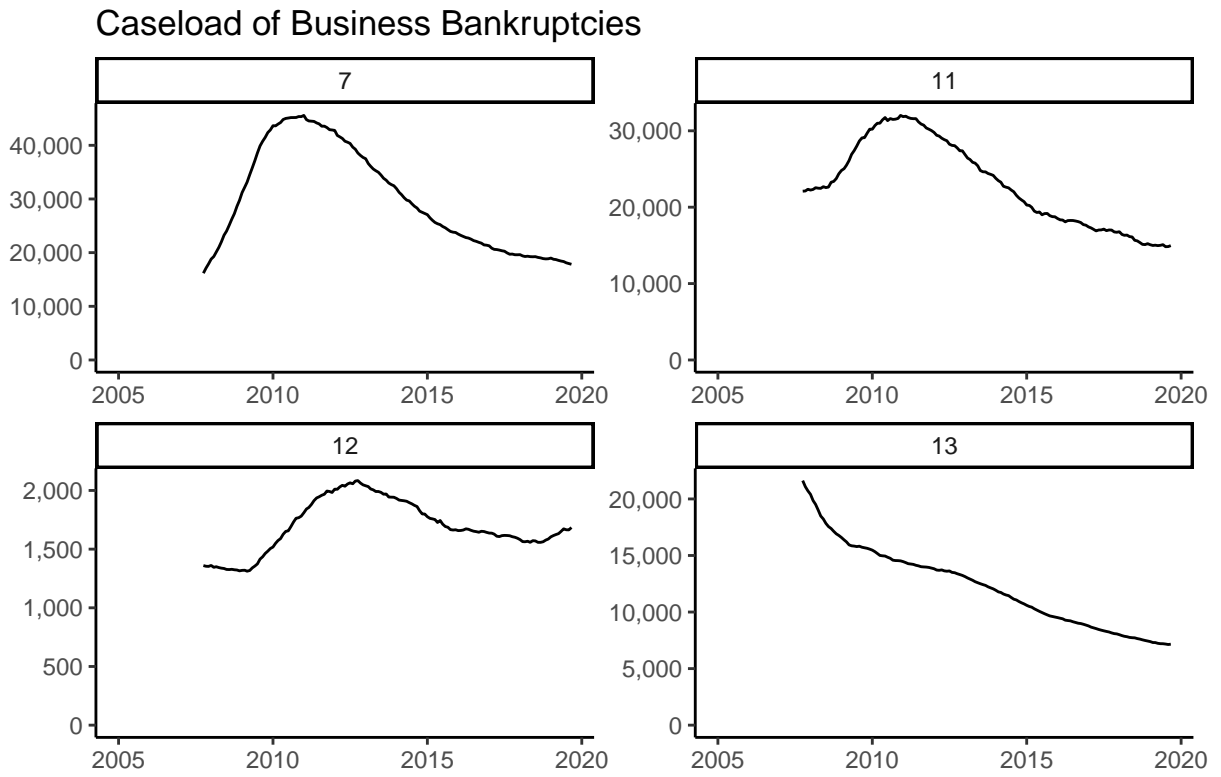
Table 8: Subsets of Chapter 12 Regression Results

