Chapter 12 Bankruptcy and Determinants of Outcomes

by

David W Wyche

(Under the Direction of Will Secor)

ABSTRACT

Farm bankruptcies are assessed for determinants of outcomes in the State of Georgia between 2003 and 2014. Based on filer-specific financial characteristics and general economic conditions at time of filing, limited dependent variable estimation is employed to assess the probability of categorized outcomes. Also presented is a novel approach to synthesizing bankruptcy court filings. This allows us to develop a reliable set of data and perform a meaningful analysis and a unique method of classifying bankruptcy case dispositions. Among characteristics at time of filing, greater property values and increased total assets are associated with a negative probability of a positive outcome for debtors. These results indicate that the willingness and flexibility of creditors significantly affects outcomes of chapter 12 bankruptcies.

INDEX WORDS: Agricultural Economics, Agricultural Finance, Applied Economics, Bankruptcy, Chapter 12, Farm Bankruptcies, Farm Finance

CHAPTER 12 BANKRUPTCY AND DETERMINANTS OF OUTCOMES

by

DAVID W WYCHE

B.S., North Carolina State University, 2014

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

ATHENS, GEORGIA

2021

CHAPTER 12 BANKRUPTCY AND DETERMINANTS OF OUTCOMES

by

DAVID W WYCHE

Major Professor:	Will Secor
Committee:	Adam Rabinowitz
	Cesar Escalante

Electronic Version Approved:

Ron Walcott
Dean of the Graduate School
The University of Georgia
May 2021

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

Agricultural lending in the United States services a specific sector and rural communities by providing credit to commercial farming operations. Providing much needed financing, the agricultural lending industry helps facilitate land acquisition, business expansion, capital investment, and day-to-day operations. This forms a relationship between the agricultural lending industry and the farm economy, as well as the rural communities they support.

From the 1990s through the late 2010s, total farm debt in the United States maintained an upward trend, mostly driven by increased financing for real property. Bolstered by rising property values, the national debt-to-asset ratio, as an indication of farm solvency, remained at a level suggesting generally sound financial standing over this same time period (USDA-ERS, 2021). While national levels for cash receipts of both livestock and crop farming operations increased modestly between 2003 and 2020, periods of depressed commodity prices can be seen as having an impact on farm financial performance (USDA – NASS, 2021). Likewise, stagnancy in net farm income over this same time period can be viewed as a function of rising production costs, despite gains in gross farm income (USDA – ERS, 2021).

However, it is important to consider that national farm financial statistics are the aggregations of many individual situations, often represented by average values. In a 2018 release from the University of Illinois, it can be observed that the incidence of extreme financial positioning, as demonstrated by debt-to-asset ratios, in the farm financial sector can increase

while more aggregated levels indicate generally sound financial standing (Schnitkey, 2018). Based on contemporary trends in net farm income and the susceptibility of farming operations to these movements, farm financial stress merits in-depth analysis (Patrick, Kuhns, and Borchers, 2016; USDA-ERS, 2021). Though a measurement for the level of farm financial stress does not exist, it can be proxied by the number and rate of chapter 12 bankruptcy filings (Dinterman, Katchova, and Harris, 2018).

Chapter 12 bankruptcies represent eligible legal entities connected to agricultural operations that find the court-supported debt restructuring process, and unique legal protection provided therein, an optimal financial and business strategy given a difficult financial situation. As bankruptcies are typically considered a last-resort option for distressed operations, chapter 12 bankruptcies should be viewed as an extreme of farm financial positioning (Schnitkey, 2018; Walker, Suri, and Goeringer, 2020). Under the US Bankruptcy Code, family farmers and fishermen may voluntarily elect to restructure and repay existing debt obligations under chapter 12. This chapter of filing is less expensive, more streamlined, and tailored to the unique operating structures and financial demands of agricultural firms. Developed as a response to the farm financial crisis of the 1980s, chapter 12 has developed into a key element of the farm financial landscape. An increased understanding of chapter 12 serves a larger body of agricultural finance and financial economic research by assessing trends in financial stress and analyzing a key provision for remediation.

With 2019 commodity cash receipts in excess of 8.3 billion dollars, the 16th largest in the country, the State of Georgia maintained the third highest level of chapter 12 filings over the 2010-2019 decade (ERS, 2021; Newton, 2020). Considering the relative farm economy size of the

two highest filing states, California and Wisconsin, the rate of chapter 12 filings in Georgia becomes an interesting subject. Previous research on chapter 12 bankruptcies has primarily focused on the assessment of filing rates from a national perspective. Stam, Dixon, and Rule (2003) indicate a link between the debt-to-asset ratio and filings rates. Dinterman, Katchova, and Harris (2018) point to a connection between filing rates and land values, suggesting that more focused indicators of farm financial standing may be better than state-level aggregations for assessing filing rates. Both studies submit that general economy and farm economy conditions likely contribute to the incidence of chapter 12 filings.

Every chapter 12 filing results in a final outcome, or disposition, indicating the nature in which a debtor has navigated the bankruptcy process. As chapter 12 is an indicator for the level of farm financial stress, as well as a tool available to distressed farming operations, it is important to understand the determinants of these outcomes. Previous research on chapter 12 bankruptcies presents a clear gap, that classifying and analyzing outcomes has not been a focus. Employing limited dependent variable models, this paper examines the effects of a number of explanatory variables, including case-specific financial characteristics at time of filing, economic conditions varied by county and year, indicators for the level of agricultural activity by county, and trends in property values on the probability of final outcomes. Data was sourced from the Integrated Database (IDB) from the Federal Judicial Center, case-specific filing documents accessed via the PACER tool of the US Court system and court-specific Case Management/Electronic Case Files (CM/ECF) record systems, the US Bureau of Economic Analysis, the US Federal Reserve Economic Data, and the US Department of Agriculture Census of Agriculture. A final set of 158 unique and closed cases, each representing a complete set of

unique financial characteristics for a given farming operation, in the State of Georgia from 2003 - 2014 are used in this analysis.

Data collection and synthesis is a crucial component to understanding the unique characteristics of chapter 12 filers, including the considerations that must be made in order to generate practical analysis. We begin with the assumption that each observation must represent a unique and complete set of financial characteristics for a farming operation capable of restructuring debt obligations under the auspices of the US Bankruptcy Court system and provided the protections of chapter 12 filing status. Starting with an initial set of 437 chapter 12 filings over the 2003 – 2019 period, data are collected from filings documents accessed from each court's CM/ECF system via PACER. In general, voluntary petitions, schedules detailing financial positioning, statements of financial affairs, various amendments, and final reports were collected for each of these 437 filings. From there, a funneling process is used to restrict observations in order to satisfy our necessary assumptions, most notably representation of a unique farming operation having filed for chapter 12 bankruptcy that has subsequently been completed. By removing repeat filings by the same entity within one year, active cases, cases for which no plan was confirmed, and cases identified as having related filings, we arrive at a final set of 158 cases that justifiably satisfy our assumption and can be reliably analyzed as unique farming operation financial positions.

Outcomes for chapter 12 cases may be characterized by more than a dozen formal disposition categories, though are typically aggregated as discharged and dismissed. An often-noted reality in bankruptcy research, chapter 12 included, is that dismissals do not necessarily represent sub-optimal outcomes. Capturing instances where a debtor may realize some benefit

from leaving the chapter 12 process and its protections, we delineate dismissals further as either trustee dismissals or friendly dismissals. Trustee dismissals are a non-voluntary action representing a "negative" outcome; whereas friendly dismissals, or voluntary dismissals, occur when debtors initiate an early exit from the bankruptcy process on their own accord. We expand on this further by grouping discharged and friendly dismissal cases as "positive" outcomes against the trustee dismissal class of "negative" outcomes.

From thorough efforts to characterize and describe the set of financial circumstances, and generalized conditions pertaining to unique chapter 12 cases, it can be observed that debt-to-asset ratios for farms in bankruptcy far exceed average national levels, as well as generally accepted thresholds for financial distress. This is distinguished further by comparing the average debt-to-asset ratio for positive outcomes to that of trustee dismissals, where ratios are observed to be higher than the class of positive outcomes. Property value, a state-level factor varied yearly and proxy for the economic conditions affecting land values, is seen to be greater for trustee dismissal cases than positive outcomes.

Included in the results are regression coefficients, standard errors, and Pseudo R^2 as a goodness-of- fit measure. As regression coefficients from logit models do not have a convenient interpretation, average marginal effects (AME) are also included. Based on model fit across various specifications, we arrive at the preferred model and outcome categorization of positive outcome versus trustee dismissal. The interpretation of AME calculations is the effect of a change in an explanatory variable on a given outcome class, holding all other factors constant. Total assets are shown to be a significant indicator, at the 10% level, with a positive impact on the likelihood of trustee dismissals. Property value is also shown to be a significant indicator, at

the 5% level, with a positive impact on the likelihood of a trustee dismissal. That greater assets and increased property values are associated with higher probability of a negative outcome, the conclusion is made that creditors' willingness and flexibility to work with debtors, based on characteristics at time of filing, significantly affects outcomes.

