

Survival Analysis of Farm Bankruptcy Filings

An examination of chapter 12 filing trends*

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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). Since 2007, chapter 12 filers have seen noticeable increases in their debts levels whereas alternative business bankruptcies have either stagnated or declined in their debts. Using survival analysis methods to correct for the censored nature of open cases, we find that 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. Our results are consistent with claims that farmers have had rising debt levels in comparison to similar businesses filing for bankruptcy and corroborate claims that farmers in financial stress have had a more difficult time restructuring through chapter 12.

JEL Codes: G33, K35, Q14, Q18

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Introduction

Since the National Bankruptcy Act of 1898, farmers have been afforded special beneficial aspects in bankruptcy procedures at various times 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, and the Family Farmer Bankruptcy Clarification Act of 2017 (FFBCA). 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.¹ 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). 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 (Zhang et al. 2018), the selling of land as a part of a repayment plan lead to substantial capital gains and its resulting tax. 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 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

¹As of 2018, chapter 13 filings cannot exceed unsecured debts of \$394,725 and secured debts of \$1,184,200. For chapter 12 filings, total debts cannot exceed \$4,153,150 for farmers and \$1,924,550 for fishermen. Both chapters debt limit values are adjusted for inflation once every three years although on different schedules, which can be seen in tables 1 and 2. Chapter 13 values will be adjusted next on April 1, 2019 while chapter 12 values will be adjusted on April 1, 2020.

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 – i.e. pay down absolute priority claims at the expense of government claims – 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 thus potentially leading to more successful bankruptcy proceedings at the expense of government revenues.

To date, increasing debts of farmers have not been addressed or tested in a non-anecdotal setting. This study formalizes the claims to test if completion time for chapter 12 have increased and if debts have been a factor causing an increase in completion times for chapter 12 through survival analysis of individual filings of bankruptcy. 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.² Stam, Dixon, and Rule (2003) follows the filing procedure of bankruptcies by examining the time to termination of chapter 12 bankruptcy cases and their outcome (discharge versus dismissal)³ 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

²A 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.

³Receiving 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.

data are aggregated to the national level which masks additional information that can be gained through use of tracking individual cases over time.

Our study uses survival analysis techniques to address whether trends in completion times of chapter 12 cases are a farmer specific problem or apply to other bankruptcy chapters as well. We utilize individual level filings of all bankruptcies filed from October 1, 2007 through September 30, 2018 in order to construct our survival analysis of chapter 12 cases (Federal Judicial Center 2017). With individual level filing data, we are able to exploit financial characteristics of filers which are required to submit a schedule of their assets, debts, and liabilities at the time of filing. 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 mixed evidence that debt levels have affected the completion times of chapter 12 whereas we do find other chapters complete faster for businesses with lower levels of debt.

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.

Bankruptcy Procedures For Farmers

If a business finds its current debt payment obligations exceed its current cash flow – i.e. having repayment capacity problems – the business may consider filing for bankruptcy to lessen their debt obligations. A business pursuing bankruptcy has four chapters to choose from in 7, 11, 12, and 13 depending on the business structure, their total debt levels, and whether or not the business intends to continue its operation (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 which only makes sense for a business if there is no viable business model that can result in a positive cash flow in the foreseeable future. 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.

In order to file for a chapter 12 bankruptcy, the entity must fall under the definition of a family farmer.⁴ 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.⁵ 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. 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. 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).

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
2008-04-01	\$3,544,525	\$1,642,500
2011-04-01	\$3,792,650	\$1,757,475
2014-04-01	\$4,031,575	\$1,868,200
2017-04-01	\$4,153,150	\$1,924,550

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 – i.e. forgiven if all the terms of the repayment plan have been met. In general, a farmer prefers to receive a discharge of their debts which occurs

⁴Fishermen were initially not included in the definition of family farmer in 1986. The 2005 BAPCPA expanded the definition to include fishermen but with less favorable definitions. Fishermen need at least 80% of their debt related to their operation and have a lower debt limit.

⁵If filed after October 17, 2005, then the qualification can be satisfied for each of the prior 2nd and 3rd preceding years instead of only the previous year.

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.⁶

A farmer 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 (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.⁷

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 plan, 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.