	<i>Dependent variable:</i>		
	Duration in Months		
	11 and 12	12 and 13	11 and 12 and 13
Chapter 12	0.621*** (0.017)	0.229*** (0.020)	0.354*** (0.019)
Liabilities (millions)	0.041*** (0.004)	-0.037** (0.018)	-0.094*** (0.014)
Over 50 Creditors	0.326*** (0.014)	0.063*** (0.021)	0.261*** (0.016)
Corporation	-0.414*** (0.011)	-0.393*** (0.047)	-0.742*** (0.009)
Previous Filer	-0.310*** (0.015)	-0.399*** (0.013)	-0.366*** (0.011)
Pro Se	-0.623*** (0.027)	-1.053*** (0.025)	-1.048*** (0.021)
2009	-0.075*** (0.020)	0.023 (0.020)	-0.011 (0.018)
2010	-0.104*** (0.020)	0.027 (0.021)	-0.042** (0.018)
2011	-0.214*** (0.020)	0.025 (0.021)	-0.101*** (0.018)
2012	-0.235*** (0.021)	-0.002 (0.022)	-0.127*** (0.019)
2013	-0.175*** (0.021)	0.002 (0.023)	-0.119*** (0.019)
2014	-0.109*** (0.022)	0.042* (0.026)	-0.062*** (0.021)
2015	-0.098*** (0.023)	0.102*** (0.028)	-0.032 (0.022)
2016	-0.014 (0.024)	0.070** (0.028)	-0.025 (0.022)
2017	-0.034 (0.024)	-0.029 (0.031)	-0.073*** (0.024)
2018	-0.014 (0.026)	-0.203*** (0.036)	-0.172*** (0.026)
2019	0.443*** (0.039)	-0.002 (0.054)	0.176*** (0.040)
Q2	0.005 (0.012)	0.024 (0.015)	0.023* (0.012)
Q3	-0.004 (0.012)	0.014 (0.015)	-0.008 (0.012)
Q4	-0.025** (0.013)	-0.004 (0.015)	-0.005 (0.012)
Observations	41,232	25,822	43,109
Log Likelihood	-148,073.500	-98,496.040	-160,062.500
AIC	296191	197036.1	320169.1

*Note:* \*p<0.1; \*\*p<0.05; \*\*\*p<0.01  
Standard errors are clustered at the court district level.

# Figures

Figure 1:

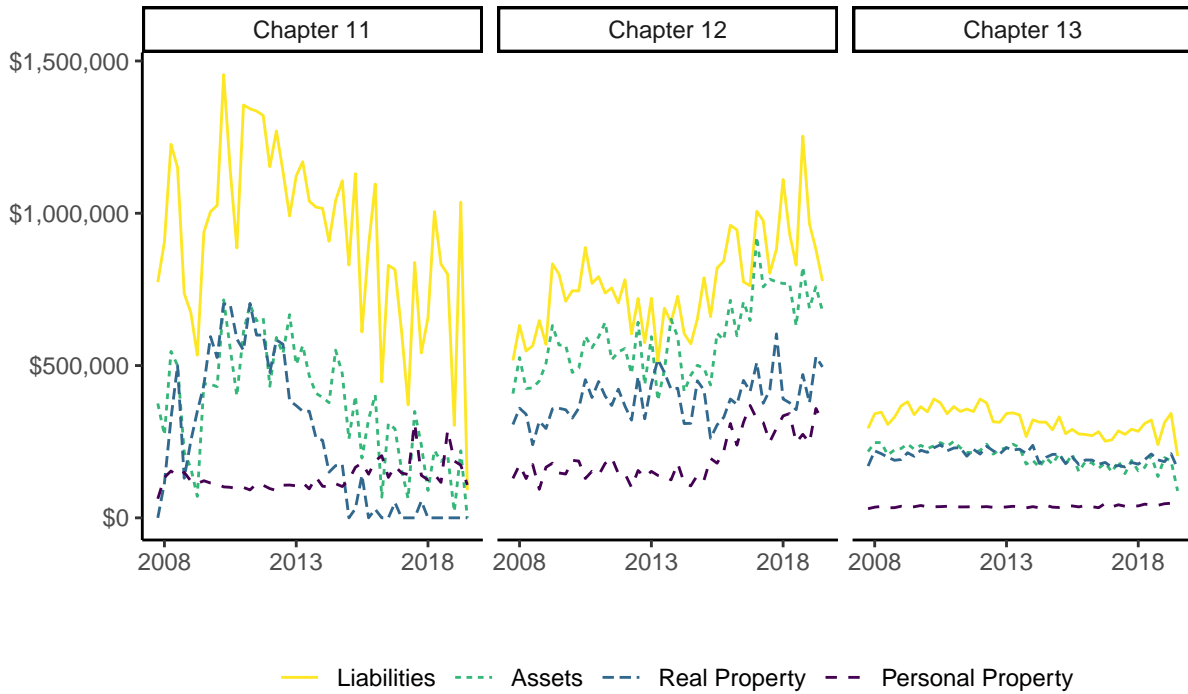


Source: FJC IDB



Figure 2:

**Filed Bankruptcy Finances (Businesses only)**  
median quarterly values from 2007-09-30 to 2019-09-30



Source: FJC IDB

Figure 3:

Probability of a Case Still Open  
for cases filed after 30 September 2007

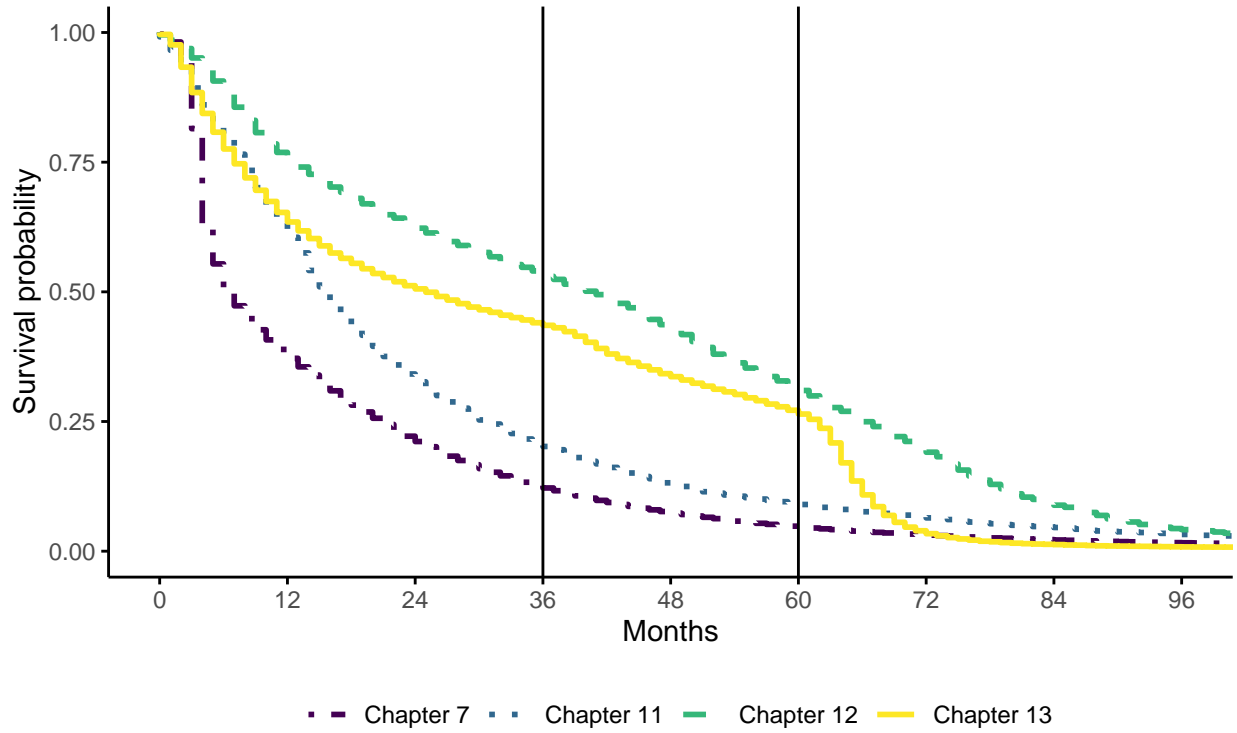


Figure 4:

### Probability of a Case Still Open For Reorganization of Businesses