Data characterization efforts from this research establish a practice for classifying filings as unique and complete. Collected and analyzed here is the same set of information accepted by the court as a faithful representation of a debtor's financial position and used in the chapter 12 process to develop a viable bankruptcy plan. Using case number and bankruptcy district codes to establish unique case keys to linking this information from two sources, IDB and PACER, this method can provide for missing values as well as a check against errors. More importantly, filings collected from PACER and CM/ECF systems provide the necessary documentation to establish crucial distinctions regarding debtors. These distinctions, unique cases, complete cases, and cases with plans, allow for the proper restriction of filings. The unique case distinction allows for sound data aggregation and synthesis by eliminating duplicity within the set of observations, establishing a set of data with independent observations. The complete distinction, made by restricting related cases, establishes a set of data free of endogeneity, where each observation can be assumed to represent the complete financial situation for a given farming operation. Lastly, by restricting to cases for which a plan is established, we properly limit our analysis to those cases for which any outcome was truly viable, as determined by the court and not a result of missing information in the case filing. These distinctions satisfy necessary assumptions underlying most modelling methods, that observations are independent, complete, and free of correlated errors (Wooldridge, 2009; Cameron and Trivedi, 2005).

Drawing generalized conclusions from these analyses is difficult considering the nature and variation of operations filing for bankruptcy, as well as the positioning of these operations in the farm financial landscape. However, that total assets and property values are significantly associated with probability of trustee dismissal indicates that the flexibility and willingness of creditors to accept restructured debt servicing arrangements impacts chapter 12 outcomes. Having improved model fit by refining the classification of outcomes, we establish a useful framework for understanding dispositions. That voluntary dismissals, requested by debtors, are more closely aligned with discharged dispositions lends support to the often-noted claim that dismissals do not necessarily represent sub-optimal outcomes for debtors or creditors.

In the next chapter we present a literature review of agricultural finance and chapter 12 bankruptcy research, as well as a discussion of broader bankruptcy literature. The third chapter discusses data collection, the restrictions employed, categorization of outcomes, and explanatory variables considered by our analysis. Here we also present descriptive statistics. In the fourth chapter we present the methods, measures for model fit, and appropriate interpretations of results for our analysis. The fifth chapter presents results, both regression coefficients and estimated effects, for modeled outcomes and specifications. Finally, the sixth chapter presents conclusions from our data synthesis and modelling efforts, establishing the importance of this research and its contributions to the study of agricultural finance and bankruptcy research.

CHAPTER 2

LITERATURE REVIEW

Chapter 12 Bankruptcy Background

Chapter 12 bankruptcy is sought by commercial farming and fishing operators to address financial stress relating to the operation. The majority of bankruptcies in the United States are filed under chapters 7, 11, and 13, addressing asset liquidation, business reorganization, and personal debts. However, chapter 12 is better characterized as a debt adjustment process specifically designed to maintain possession of property and continued commercial activities while restructuring the financing and liabilities of a commercial farming or fishing operation (Walker, Suri, and Goeringer, 2020).

An entity seeking the protections and restructuring process provided by chapter 12 must meet certain requirements. Effective in the fourth quarter of 2019, total debts of a filer must not exceed $10,000,000. This new debt limit marks a significant increase from $4,411,400, set in April of 2019 as a periodic inflation readjustment of the debt limit. Over the time period in this analysis, the debt limit was periodically adjusted for inflation from $1,500,000 in 2003 to $4,031,575 in 2013 (Dinterman, 2020). For individuals, operating as sole proprietors, at least 50% of debts must be related to the commercial activities of the operation and more than 50% of gross income must come from the operation in question. As a key point of contrast to other bankruptcy filings, chapter 12 is voluntary and cannot be forced on an individual or corporation by creditors or other involved parties (US Courts). Following a voluntary petition to initiate a

chapter 12 bankruptcy, a filer receives an automatic stay, ceasing most collection activities, like wage garnishment, calls from collection agencies, and lawsuits. The filer's sum financial characteristics, meaning assets, income streams, and financial obligations, are then transferred to a "bankruptcy estate", overseen by a court-appointed bankruptcy trustee (Walker, Suri, and Goeringer, 2020; US Courts, 2021).

Bankruptcy filers submit an account of assets and liabilities to the court, detailing real and non-real assets, including personal assets and liabilities if filing as an individual, as well as secured, priority, and unsecured non-priority liabilities claimed by creditors against the debtor. Secured claims are the class of liabilities for which there is some underlying collateral, often real property or equipment, securing the value of a loan. Priority claims, often taxes and fees owed to the court or bankruptcy trustee, are considered uniquely by the bankruptcy court system and generally owed in full to the respective creditor. Unsecured claims against a debtor are liabilities for which there is no collateralized asset, such as credit card and medical bills (US Courts).

Following an initial accounting of the assets and liabilities of a filer, the payment of a filing fee, and submission of proper documentation, the trustee will initiate a meeting of creditors. Designed for the trustee and creditors to examine a filer under oath, this meeting lays the groundwork for the formulation of a chapter 12 plan. Within 90 days of the meeting of creditors, debtors are responsible for submitting a proposed repayment plan laying out a schedule of payments and/or actions to repay or restructure debts over a period of three to five years (Walker, Suri, and Goeringer, 2020). Plans vary greatly from filing to filing, but can involve payments to the trustee for disbursement to creditors, the sale of property, re-negotiated terms based on current market conditions, or property forfeiture. Priority claims, representing

necessary payments by a debtor, must be accounted for first in the plan (Walker, Suri, and Goeringer, 2020). Unsecured claims, having no recourse, do not necessarily have to be accounted for in full, rather a debtor may structure the plan to repay as much as unsecured creditors would have received under liquidation. Secured claims, often the largest class of liabilities and claims against a filer, is guaranteed by some collateral. A unique feature of chapter 12 is the ability of a filer to repay secured claims at the value of the secured collateral, a process known as “cramming down” (Walker, Suri, and Goeringer, 2020).

To be accepted by the court, a chapter 12 plan must detail how future expected income, or business revenues, will be used to satisfy claims and meet legal standards. Even following acceptance and confirmation of the plan, creditors have 21 days to file objections, that either the planned repayments are insufficient or that a filer’s disposable income is not being used to the fullest extent by the courts. In the event of plan rejection, debtors may submit a modified plan for consideration, transfer to chapter 7 and proceed through liquidation, or accept dismissal of the case from chapter 12. If accepted by the courts and confirmed, a filer begins to make payments to the trustee and/or creditors, as set forth by the plan. In general, when confirming a plan, courts often consider whether secured and non-priority creditors receive payment equivalent to what they would have under liquidation (Walker, Suri, and Goeringer, 2020).

The chapter 12 plan serves as the guiding document for a debtor to satisfy debt obligations over a period of time. Successful completion of this plan is a prerequisite to discharge a case. Failure to reach satisfactory agreement with all creditors through the chapter 12 trustee leading to the formation of a chapter 12 plan results in a dismissal. Though a plan may be modified, due to changing financial circumstances, or actions needed to remedy plan

delinquencies, the confirmation of a chapter 12 plan should be viewed as a critical milestone in the bankruptcy process. Failure to achieve confirmation of a plan indicates a filer's financial circumstances, or willingness to operate within the auspices of the court, are insufficient to be a viable chapter 12 bankruptcy. Therefore, the existence of a confirmed plan should be viewed as a necessary prerequisite for the ability to discharge debts under chapter 12 bankruptcy.

Though a filing may result in upwards of a dozen distinctions of formal disposition, we can generally group these outcomes into that of discharged and dismissed. Following successful execution of the plan, or a version modified at some point in the process, a case is discharged. Remaining debt, as specified by the plan, is discharged and for which creditors may make no future claim against the debtor. It is important to note that long-term secured debts, arranged to be paid beyond the life of the plan, like mortgages, are not applicable for discharge. Otherwise, following some failure to follow the schedule of payments set forth by the plan or demands of the trustee to remain in good standing with the court, a case is dismissed and the filer is no longer afforded protection of the automatic stay against collection activities (US Courts; Walker, Suri, and Goeringer, 2020).

In the examination of chapter 12 cases and plans, the objective is apparent – to restructure existing financial obligations for distressed operations and satisfy creditors to a certain, minimum standard. It is important to consider that these goals are not necessarily synonymous with improving the overall financial standing of an operation to a high level. Additionally, it has been reiterated in the literature of chapter 12 research that dismissals do not necessarily represent sub-optimal outcomes (Faiferlick and Harl, 1988; Harl, 1992; Stam, Dixon, and Rule, 2003; Walker, Suri, and Goeringer, 2020). Keeping these two points in mind, we

consider the existence of a plan a necessary milestone for a viable chapter 12 case, while also allowing that non-discharged dispositions may also represent a favorable outcome for a given filing. Dismissals prior to the establishment of a plan should be viewed as the result of an inability or unwillingness of a filer to meet all guidelines of the court. Whether this dismissal happens as a result of a failure to pay a filing fee, failure to file information with the court, or failure to develop sufficient debt restructuring provisions, filings which fail prior to confirmation of a plan are not considered to be viable chapter 12 cases. So, while these debtors may have filed under chapter 12, meeting the most basic requirements, the viability of a chapter 12 case should be viewed as the potential to discharge following successful completion of a plan. However, discharge is not a realistic and generally accepted potential outcome for cases failing to achieve a plan (US Courts).