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 claims⁸ 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

⁶A farmer may prefer a dismissal if they have accumulated more debts after their initial filing and would like to re-file a chapter 12 case instead of receiving a discharge on their current debts.

⁷It 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 has also not been a way to determine the occupation of filers of bankruptcy after 1978.

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

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

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, 2018 – which is the end of the 2018 governmental fiscal year. Each fiscal year provides a snapshot of all bankruptcy filings that were active at some point in that time period. 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, 2018),

the result of the case (discharged versus dismissed), the financial standing (assets, liabilities, real property), whether they were a previous filer, the number of creditors, 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.

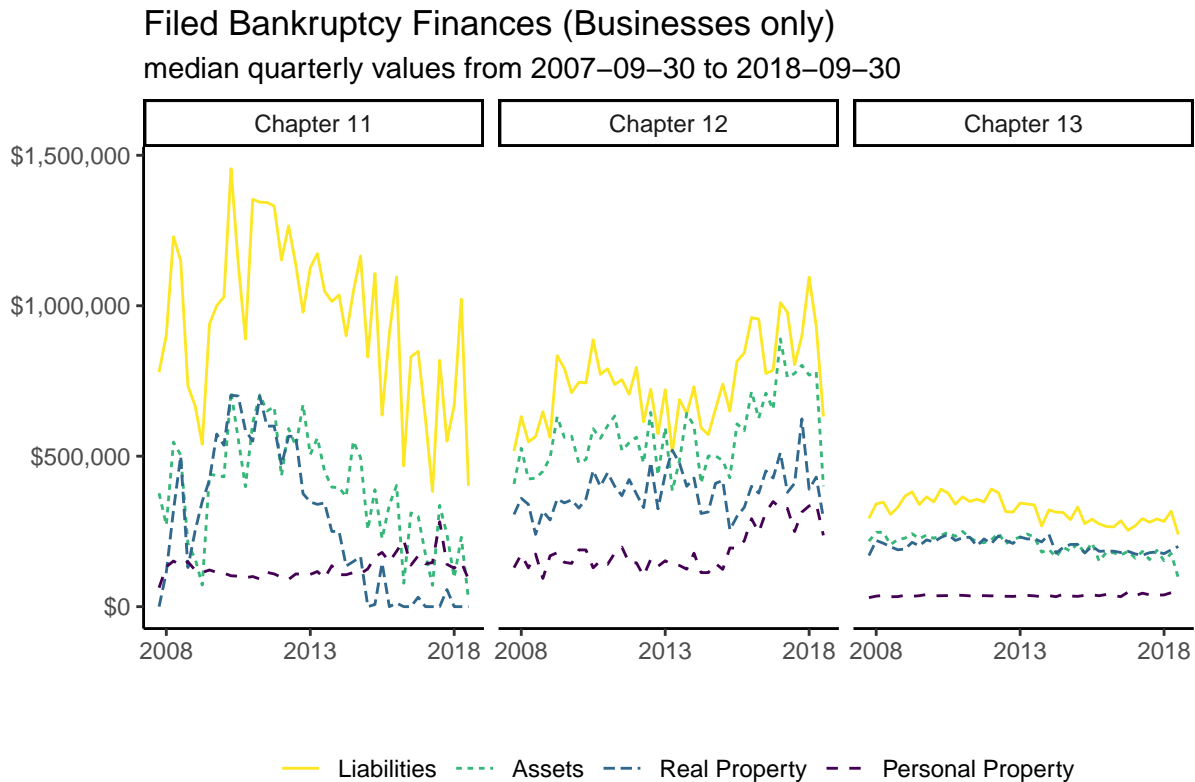
Table 3: Bankruptcy Cases Closed and Filed

Year	Chapter 7		Chapter 11		Chapter 12		Chapter 13	
	Closed	Filed	Closed	Filed	Closed	Filed	Closed	Filed
2008	16,504	27,595	6,957	8,244	381	342	8,393	3,897
2009	27,330	41,493	7,948	13,973	358	499	6,016	4,568
2010	38,045	41,689	10,540	12,750	427	726	5,531	4,388
2011	37,607	35,530	11,773	10,575	468	694	4,458	3,861
2012	33,546	28,805	11,877	9,347	464	551	4,010	3,424
2013	28,608	22,889	11,339	7,980	533	393	3,944	2,768
2014	23,922	18,556	9,519	6,354	487	368	3,627	2,315
2015	19,854	15,892	7,976	5,713	531	373	3,331	2,067
2016	17,079	14,620	6,849	6,013	454	446	2,936	2,278
2017	16,174	13,785	6,516	5,717	530	490	2,827	2,044
2018	14,379	13,024	7,186	5,573	483	452	2,375	1,856

^a Year refers to the government fiscal year, which spans from October 1st to September 30th.