Related Literature

Stam, Dixon, and Rule (2003) review filing and disposition rates for the first sixteen years of chapter 12 bankruptcy's existence. Indicating that chapter 12 filing status has strengthened the bargaining status of farms with creditors, this paper highlights the significance for filers of being able to cram down secured debts to fair-market value of collateral. Pointing to a growth in real land values over the course of their analysis, thus reducing some of the benefits of chapter 12 filings, the authors draw a link between land values and filing rates. As such, we make special consideration of secured debts and real property values in our analysis of key determinants for outcomes. Additionally, it is suggested that chapter 12 may encourage debtors and creditors to negotiate bilateral settlements outside of bankruptcy proceedings and beyond the purview of

the courts, and the authors suggest that a dismissal does not necessarily indicate a sub-optimal outcome for a debtor or all creditors. This same conclusion is discussed by Faiferlick and Harl (1988) and Harl (1992).

Stam, Dixon, and Rule (2003), as well as Stam and Dixon (2004), make special note of the chapter 12 plan. As the guiding document for a bankruptcy, an accepted and confirmed plan should be seen as a seminal point in the bankruptcy process. Indicating that all parties to a given bankruptcy case have agreed to a repayment plan or specified remedial actions, the existence of a confirmed plan is a necessary pre-requisite to discharge. Because of this discussion on the significance of a confirmed chapter 12 plan, we use evidence of a confirmed plan as a critical demarcation point in our analysis. However, none of the chapter 12 research efforts by Stam, Dixon, and Rule (2003), or others, have accounted for the viability of chapter 12 filings by plan confirmation, nor have they restricted analysis to filings representing unique and complete financial characteristics for operations in the bankruptcy process, as we have done.

In a survival analysis of farm bankruptcy filings, Dinterman and Katchova (2020) find that time to completion, regardless of outcome, has increased for chapter 12 at a faster rate than other bankruptcy chapters. While unable to draw a decisive connection between time to completion for chapter 12 filings and upward trends in debt levels of filers, the authors do find support for the original purpose of the Family Farmer Bankruptcy Act of 1986, the Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCA) of 2005, and the Family Farmer Bankruptcy Clarification Act of 2017. Each of these acts sought to address the unique challenges of commercial farming operations in financial difficulty by providing preference and provisions for farming-related bankruptcies. This survival analysis also indicates that land values, being

intricately tied with chapter 12 filing rates, more-so than other bankruptcy chapters, likely impact the time necessary to complete a case. Likely attributable to this connection between chapter 12 filings, property values, and time to completion is the "cram down" benefit provided by chapter 12. By allowing filers to restructure certain debts, specifically real property mortgages, to current market values, the "cram down" benefit creates a link between property values and the ability of filers to remain in the chapter 12 process and successfully discharge a case (Walker, Suri, and Goeringer, 2020; Dinterman and Katchova, 2020).

Dinterman, Katchova, and Harris (2018) evaluate farm financial stress, proxied by state level chapter 12 filings, as a function of macroeconomic conditions, agricultural land values, and various state-level demographic aggregations. Finding that only agricultural land values are consistent predictors of farm bankruptcy filings this article suggests that a more nuanced assessment of farm bankruptcies with respect to land values and real property may be warranted. Even going so far as to say that the results "appear to highlight a potentially dynamic relationship between agricultural land values and farm bankruptcies," it is suggested that farm-level data may serve as a better indicator for financial stress than state-level aggregations. Though not as consistent of an indicator, the authors also conclude that macroeconomic conditions are a driver of chapter 12 filings. Including a number of county-level macroeconomic conditions indexed by year as well as case-specific financial information, the work of Dinterman, Katchova, and Harris (2018) provide a starting point for variable selection for understanding the determinants of outcomes for Chapter 12 filings.

As part of their efforts exploring chapter 12 filing rates, and associated research, Dinterman and Katchova assess relationships with land value trends (2017). Finding a two-way

link between farm financial stress, proxied by farm bankruptcies, and agricultural land values, the authors suggest that further research is needed to assess farmland values. For purposes of assessing the determinants of chapter 12 outcomes, this established link provides support for the inclusion of property value and a series of land-use variables as regressors to explain outcomes of chapter 12 filings.

Dixon, Ahrendsen, Settlage, and Stam (2004) use a state-level panel data set to assess factors affecting chapter 12 filings, starting with 1987, the first full year of the filing chapter being available. The authors show that the debt-to-asset ratio, government payments, employment, and net farm income, among other factors, are significant indicators for the rate of chapter 12 filings. Noting that economic conditions and financial factors may likely affect filing rates more than social norm variables, such as the proportion of senior farm operators, the authors do state that such conditions may not always be relevant or known at the time of loan origination. It is also suggested that proximity to metropolitan areas, providing an outlet for off-farm employment, may allow an otherwise distressed operation to stave off bankruptcy.

While there is no work assessing outcomes of individual chapter 12 bankruptcy cases, we can gain insight from research on chapter 13 bankruptcy. In a study on chapter 13 bankruptcy exits, created as part of the 1978 Bankruptcy Code and providing debt restructuring to consumers, Porter (2011) assesses the reasoning behind bankruptcy terminations. While many filers of this chapter enter into bankruptcy with intended goals, like maintaining home ownership, a majority exit via some class of dismissal. Attributing some of these exits to debtors having found some preferable arrangement to achieve their stated goals, this study concludes that bankruptcy exists as an optimal strategy for distressed consumers. Drawn from this analysis

is the parallel that distressed farming operations make an optimal decision to enter into bankruptcy, with some intended goal, and remain in the chapter 12 process until it is complete or no longer an optimal strategy. With a similar process and providing similar protections as chapter 13, chapter 12 acts as a shield for debtors against collections and legal actions, but demands cooperation and the adherence to a repayment plan.

Based on Porter (2011), our understanding of the chapter 12 process and underlying mechanisms, and nature of outcomes, we make a key assumption regarding chapter 12 exits and outcomes that underlies our analysis (Walker, Suri, and Goeringer, 2020; Stam, Dixon, and Rule, 2001). This assumption is that debtors of viable chapter 12 cases remain in the court system as long as they are able and find it advantageous. Finding the protections of the court beneficial, debt restructuring requirements of the plan optimal, and status as bankruptcy participant acceptable, some debtors remain in the court-ordered bankruptcy process until plan completion and discharge. Others, who pursue some alternative to the scheduled repayment plan and no longer realize net benefits from chapter 12 protections, exit as voluntary dismissals. It should be considered that other debtors, finding the protections of chapter 12 preferable to debt collection efforts or liquidation, but unable to complete a plan confirmed by the court, are dismissed by order of the court.

Agin (2019) employs artificial intelligence to predict outcomes of chapter 11 bankruptcies using data from the Integrated Database (IDB) like this analysis. Typically used by corporations to reorganize operating and management arrangements of a business while restructuring debt obligations to emerge as a more financially sound entity, chapter 11 often involves larger and more complex legal and financial circumstances for filers (US Courts; Agin, 2019). However, like

with chapter 12, the chapter 11 plan also serves as a guiding document for successful reorganization under this chapter. One categorization of outcomes predicted by Agin is viability, defined as cases having obtained plan confirmation, or having participated in the chapter 11 process long enough that plan confirmation was a viable outcome. Agin uses the IDB data to infer the existence of a plan, but is limited in that the IDB does not contain a unique variable to note the existence of a confirmed plan. Here it is important to note a key difference in the nature of chapter 11 proceedings, this chapter allows for more flexibility of creditors working without a plan because of intended corporate reorganization efforts, as opposed to chapter 12's focus on debt restructuring (US Courts; Walker, Suri, and Goeringer, 2020). The remaining categories for this particular model, dismissal and conversion, highlight the significance observed in the existence of a chapter 11 plan. A similar application of chapter 11 plan confirmation, with the same effect and leading to the same conclusion, is employed by LoPucki and Doherty (2015). Like Agin (2019) and LoPucki and Doherty (2015), we employ the existence of the chapter 12 plan as a key demarcation in our analysis. Though, unlike chapter 11, the plan serves as such a pivotal point in the ability of a filer to participate in the chapter 12 process, the application of chapter 12 plans used here is to restrict our data set in order to analyze only those cases which can be considered viable.

CHAPTER 3

DATA

This research assesses determinants of chapter 12 bankruptcy outcomes as a function of financial characteristics and economic conditions at, and leading up to, the time of filing. Using limited dependent variable models, described in the methods chapter, we estimate the impacts of these explanatory variables on various specifications of outcomes. In this chapter we first present the various sources of data. Next we will outline the funneling process by which the set of observations we analyze is restricted from 437 to 158 cases, and the necessary theoretical assumptions this satisfies. We also describe the various sets of dependent variables modeled, as well as the filer characteristics, financial information, and economic conditions at time of chapter 12 filing that help to explain these outcomes. The data management and synthesis associated with this research is a significant contribution to the study of chapter 12 bankruptcies and agricultural finance. In particular, the case funneling process and use of economic conditions, that vary spatially and temporally, are novel and provide support to the regression, marginal effects, and standard error calculation methods described in the next chapter. Likewise, the integration of two sources of bankruptcy data and information, case documents obtained via PACER and the Integrated Database, presents a unique method for constructing and managing a dataset for the study of chapter 12 bankruptcies.

Data Sources

The Public Access to Court Electronic Records (PACER) tool and Case Management/Electronic Case Files (CM/ECF) systems available through each bankruptcy court served as the primary source of filer financial characteristics. PACER is an online application provided by the US Court System connecting users to various court CM/ECF systems. Each bankruptcy court maintains a CM/ECF system for document filing, but also serves as a depository for case-specific documents and record keeping. Chapter 12 bankruptcy filing documents and data from PACER and each court's CM/ECF system are reliably available from 2003 to the present day. Documents available for cases within each court are Voluntary Petitions, Schedules A through J, Statements of Financial Affairs, Final Reports, and various court orders and amendments. Also obtained through the PACER tool and CM/ECFs are the chapter 12 plan, bankruptcy court district, case identifiers, current case status, and the organizational nature of a filing.

Data collected from documents gathered via PACER are the basis of our data set and are critical for making key distinctions and delineations regarding the classification of filers. Distinguishing between filings, unique cases, and unique filers was necessary based on synthesis of Voluntary Petitions. Likewise, only accessible from Voluntary Petitions is whether or not a specific filing has a related bankruptcy and to which case it is related. Both of these are explained further in this chapter, but are critical distinctions made about filings and key contributions of this research.

The Federal Judicial Center provides public access to its Integrated Database (IDB) of filing and court data, for both criminal and civil proceedings. The IDB was used as a secondary and

confirmation source of data collected or uncollected from PACER and each court's CM/ECF. Filer financial data from IDB is consistently available from 2006. Proving useful for data validation and cleaning efforts, IDB provides a standard format for accessing data on chapter 12 filings, including specific disposition designations. Additionally, IDB provides a source of data for any bankruptcy that went through chapter 12 proceedings, regardless of filing chapter or chapter at case-close.

Data on filer financial characteristics were primarily sourced from PACER and CM/ECF systems, with IDB information serving in a complementary and confirmatory capacity. Though similar data points are available from each, IDB and PACER differ in a few key aspects. IDB provides data on case filings by year, capturing changes in filer financial positions and characteristics from amended schedules and modified claims. These data, while illustrating that chapter 12 proceedings can be dynamic, lack enough variation year-over-year and case-by-case to create a balanced panel data set. The filing documents, amendments, and reports available through PACER and CM/ECF systems make note of previous bankruptcy filings, related bankruptcies, and business interests, which is unavailable from IDB data. We use this information to connect filings and make unique and related case distinctions. Additionally, it is from the PACER tool itself that we gather evidence of a confirmed chapter 12 bankruptcy plan.

Voluntary petitions, the initial document and the first legal action taken by a filer seeking protection and guidance of chapter 12 bankruptcy, gathered from court CM/ECFs provide case identifying information. This identifying information, like names of debtors, county of residence, and bankruptcy court district, was used to verify filing chapter, that a filer meets necessary conditions for chapter 12 bankruptcy, and the existence of related cases. Voluntary petitions also provide the necessary information to connect filings by a common legal entity over time and

distinguish between re-filings and filings representing unique financial characteristics. Voluntary petitions are filed with a debtor's appropriate bankruptcy court, of which there are three in Georgia: Northern, Middle, and Southern. These courts handle all bankruptcy proceedings, regardless of chapter, for individuals and corporations based within their boundaries.

Schedule A through schedule J collected from PACER and court CM/ECFs are the foundation for determining case-specific financial characteristics at time of filing. Filed at, or shortly after, the time of a voluntary petition, these documents outline a debtor's assets, liabilities, claims, ongoing legal actions, and relevant income. In general, necessary data can be collected from a standardized Summary of Schedules included in these filings. For each case, total assets, personal assets, real property assets, total liabilities, secured liabilities, priority unsecured liabilities, and non-priority unsecured liabilities were collected.

County-level real GDP and total employment were captured from the US Bureau of Economic Analysis. The Census of Agriculture from the National Agricultural Statistics Service (NASS) of the USDA was used for estimates of total land, cropland, woodland, and pastureland by county to serve as indicators of agricultural activity. NASS also provided a source of information on property values at the state level. Federal Reserve Economic Data from the Federal Reserve Bank of St. Louis provided data on the prime interest rate. These sources allow us to incorporate agricultural activity, variation in property value over time, and general economic trends into our analysis. Without these sources, the ability to draw relationships between characteristics at time of filing and outcomes would be seriously constrained.

Unique and Related Cases

The first important distinction made in this analysis is between filings, unique cases, and unique filers. Repeat filers was a noticeable occurrence during the collection and synthesis of filing data. Of the 437 chapter 12 filings between 2003 and 2020, 18 can be considered repeat cases and 46 can be considered repeat filers. To arrive at a set of unique cases representing unique financial circumstances for a filer, multiple filings by the same legal entity within a twelve-month period are eliminated, keeping only the most recent filing.

Additionally, within the original set of 437 chapter 12 cases, 97 cases are related to another chapter 12 case currently working through the courts. In the initial filing for a chapter 12 bankruptcy, the Voluntary Petition, a filer makes note of any related cases. These are often an individual filer connected with a corporation also filing for bankruptcy, or a group of family members filing as individuals, but with interconnected finances. However, it has been observed that multiple corporations filed as related cases, as well as individuals and estates, or as many as four individuals as a set representing a single farming operation with multiple legal entities. The 97 filings in the original data set denoted as related cases, constitute over 40 instances of interconnectedness within these filings. As can be seen in the data of filers, particularly those of individuals and related corporations, certain parties in these related cases are often over-saddled with debt. Serving as a “sink” for taking on liabilities, an individual may maintain ownership of real property, a key piece of collateral for securing agricultural financing, while co-signing on a loan for a related entity. Though treated as separate entities by the court system, these related cases appear to impede the ability of both cases to satisfy bankruptcy obligations and achieve a

discharge. From the set of closed cases filed before 2014, 36% of related cases are ultimately discharged, as compared to 46% of non-related cases.

Data Restrictions

To most accurately analyze dispositions, unique cases are used in order to ascertain determinants of these outcomes as they relate to unique financial situations. To include multiple filings from the same entity over a short time frame would likely overstate both the instance of that particular outcome, and the prevalence of those particular characteristics. Compounding this issue for statistical analysis would be instances where subsequent, and redundant, filing characteristics result in discharge after a series of dismissals for reasons such as failure to file documents or to pay the filing fee.

As this research seeks to determine the drivers of bankruptcy outcomes, open cases, as of September 30th, 2020, and cases filed after 2014 are dropped. This restricts the original 419 unique cases to 255. Though a chapter 12 plan is expected to be structured over a three- to five-year period (Walker, Suri, and Goeringer, 2020), the 75th percentile for time to completion of discharged cases in our data set is over five years and two months, with a left skewed distribution. To accommodate this and allow for practical consideration of the time needed to successfully discharge a case, we choose 2014 as our upper limit for filing year. Failing to consider this might result in over-inclusion of dismissed cases in the model. Though our data set is comprised of characteristics at time of filing, the outcomes we model are often not observed until several years later. By restricting the analysis to cases filed in 2014 or earlier we eliminate the disproportionate number of dismissed cases in more recent years. Chapter 12 bankruptcy data for recent years,

2015 to 2020 in this analysis, are in fact incomplete years of data. Cases filed in this time period, which may have already completed or will complete a chapter 12 plan, would not have had sufficient time to successfully work through a plan and discharge remaining debt. Only 74 of the 180 filings after 2014 have reached a final outcome, of which only 17 are discharged. Thus, by including dismissed cases during a time period when likely discharged cases are still open will overestimate dismissals.

As discussed earlier, the confirmation of the chapter 12 plan is an important delineation for cases that seek to continue the chapter 12 process and move towards a full discharge. Accordingly, removing cases for which no plan confirmation could be determined allows for comparison of filers seeking common outcomes and similarly situated case conditions, in that they were accepted by the court. Dropping cases that did not have a chapter 12 plan confirmation reduces our set of cases to 189.[1] Instituting this restriction should be considered an important component to understanding drivers of chapter 12 case outcomes, as the percentage of discharged cases prior to this implementation is 43.9% and 58.9% afterwards. This dramatic shift in the percentage of discharged and dismissed cases, as a result of satisfying data assumptions, highlights the value in our restriction process. That by limiting re-filings, related cases, and non-viable cases from analysis we significantly impact expected outcomes indicates a need to better characterize and categorize filings, as well as outcomes.

[1] Two cases are included in this number without a confirmed plan, representing discharged cases. As we attempt to represent a set of cases for which satisfactory servicing of existing debts has occurred, and been supervised by the courts, it is a fair assumption that these two cases are congruent with that goal.