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 have been shown to increase in 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). Prior to the governmental fiscal year of 2008, the trend in bankruptcies filed for businesses was declining ever since the passage of BAPCPA – which occurred at the beginning of the 2006 governmental fiscal year. While the stated intention of BAPCPA was to limit

abuse of consumer bankruptcies, most businesses also felt 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, for personal bankruptcy filings, chapter 7 filings had a 50% drop in filings since the passage of BAPCPA while chapter 13 filings were largely unaffected.



Source: FJC IDB

Figure 1:

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, the debt levels of farmers filing for bankruptcy can be examined along with examining their assets broken down by personal and real property. Since a large argument in passing the Clarification

Act is that capital gains tax is a concern for farmers, real property would largely be related to this concern. Figure 1 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 would be the financial characteristics of business filers for other reorganization forms of bankruptcy (chapter 11 and 13).

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 argument for FFBCA 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.

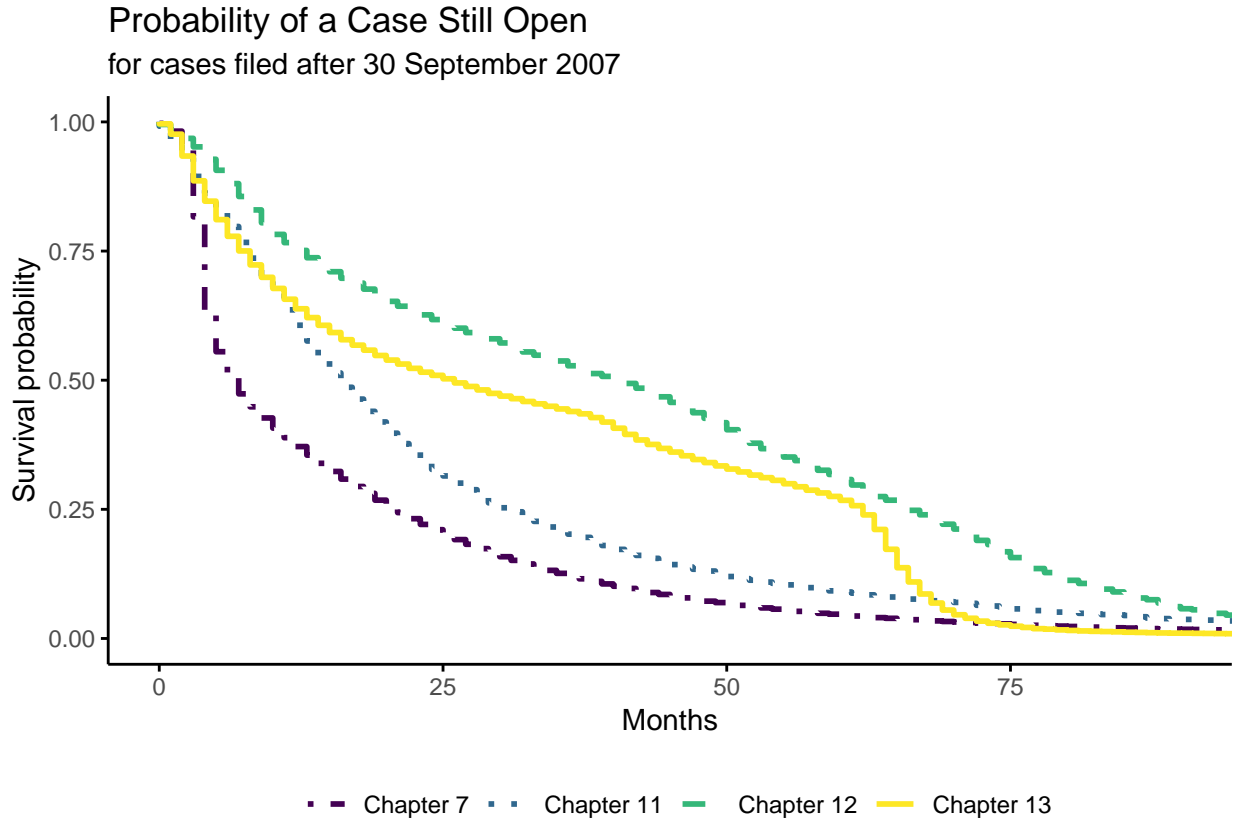


Figure 2:

In evaluating the time to completion, it is clear from the Kaplan-Meier curves produced in figure 2 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 and the equivalent is 26 months for chapter 13 and 40 months 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 close on average.

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.

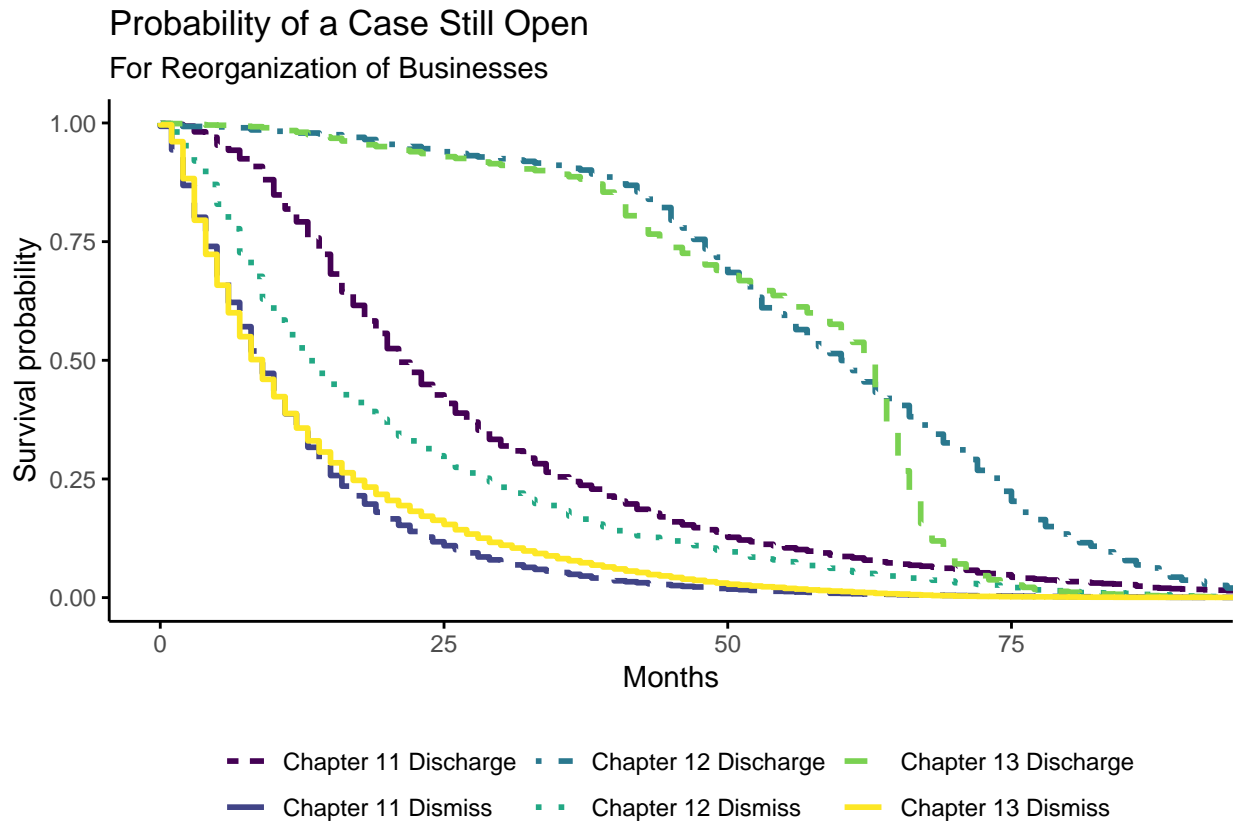


Figure 3:

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 3 displays. Dismissals occur faster for all forms of reorganization, although chapter 12 dismissals consistently have longer times 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 (60 and 62 months, respectively), the upper quartile of completion time

drastically diverges (74 months for chapter 12 and 66 months for chapter 13).