A final restriction is made to those cases for which the existence of a related case was not established. Related cases should be viewed as only representing a portion of a distressed farming operation's financial situation. As previously described, these related cases are often an individual and a related corporation. By maintaining ownership of real property, for example, an individual can secure financing for activities for a related corporation. These finances are interconnected, which undermines the necessary assumption of independent observations within a data set (Woolridge, 2009). Removing these cases from our analysis improves the ability to assess determinants by creating a more homogenous set of circumstances. Instituting this restriction creates a set of 158 unique cases, each representing the complete characteristics for the entity and farming operation filing for chapter 12.

This process of restriction, or funneling, from filings to unique cases representing complete financial information for a given operation is central to assessing chapter 12 bankruptcies and ultimate outcomes. In addition to its conceptual basis, funneling is important econometrically. Most econometric methods assume independent observations free of endogeneity. Independence in this research is satisfied by restricting related cases and re-filings from analysis (Cameron and Trivedi, 2005). Representing instances where a farming operation files bankruptcy across multiple legal entities, related cases are interdependent and cannot be assessed in the same manner as our non-related cases. Making the restriction to unique cases further eliminates instances of repeated, or extremely similar, financial situations for the same operation. Endogeneity is the presence of explanatory variable and error term correlation (Wooldridge, 2009). By restricting related cases from our study, we only analyze filings which are assumed to represent complete financial situations for a given operation. As such, we are

eliminating from the analysis instances when a given filing might represent liabilities secured by real property assets for a different filing. By doing this we can reasonably assume that financial characteristics for a given case are not correlated with error terms (Wooldridge, 2009).

The restriction made to cases for which the existence of plan confirmation could be established satisfies our assumption that each case represents a viable chapter 12 proceeding. While abstract, viability in this sense should be considered a product of a debtor's willingness to work within the confines of the court and ability to fit within the requirements and prescriptions of the court (Walker, Suri, and Goeringer, 2020). Though difficult to capture, failure to confirm a chapter 12 plan can be due to a number of reasons, like insufficient funds, creditor objections, or failure to file information (US Courts; Walker, Suri, and Goeringer, 2020). As a necessary prerequisite for dismissal, plans lay the foundation for how a case proceeds to discharge. As a result, these cases cannot be assumed to have any reasonable expectation of a positive outcome and are then not representative of viable chapter 12 cases.

Without making distinctions such as unique and complete cases, or controlling for the peculiarities accounted for by these restrictions, previous studies focused on filing rates may overestimate the true prevalence of farm financial distress by using chapter 12 as a proxy for this measure. As a confirmed plan establishes a filing as a viable chapter 12 case, previous research on filing rates may also mis-represent the applicability of chapter 12 to instances of farming operations in distressed financial situations. Previous studies may also mis-characterize outcomes by simply delineating between discharged and dismissed cases, as this does not allow for dismissals to be associated with a positive outcome for the debtor.

Table 1 summarizes the number of cases that can be categorized by each restriction as well as outlines the running total of cases by implementing each restriction sequentially, top to bottom. Within the set of 437 chapter 12 filings in Georgia between 2003 and 2020, 98 cases are not closed and still active in the court. 167 cases were filed in 2015 or later. The unique case restriction characterizes 18 filings as being repeat financial circumstances from the same legal entity over a short time period. The institution of our plan restriction, indicating a viable chapter 12 filing, encompasses 87 cases. This plan restriction removes cases dismissed for failure to file information, unpaid filing fees, or inability to work within the chapter 12 system. Regardless, these cases should be considered nonviable chapter 12 filings. Finally, the related cases restriction, classified as cases for where related individuals, corporations, or other entities are present, characterizes 91 of our 437 cases. Removing these results in a set of observations representing complete financial information for a filing entity. In the far right column we show the running total of cases remaining in our data set by instituting these restrictions sequentially. From 437 chapter 12 filings in Georgia between 2003 and 2020, our funneling process creates a set of 158 cases representing unique and complete financial circumstances that were accepted by the court to reorganize under chapter 12, while allowing for sufficient time to restructure.[2]

[2] This funneling process may be instituted in any order. Shown here is the order in which our data collection and synthesis occurred. While a different order may change the number of cases removed by each restriction, the final result will be the same, 158.

Table 1: Case Restrictions and Funneling Process. Gives the number of cases classified by each restriction and the running total of cases as a result of implementing these restrictions in the sequence shown.

Case Restrictions and Funneling Process

Restriction	Number of Cases Classified by Each Restriction (dropped)	Running Total of Cases
		437
		Filings between 2003 - 2020
Open Cases	98	339
Filed 2014 or Later	167	266
Non-Unique Cases	18	255
No Plan Confirmation	87	189
Related Cases	91	158

Dependent Variables

A series of dependent variables were utilized in our modelling efforts. The first and simplest was that of discharged versus dismissed cases. The second, a multinomial set of outcomes, was discharged versus friendly dismissal versus trustee dismissal. The third and final outcome specification used was positive outcome, comprised of both discharged cases and friendly dismissals, versus trustee dismissal. The same independent variable specifications are employed across all three sets of outcomes to allow for comparison of model fit and effects of filing characteristics on probability of various outcomes.

Discharges and dismissals are the most general final dispositions, making no distinction as to the specific nature or cause of outcome, and are the most commonly used outcome designations within chapter 12 research. With a split of 95 to 63 observations, discharged to dismissed, this is the most “balanced” dissection of dependent variables in our analysis, but as

will be demonstrated in the results, this categorization is not adequate for understanding outcomes. Notably, this class of dependent variable specification ignores any nuance within those designations and fails to consider that certain dismissed outcomes may represent more preferable outcomes than others.

The second dependent variable utilized was a multinomial set of discharged versus friendly dismissal versus trustee dismissal outcomes. The most formal specification, and perhaps the most complete, the multinomial set of outcomes differentiates between a dismissal that was voluntarily requested by the debtor versus a dismissal that was ordered by the trustee as the result of some failure by the debtor. As opposed to the first set of outcomes, discharged versus dismissed, the multinomial set specifically addresses two distinct dismissal categories. Though not a formal classification of bankruptcy outcome, a dismissal was deemed friendly if it was noted by court documents that the debtor voluntarily sought exit from the bankruptcy process. In these instances, a debtor is voluntarily requesting to exit both the structure and obligations of the chapter 12 plan, as well as the benefit of automatic stay from debt collection afforded by the court. This voluntary action is considered friendly because it indicates that a debtor has found some more preferable alternative to the chapter 12 bankruptcy process. However, even though the concept of "friendly dismissals" is recognized within chapter 12 bankruptcy literature, the limited number of friendly dismissals in our final data set (13), as compared to the much larger trustee dismissal and discharged outcome class, likely constrains our ability to model that outcome effectively (Stam, Dixon, Rule, 2003). Though we improve model fit from the discharged versus dismissed specification, our ability to model outcomes as a function of characteristics at filing can be improved by further refining the nature of outcomes.

The final designation of outcome classes to be modeled is that of positive outcomes and trustee dismissals. Positive outcomes are denoted as an aggregated class of discharged cases and friendly dismissals. Discharged cases can be considered optimal for a debtor as they necessitate a debtor's cooperation to complete the plan, so are deemed to be positive. Likewise, friendly dismissals, as voluntary actions by the debtor, can also be considered positive outcomes as they too require a debtor's cooperation and realization of a benefit provided by a particular outcome. A common theme in the body of chapter 12 research, notably by Stam, Dixon, and Rule (2003) is the idea that a dismissal does not inherently represent a bad outcome for a filer or creditor. Debtors and creditors are free to negotiate debt restructuring outside the purview of the court and outside the confines of the chapter 12 plan. This allows for a situation where a filer can work with one or more key creditors to restructure loans to the point that the chapter 12 plan is no longer necessary or no longer the optimal debt restructuring strategy. By accounting for this with the inclusion of voluntary dismissals as "friendly", we are saying that a filer who requests a dismissal, voluntarily exiting bankruptcy and foregoing the protections it provides, has found a more favorable outcome than would have been provided for under the plan. Positive outcomes comprise 108 of the 158 cases in the final set of cases.

The alternative to positive outcomes is that which could be considered a negative outcome and specified as a "trustee dismissal". Included in this class are instances where the chapter 12 bankruptcy trustee, appointed to represent the debtors, initiates a dismissal of a case. Following the confirmation of a bankruptcy plan, a trustee might move for dismissal due to a filer's failure to make plan payments, refusal to release property, or a failure to comply with a trustee's actions to remedy default or make modifications to the plan. For cases ultimately

resulting in a trustee dismissal, filers have not sufficiently satisfied plan payments and have not reached some alternative to bankruptcy whereby it would be advantageous to leave the bankruptcy process. In other words, a filer is finding some amount of protection under the status as a chapter 12 debtor, but is not able or willing to maintain the responsibilities of a chapter 12 debtor. This outcome accounts for 50 of 158 observations in the final set of cases. Figure 1 outlines the incidence of each specific outcome, discharge, friendly dismissal, and trustee dismissal in our final set of cases from 2003 to 2014.

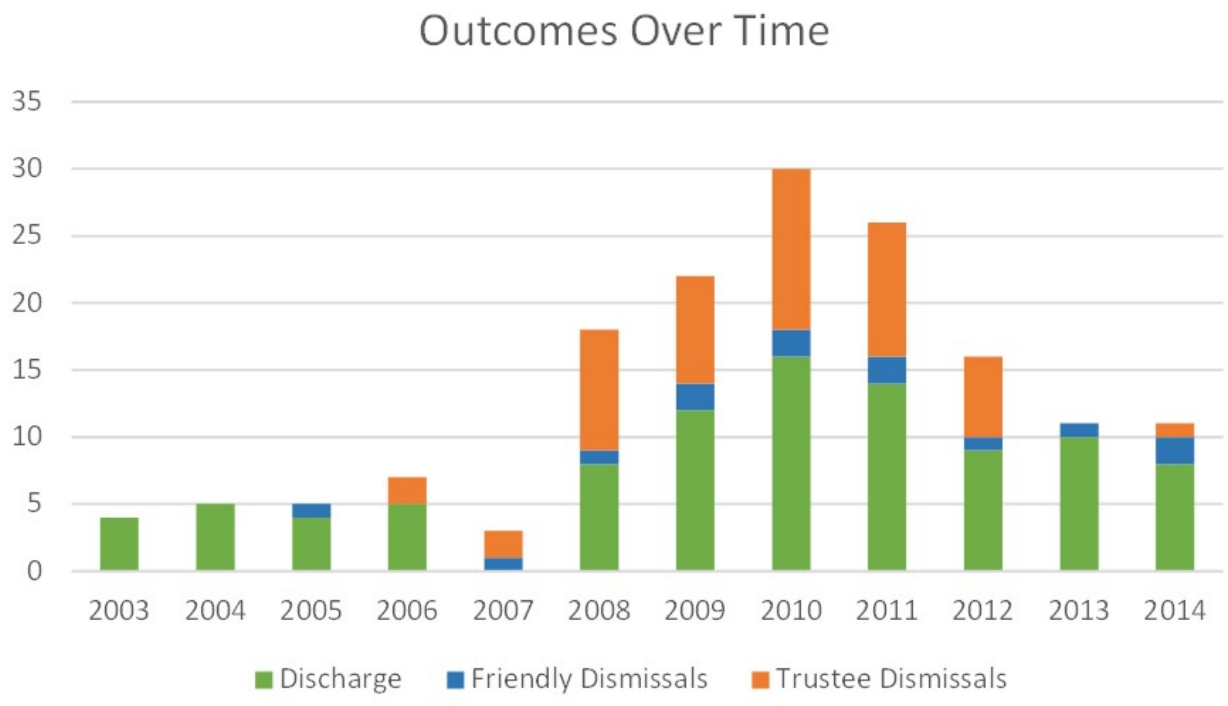

Figure 1: Outcomes Over Time. Incidence of discharged, friendly-dismissed, and trustee-dismissed outcomes between 2003 and 2014

Independent Variables

This research aims to model outcomes as determined by factors at time of filing, so we consider a series of case-specific financial characteristics, general economic conditions, and a set of indicators for agricultural activity relating to the time and/or place of filing. Table 2 summarizes these variables with units, as used in regression analysis and average marginal effect calculation, how they vary by time and/or geography, the source, and the expected direction of impact on the probability of a positive outcome, discharged or friendly dismissal as compared a trustee dismissal.

Table 2: Explanatory Variable Descriptions and Expectations. Provides variable descriptions, units, variation-by, source, and the hypothesized direction of effect on probability of a positive outcome

Explanatory Variable Descriptions and Expectations

Variable	Units	Variation	Source	Expected Direction of Effect on Probability of Positive Outcome
Debt-to Asset Ratio	Ratio	Filing-specific	calculated	positive
Total Liabilities	Scaled by $100,000 *2019 USD*	Filing-specific	Pacer; IDB	positive
Total Assets	Scaled by $100,000 *2019 USD*	Filing-specific	Pacer; IDB	negative
Real Property Share	Percentage of Total Assets *0 to 1*	Filing-specific	Pacer; IDB	positive
Secured Liability Share	Percentage of Total Liabilities *0 - 1*	Filing-specific	Pacer; IDB	positive
Individual Filer	Binary *1 for Individual filer, 0 otherwise*	Filing-specific	Pacer; IDB	positive
Cropland Share	Percentage of total county land area *0 to 1*	County-level by year	USDA - NASS	positive
Pastureland Share	Percentage of total county land area *0 to 1*	County-level by year	USDA - NASS	positive
Government Payments	Scaled by $10,000 *2019 USD*	County-level by year	USDA - NASS	positive
Property Value	Scaled by $1,000 *2019 USD, per acre*	State-level by year	USDA - NASS	negative
% Δ Total Employment	Year-over-year % change in total employment *-1 to 1*	County-level by year	US - BEA	negative
% Δ Real GDP	Year-over-year % change in real GDP *-1 to 1*	County-level by year	US - BEA	positive
Prime Rate Lagged	Prime rate year prior to filing *0 to 100*	National-level by year	St. Louis Federal Reserve - FRED	negative

Total assets and total liabilities are included as independent variables, as well as the relation between the two as debt-to-asset ratio. As two of the most significant components of a business' balance sheet, it follows that both should be included as level values. Likewise, the debt-to-asset ratio, serving as a leading indicator for a firm's leveraged financial position, is a justifiable factor for determining a case outcome at the time of filing. Demonstrated in Figure 2 are debt and asset observations for all filings in our final set of cases, as well as a 45-degree line (a debt-to-asset ratio equal to one). A debt-to-asset ratio in excess of 0.60 is generally considered vulnerable for agricultural operations, 114 of the 158 cases represented below have a debt-to-asset ratio in excess of 1.0, the area above the 45° line in Figure 2 (UMN – Extension, 2018). This point, even more critical and indicative of severe financial stress, is the point at which complete asset liquidation would fail to adequately service the liabilities of these operations (Berk and Demarzo, 2014). That the overwhelming majority of debtors in our analysis are at such an alarming financial position serves to highlight the extreme at which these cases exist on the spectrum of farm financial situations.

Real property assets, as a share of total assets, and secured liabilities, as a share of total liabilities, are also included as independent variables. In general, both of these share variables make up the largest component of their respective total. Real property is often used as the collateral on a secured liability. By including these variables, we attempt to capture the dynamic relationship between a filer's ability to secure financing, the share of debts that are secured, and the ultimate outcomes of an operation seeking remedy under chapter 12 protection. These are included as share, rather than level terms, to limit independent variable correlation and issues arising from multicollinearity.

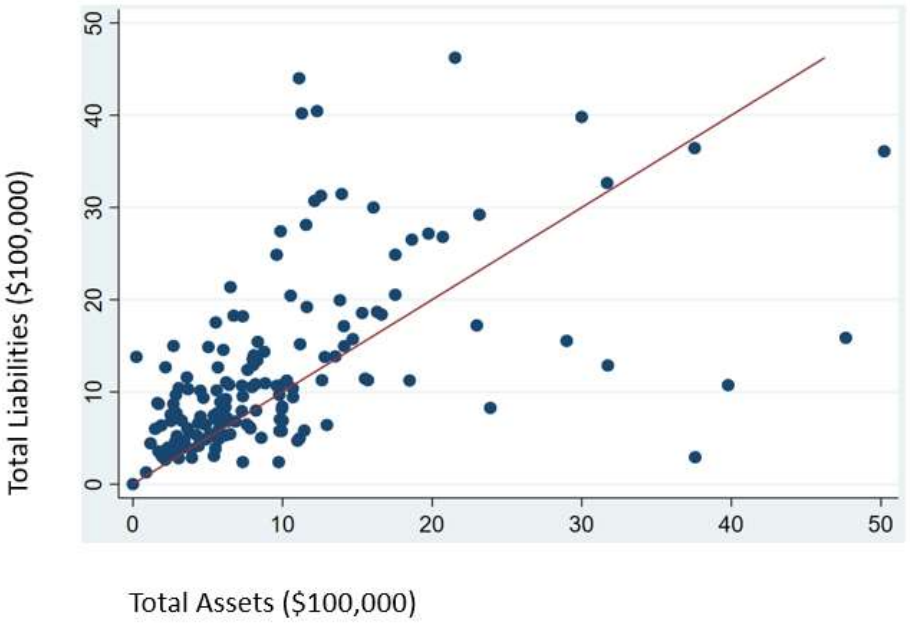

Figure 2: Debt-to-Asset Ratio. Shows incidence debt-to-asset positions for the 158 cases in our final, restricted data set. 45° line for reference (where Total Assets equal Total Liabilities).

To account for general economic conditions around the time of filing, county-level changes in year-over-year total employment, year-over-year real GDP at the county level, and national-level lagged prime interest rate were included as independent variables. The change in total employment controls for the ability of a filer to secure off-farm employment, thereby strengthening overall financial standing going into bankruptcy. The change in real GDP serves as a proxy for the general trend in economic activity around the time of filing. The lagged prime rate, as a measure of the cost of capital leading up to a bankruptcy filing year, provides an indication of the ability of an operation to service debts and re-negotiate existing debts in a favorable way prior to filing bankruptcy.