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 ϵ_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. We consider the exponential, log-logistic, log-normal, and Weibull distributions in our analysis. 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 are presented in table 4.

Our main interest in modeling bankruptcy completion times is related to the trends since 2007 as well as the

Table 4: Characteristics of Bankruptcy Filers

chapter	Above 50 Creditors	Corporation	Previous Filer	Pro Se	Total
7	20.7%	26.8%	5.44%	4.10%	289,642
11	28.0%	79.7%	8.04%	4.37%	78,163
12	6.38%	15.0%	18.6%	4.82%	4,796
13	7.89%	0.799%	27.3%	9.27%	29,174

^a For all business bankruptcies filed between October of 2007 and September of 2018.

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 cyclicity but these coefficients are not of direct interest. If the FFBCA 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 significant predictor of chapter 12 completion times. The first result would arise from dummy variables with a reference category in 2008 trending towards larger coefficients (and eventually positive) 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 lead to longer completion times.

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 – the fiscal filing year and liabilities are the main variables of interest within our models. 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 as well as the fiscal year coefficient estimates in figure 4 with confidence intervals displayed as lines from the point estimates.

Table 5: Chapter 12 Regression Results

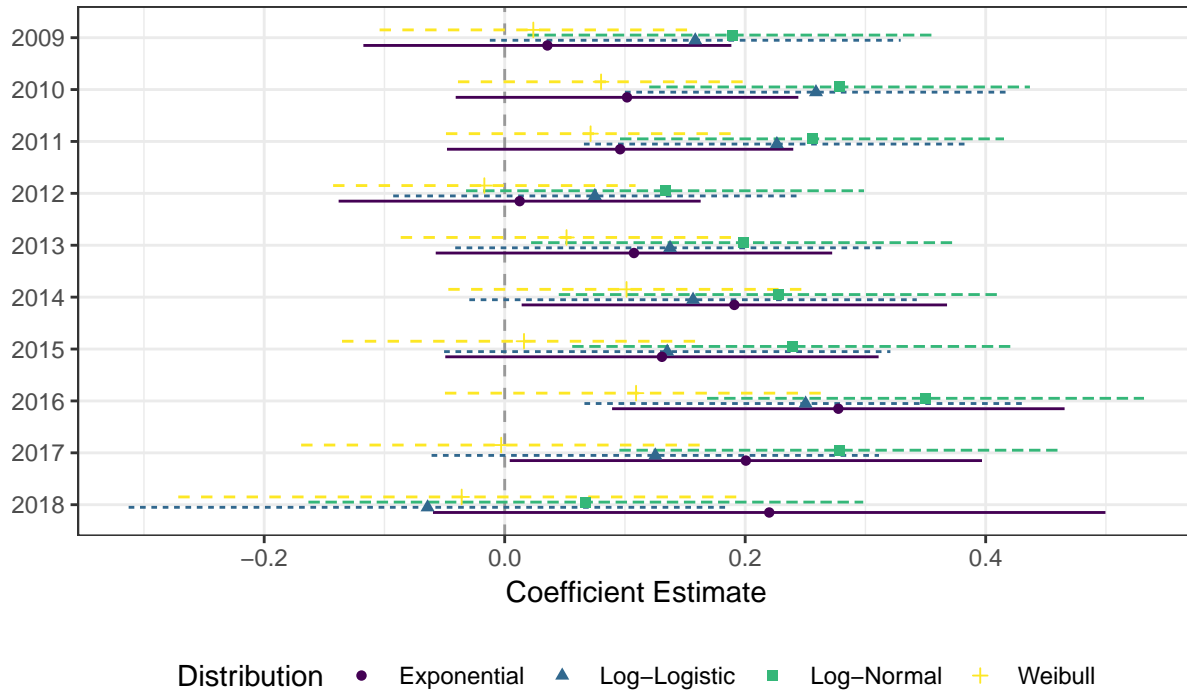
	Chapter 12 Duration in Months			
	Distribution			
	Exponential	Log-Logistic	Log-Normal	Weibull
	(1)	(2)	(3)	(4)
Liabilities (millions)	0.047** (0.019)	0.052*** (0.018)	0.058*** (0.018)	0.042*** (0.016)
Over 50 Creditors	0.100 (0.069)	0.155** (0.071)	0.138* (0.072)	0.101* (0.058)
Corporation	-0.196*** (0.048)	-0.257*** (0.050)	-0.232*** (0.049)	-0.179*** (0.040)
Previous Filer	-0.242*** (0.044)	-0.316*** (0.046)	-0.295*** (0.046)	-0.217*** (0.037)
Pro Se	-0.966*** (0.071)	-1.286*** (0.081)	-1.205*** (0.078)	-0.875*** (0.060)
Q2	0.010 (0.049)	0.021 (0.050)	0.025 (0.050)	0.006 (0.041)
Q3	0.030 (0.049)	0.012 (0.050)	0.018 (0.050)	0.016 (0.041)
Q4	-0.034 (0.050)	-0.084 (0.051)	-0.062 (0.051)	-0.037 (0.042)
Observations	4,796	4,796	4,796	4,796
Log Likelihood	-16,376.060	-16,470.540	-16,447.900	-16,301.350
χ^2 (df = 18)	225.373***	371.624***	362.810***	246.286***

Note:

*p<0.1; **p<0.05; ***p<0.01

Chapter 12 Regression Results

Fiscal Year Fixed Effects



Note: Dot represents point estimate of coefficient while 95% confidence interval represented by line

Figure 4:

All models produce similar coefficient estimates, although the Weibull distribution appears to be the best fit according to the maximized log-likelihood criteria and is our preferred specification. Across all models, liabilities consistently increase the completion times for chapter 12 filers which is a central issue with respect to FFBCA. Farmers with more liabilities are in bankruptcy for larger times – for an additional million dollars worth of liabilities this 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 results in longer times to completion. All of these results are of the expected signs with a note that 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 0. Similarly, the time trends of the filing year, as shown in figure 4, do not exhibit an obvious trend or have coefficients that are consistently

statistically different from zero. While the justifications for the FFBCA were related to increased completion times, failure to find a time trend is not inconsistent with these claims like a statistically significant negative trend would be. On this aspect, it is not clear if farmers have been struggling in their bankruptcy filings over time prior to the FFBCA. 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. Our subsequent models for other chapters use a Weibull distribution to look at economy-wide trends in bankruptcy completions, in table 6, for chapters 7, 11, and 13 as compared to the previous results from table 5 for chapter 12. Our results are not sensitive to the assumed distribution as they all produce similar estimates.