The ability to characterize filer demographics and operational activities is limited. Marital status and dependents of filers can be gathered from Statements of Financial Affairs or Schedule

I, but these documents are often incomplete. Filer demographics, such as age, education, gender, and race, are not reported and unobserved characteristics by our analysis. The Statement of Financial Affairs provides some indication as to the nature of business in which a debtor is involved, but the level of information is inconsistent. For example, some filers might detail specific business activities (e.g., cotton and peanut farming, or beef cattle), while others are more ambiguous (e.g., farming), and others list nothing at all. Certain farming practices, like peanut farming or poultry and egg production, can be assumed from equipment assets or executory contracts and unexpired leases detailed in the various schedules of financial information. However, this method is also not consistent subject to providing asymmetrical information, for specific cases and across the entire set of cases.

Where applicable, individual filer status is included as a dummy variable, and as a model restriction. This additional restriction to individuals only allows us a robustness check for extreme variations in determinants of outcomes between individual filers and our core data set, comprised of both individual filers and incorporated legal entities and partnerships. Given the lack of information on farm activity, and the inability to estimate such factors, we use a series of land use variables and government payments received, by county, to proxy for agricultural activity and the strength of the local agricultural economy. Including the share of total county land designated as cropland and pastureland proxies for the two major land-use classes related to agricultural activity. Government payments serve as an additional measure for the relative level of agricultural activity, while also providing for a measure of the level of support provided to commercial farming operations in a given county. Also included as an explanatory variable is state-level farmland property value to account for the opportunity cost of land at time of filing.

We hypothesize that the willingness of creditors to accept restructured secured liabilities is related to current market condition.

Average monthly income for an individual, or revenues for incorporated filers, measures the reported cash inflows of filers during the filing year-to-date. Unfortunately, this information is unavailable for many filings, and there appears to be significant noise in its reporting. There are 45 instances of zero or missing values in the final set of cases to be analyzed, which often do not appear to be indicative of the assets and liability profiles for these debtors. Additionally, the majority of incorporated filers do not report revenues as part of their chapter 12 filings. As such, we exclude these as independent variables in modelling efforts, but provide them in summary statistics for reference. As navigating the bankruptcy process necessitates maintaining payments, income does likely tell part of that story.

Time to case outcome in days is an additional measurement considered by our data collection and included in the characterization of filings, but excluded from modelling efforts due to endogeneity. Outcome is not a function of the duration of a bankruptcy case. Rather, it is outcome that dictates the amount of time spent in the court. By nature, a discharged case, holding all other factors constant, will demand a longer period of time than a dismissed case. A dismissal, friendly or not, happens before a discharge is ever possible. While time to case outcome is excluded from the analysis, it is summarized because previous research has found the time to case outcome an interesting variable to analyze (e.g., Dinterman and Katchova (2020)).

Summary Statistics

Presented in Table 3 are descriptive statistics for the final set of 158 cases created by our restriction process, including delineations for the final outcome classifications. Values are expressed in the units in which they were collected, as opposed to the transformed or scaled units used in regression and described in the table above (e.g., dollars of total assets as opposed to 100,000 dollars, real GDP as opposed to percent change in real GDP, etc.). This allows for a more straightforward comparison between characteristics of all cases, especially those which are not included as regressors, like average monthly income and debt discharged. Looking at the final set of 158 cases, we can see that the majority of filings take place in the Middle District of Georgia and are overwhelmingly individual filers. Both of these observations seem to hold when comparing across trustee dismissal and positive outcome classes of dispositions. Temporally, the majority of cases are filed between 2006 and 2014. As 95 cases are discharged and 13 classified as friendly dismissals, the majority of cases are deemed to result in a positive outcome for the filer.

Government payments, total employment, real GDP, and land share variables all vary by county and year. There does not appear to be much difference in land share variables across trustee dismissal and positive outcome categorization. Average values for government payments, total employment, and real GDP are all observed to be higher for positive outcomes. An interesting data point is maximum value for real GDP observed in positive outcomes; this figure of $33,000,000 occurs in Gwinnett county, part of the Atlanta metropolitan area.

Property value, a state-level measurement that varies by year, is observed to be higher for trustee dismissals than positive outcomes, with a smaller range and standard deviation.

Lagged prime rate, another variable that only varies by year, is seen to have the same median, maximum value, and minimum value across trustee dismissal and positive outcomes, but a moderately higher mean value for trustee dismissals.

The debt-to-asset ratio for all cases indicate general insolvency among filers. The average and median for cases included in this analysis, 1.96 and 1.32, respectively, stand in stark contrast to national averages between 0.10 and 0.15 over the same time period (USDA-ERS, 2021). Debt-to-asset ratios above 0.75 for farm operations can be considered risky, with ratios below 0.3 indicative of strong financial positions (Schnitkey, 2018). Comparing debt-to-asset ratios across outcome classes, we can observe lower average and median values for trustee dismissals. Additionally, the range and standard deviation of this measure is much greater for positive outcomes.

Whereas debt-to-asset ratio is just the relationship between two measures, we can also look at total assets and total liabilities as independent, level values. Both assets and liabilities are observed to be higher for trustee dismissals than positive outcomes. Also included are real property assets as a share of total assets and the class of secured liabilities as a share of total liabilities. There is not much difference in either of these values across outcome classes. Though not included in our analysis due to limited availability, mean and median average monthly income is observed to be higher for trustee dismissals than positive outcomes.

Table 3: Summary Statistics. Summarizes filing demographics, financial characteristics, economic conditions, and agricultural activity indicators across the final data set, and by trustee dismissal and positive outcome classifications. Values are expressed in the units in which they were collected, as opposed to the scaled or transformed units used by regression methods (e.g., total assets are given in dollars instead of 100,000 dollars).

Summary of Cases, Trustee Dismissal versus Positive Outcome: 2003 - 2014

Variable	Total					Trustee Dismissal					Positive Outcome				
No. Observations	158					50					108				
Median Days to Case Outcome	1411					831.5					1564				
District															
Northern	22					8					14				
Middle	93					33					60				
Southern	43					9					34				
Business Organization															
Individual	92%					90%					94%				
Corporation	7%					8%					6%				
Year Range															
2003-2005	9%					0%					13%				
2006-2010	51%					66%					44%				
2011-2014	41%					34%					44%				
	Avg.	Median	Max.	Min.	Std. Dev.	Avg.	Median	Max.	Min.	Std. Dev.	Avg.	Median	Max.	Min.	Std. Dev.
Financial Characteristics															
Total Assets	956,849	731,540	5,021,448	0	863,869	1,194,014	922,720	5,021,448	182,322	1,093,044	847,050	635,408	3,978,326	0	713,734
Real Property Share	68%	77%	99%	0%	27%	68%	76%	98%	0%	30%	68%	77%	99%	0%	26%
Total Liabilities	1,202,558	928,814	4,624,058	0	937,704	1,253,623	1,022,624	4,400,998	280,669	971,382	1,178,917	874,479	4,624,058	-	925,354
Secured Liability Share	82%	87%	100%	0%	19%	84%	90%	100%	29%	16%	80%	87%	100%	0%	20%
Debt-to-Asset Ratio	1.96	1.32	60.48	0.08	4.81	1.37	1.16	3.96	0.08	0.85	2.24	1.36	60.48	0.24	5.79
Debt Discharged	330,108	165,034	2,256,691	0	478,995	-	-	-	-	-	330,108	165,034	2,256,691	0	478,995
Avg Monthly Income	15,022	9,387	78,705	-	15,838	17,109	10,393	78,705	-	18,761	14,110	9,253	72,137	-	14,405
Economic Conditions															
Government Payments	4,520	3,881	22,375	30	4,450	4,404	3,749	16,225	120	4,493	4,573	3,881	22,375	30	4,450
Property Value	4,247	4,406	5,282	2,993	583	4,490	4,406	5,282	3,576	491	4,135	4,133	5,282	2,993	589
Total Employment	19,800	8,967	437,958	707	41,221	19,199	9,403	102,063	1,865	25,271	20,078	8,758	437,958	707	46,910
Real GDP	1,420,740	582,801	33,300,000	38,154	3,118,910	1,332,559	575,586	7,494,089	148,512	1,872,058	1,461,564	582,801	33,300,000	38,154	3,558,508
Prime Rate Lag	4.37	3.25	8.05	3.25	1.66	4.75	3.25	8.05	3.25	1.95	4.2	3.25	8.05	3.25	1.48
Cropland Share	46%	48%	69%	17%	14%	47%	53%	68%	17%	15%	45%	47%	69%	19%	14%
Pastureland Share	14%	7%	46%	3%	13%	14%	7%	41%	3%	13%	14%	7%	46%	3%	13%
Woodland Share	30%	28%	59%	12%	10%	30%	28%	56%	17%	10%	31%	29%	59%	12%	11%

CHAPTER 4

METHODS

As research on chapter 12 bankruptcy outcomes is limited, we look to the larger body of financial economics and bankruptcy research to shape modelling efforts. A number of studies have utilized limited dependent variable regression, estimated via logit techniques, to assess bankruptcies and outcomes – (e.g., Kim and Kim (1999); LoPucki and Doherty (2015); Greene, Patel, and Porter (2017); Kim (2020)). This analysis is performed using logit models following the general equation:

$$Y_{it} = X_{it}\beta + D_i\alpha + A_{it}\gamma + \varepsilon_{it}$$

Where Y_{it} is the outcome for a given filing, i, filed at time, t; categorized as discharged versus dismissed, discharged versus friendly dismissal vs trustee dismissal, and positive outcome versus trustee dismissal, depending on the exact specification utilized. X_{it} are financial characteristics at the time of filing for each case to be analyzed. D_i is a dummy variable for individual filers, and only included in model specifications for which no corporate or individual data restriction was made. A_{it} is a series of area-wide economic conditions and proxy variables for agricultural activity and land values. Lastly, representing random errors for each case, is ε_{it}, which, in logit estimation, are assumed to be logistically distributed about zero.