Table 6: Weibull Regression Results

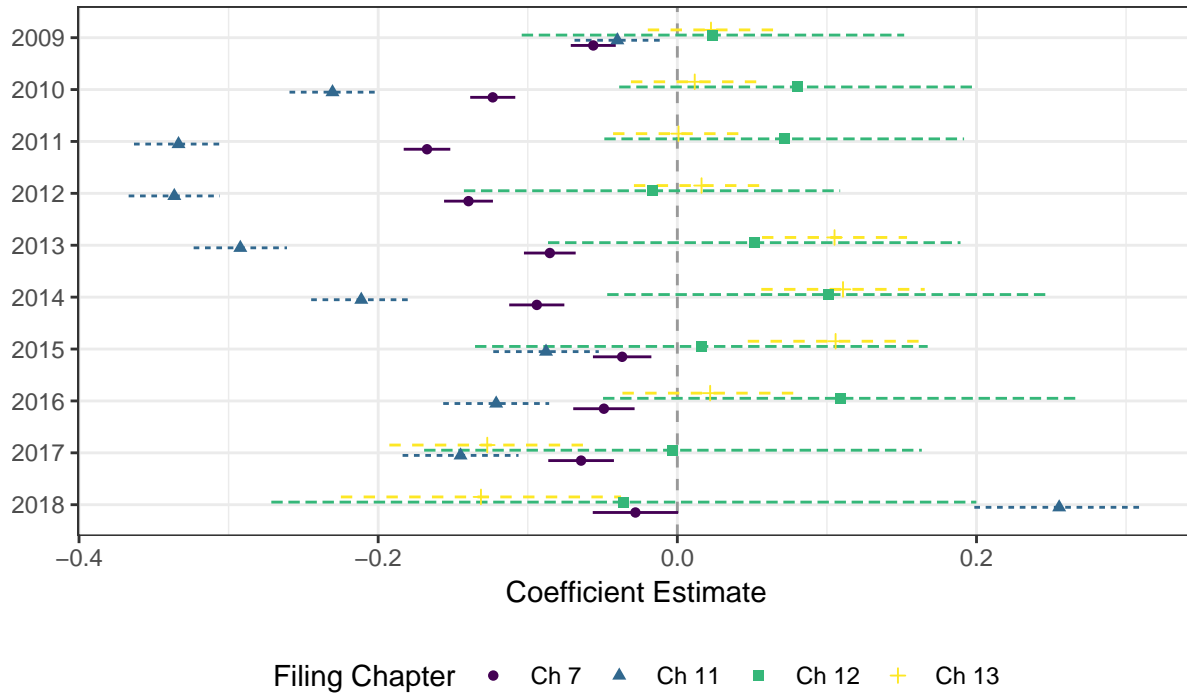
	<i>Dependent variable:</i>			
	Duration in Months			
	Chapter 7	Chapter 11	Chapter 12	Chapter 13
	(1)	(2)	(3)	(4)
Liabilities (millions)	0.070*** (0.001)	0.001*** (0.0001)	0.042*** (0.016)	0.100*** (0.015)
Over 50 Creditors	0.220*** (0.005)	0.373*** (0.008)	0.101* (0.058)	0.056*** (0.021)
Corporation	0.536*** (0.004)	-0.305*** (0.009)	-0.179*** (0.040)	-0.790*** (0.060)
Previous Filer	-0.028*** (0.009)	-0.224*** (0.013)	-0.217*** (0.037)	-0.288*** (0.013)
Pro Se	-0.194*** (0.010)	-0.937*** (0.016)	-0.875*** (0.060)	-1.546*** (0.019)
Q2	0.008 (0.005)	0.024** (0.010)	0.006 (0.041)	-0.008 (0.016)
Q3	-0.026*** (0.005)	-0.004 (0.010)	0.016 (0.041)	-0.014 (0.016)
Q4	-0.017*** (0.005)	-0.029*** (0.010)	-0.037 (0.042)	-0.012 (0.016)
Observations	289,642	78,163	4,796	29,174
Log Likelihood	-1,000,295.000	-279,010.500	-16,301.350	-107,467.300
χ^2 (df = 18)	35,478.190***	9,016.480***	246.286***	5,543.861***

Note:

* p<0.1; ** p<0.05; *** p<0.01

Weibull Regression Results

Fiscal Year Fixed Effects



Note: Dot represents point estimate of coefficient while 95% confidence interval represented by line

Figure 5:

Across different forms of bankruptcy chapters, increased liabilities are consistently a significant predictor of 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, leads to decreased completion times for chapters 11, 12, and 13 while it has a lengthened completion time for chapter 7 filers.

In addressing potential trends in the completion times for different chapters, figure 5 displays the various coefficients for fiscal year effects of the different chapters of bankruptcy. 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. 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) – which was a main reason for the creation of chapter 12 as farmers likely carry more debt due to high land values.

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 38,433 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 24,378 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 40,583 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.⁹ Table 7 displays the results of these subsets of data with the additional dummy variable indicating if a filing was chapter 12.

Table 7: Subsets of Chapter 12 Regression Results

	<i>Dependent variable:</i>		
	Duration in Months		
	11 and 12	12 and 13	11 and 12 and 13
	(1)	(2)	(3)
Chapter 12	0.652*** (0.018)	0.242*** (0.021)	0.371*** (0.021)
Liabilities (millions)	0.038*** (0.005)	-0.017 (0.019)	-0.100*** (0.014)
Over 50 Creditors	0.361*** (0.014)	0.058*** (0.022)	0.291*** (0.017)
Corporation	-0.380*** (0.011)	-0.425*** (0.049)	-0.743*** (0.010)
Previous Filer	-0.166*** (0.015)	-0.286*** (0.013)	-0.243*** (0.012)
Pro Se	-0.649*** (0.027)	-1.080*** (0.026)	-1.076*** (0.022)
Q2	-0.015 (0.013)	0.016 (0.016)	0.006 (0.013)
Q3	-0.020 (0.013)	0.018 (0.016)	-0.014 (0.013)
Q4	-0.041*** (0.013)	0.009 (0.016)	-0.005 (0.013)
Observations	38,433	24,378	40,583
Log Likelihood	-135,734.400	-91,007.620	-147,655.600
χ^2 (df = 19)	6,092.967***	1,987.366***	7,378.453***

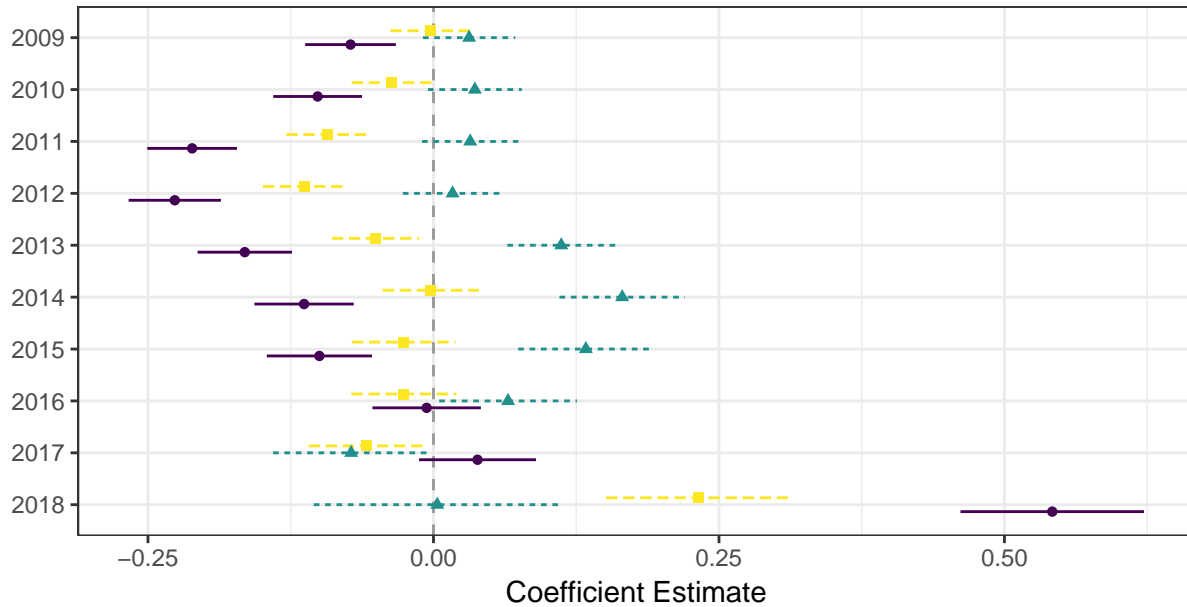
Note:

*p<0.1; **p<0.05; ***p<0.01

⁹While 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.

Subsets of Chapter 12 Regression Results

Fiscal Year Fixed Effects



Filing Chapter Subset • 11 and 12 ▲ 12 and 13 ■ 11 and 12 and 13

Note: Dot represents point estimate of coefficient while 95% confidence interval represented by line

Figure 6:

Chapter 12 completion times consistently take longer to complete when compared to similar sized small businesses as evidenced by the dummy variable which ranges in magnitude of 24.2% to 65.2% 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 continues to support the claim that chapter 12 bankruptcies take longer to complete. However, in subsetting the data based on liabilities makes the coefficient on liabilities troublesome to interpret as 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.

Trends in completion times for the subsets, displayed in figure 6, are more evident than in the trends for individual bankruptcy chapters 5. The bankruptcies with larger debt limits have trended to faster completion

times since 2008 with the exception of the most recent fiscal year of 2018. 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.

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. 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, we are finding that 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 we have no findings in direct conflict of its 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 which follow an increase trigger a higher rate of farm bankruptcies in a region. This dynamic in the farmland market brings to light a potentially more important aspect in the bankruptcy proceedings than simply the classifications of claims.

Data on how frequently farmers decide to sell off land in order to fulfill their repayment plans and how much their capital gains taxes may be 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 the recent clarification act will go a long way to help better understand the economic realities of farmers in distress.

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