Utilizing a set of limited dependent variables and employing logit estimation techniques, we assume our dependent variable takes the form of a latent variable, or the probability of a certain dependent outcome being true given factors represented by our explanatory variables.

Employing binomial logit estimation for two of our three outcome classifications, discharged versus dismissed and positive outcome versus trustee dismissal, we make the assumption that regression errors follow a standard logistic distribution. Flatter than the standard normal distribution, an assumed logistic distribution allows for larger variance in error terms, though still assumed to be uncorrelated with over or under estimation of probability. Using a set of data comprised of unique and complete financial characteristics, this is a fair assumption (Wooldridge, 2009).

As the model to be estimated is a probability of outcome given certain characteristics, maximum likelihood estimated (MLE) is appropriate. Whereas ordinary least squares (OLS) seeks to maximize observed variance explained by the model, MLE maximizes a log-likelihood function. This is a non-linear function of the parameters to be estimated, explanatory variables, independent variable, and assumption made about the distribution of error terms. MLE, as opposed to OLS, accounts for the non-linear nature of our conditional model and implies that the estimator is consistent, asymptotically normal, and asymptotically efficient. In these respects, an OLS estimator would fail due to the necessary, and strict, linear assumption (Wooldridge, 2009).

There does not appear to be any issue with multicollinearity in any of the model specifications used. By removing related cases and cases by the same legal entity over a short time frame from the set of observations used in regression, we satisfy the condition that observations are uncorrelated. Also, by the restriction of related cases we satisfy the condition that observations are not correlated with errors. Related cases, identified in the voluntary petitions as other individuals or incorporated parties with which the debtor is financially linked,

are often part of the same farming operation. As such, we cannot reliably include these cases in our analysis, as we cannot assume that each observation represents a complete financial observation for a given operation.

Coefficients from the logit estimation do not have an easily understood interpretation. Formally, it is the effect of a change in a given explanatory variable on the log-odds of the dependent variable being true holding all other explanatory variables constant. Though coefficients for binomial logit estimation can be illustrative, for understanding direction of effect or impact relative to other explanatory variables, we also calculate average marginal effects. This calculation results in a much more accessible interpretation of results, the average effect of a change in a given explanatory variable on the probability of the dependent variable being true holding all other explanatory variables constant.

Average marginal effects (AME) are calculated by averaging individual partial effects across the entire set of observations. These individual partial effects are the effects of each value for a given explanatory variable, holding all other explanatory variables constant. As opposed to other marginal effects methods, AME provides us an estimate for the effects of the data within our sample, as opposed to the effect at the average of our sample (Woolridge, 2009). Marginal effects are reported along with standard errors calculated by the delta method. The delta method, used by Stata as a default for calculating average marginal effects standard errors, is an approximation of variance by expanding a random variable about its mean, and draws on the standard errors calculated from the respective regression model (Feiveson, 2021; StataCorp, 2019).

Included in our models are two types of variables that require unique consideration when trying to interpret average marginal effects, interaction variables and dummy variables. In addition to both total assets and total liabilities being included as level terms, the interaction of these is also included as an explanatory variable in our models, as debt-to-asset ratio. However, it is impossible to ascertain the effect of a ratio holding both factors constant, which is a key assumption for interpreting the calculation of average marginal effects. For these two variables, total assets and total liabilities, AMEs are calculated by incorporating the interaction of these two values. The interpretation of this is the effect of a change in total assets on the probability of the dependent variable being true holding all other variables constant and relative to total liabilities. A like interpretation would be true for the effect of total liabilities. The effect of the lone dummy variable in our modelling, individual filer status, should be interpreted as the marginal effect of that filer being an individual on the probability of an outcome being true relative to that case being filed by a non-individual (e.g., a corporation or partnership).

For all three model specifications coefficients are reported along with conventional standard errors. As a complement to our discussion of modelling efforts, we also present standard errors calculated by three distinct methods for the third model's average marginal effects: the conventional standard error, robust standard errors, and clustered standard errors. Conventional standard errors are calculated as basic econometric application output as a measure for the accuracy of an estimate, relative to the size of that estimate (Woolridge, 2009). Robust standard errors account for potential heteroskedasticity in our model specification, where error terms might be correlated with certain values taken by explanatory variables (Cameron and Trivedi, 2005). As calculated by Stata, robust standard errors are also known as

Huber, White, or sandwich standard errors, and are valid given independent observations within the data, which is satisfied by our case funneling process (StataCorp, 2019). The third method, clustered standard errors, are standard errors calculated across groupings of observations. In our analysis, we calculate clustered standard errors across author-created geographic units, seen in Figure 3. These are based on National Agricultural Statistics Service (NASS) regions in the State of Georgia. These regions are more closely aligned with agricultural activity, compared to the Georgia bankruptcy court districts, seen in Figure 4. Though we have satisfied, by our case restriction process, the assumption that residuals are not correlated with certain observations, these clustered standard errors allow us to examine how errors are correlated across NASS regions. Calculating standard errors by these NASS regions, being aligned with agricultural practice and industry characteristics, allow us to investigate how unobserved factors or randomness leading to chapter 12 bankruptcy outcomes might vary across agricultural geography within the state of Georgia (Cameron, Gelbach, and Miller, 2011; StataCorp, 2019).

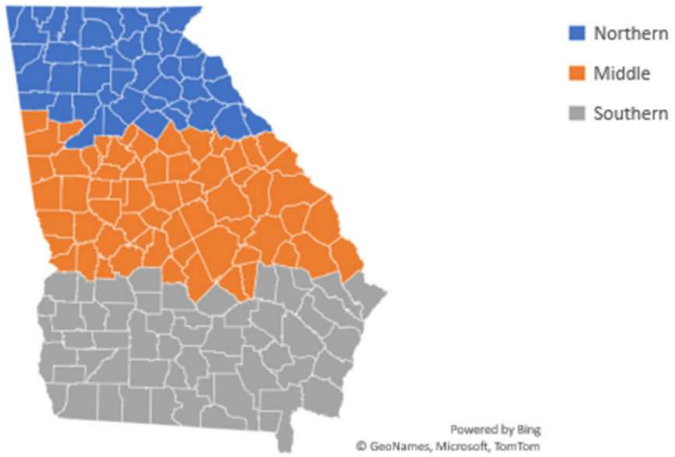

Figure 3: Agricultural-Geographic Regions in the State of Georgia. Author designated. (Rabinowitz, Secor, Wyche, and Collins, 2020)

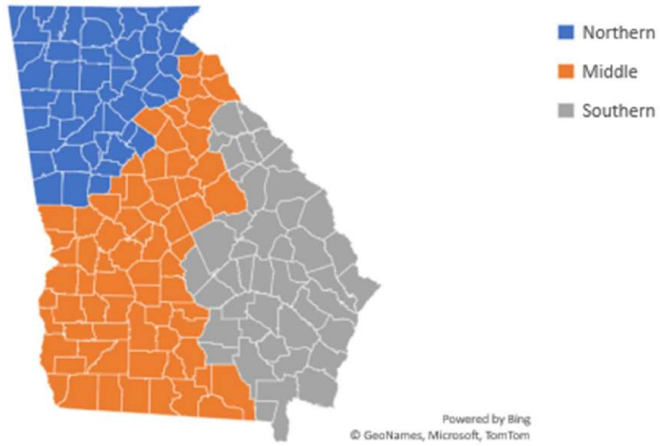

Figure 4: Bankruptcy Court Districts in the State of Georgia. (Rabinowitz, Secor, Wyche, and Collins, 2020)

Model fit is expressed in the results section as the pseudo R-squared, calculated by the McFadden method. A conventional R-squared calculation, representing variation explained by the model, is impractical for logit and maximum likelihood estimation as these methods maximize a different set of criteria. Instead, pseudo R-squared is calculated as follows:

$$R^2_{pseudo} = 1 - \frac{LL_{UR}}{LL_0}$$

Where LL_{UR} is the maximized log-likelihood of a given model and LL_0 is the maximized log-likelihood of a model with same set of dependent variables estimated by only an intercept. As log-likelihoods are negative values, an improved LL_{UR} is closer to zero than LL_0. (Wooldridge, 2009)

For the multinomial set of outcomes, discharged versus friendly dismissal versus trustee dismissal, we use a multinomial logit estimation, which also assumes logistically distributed regression errors. Like the binomial logit, the multinomial logit method utilizes a maximum

likelihood-derived estimation to maximize a log-likelihood function. However, as the multinomial logit allows for multiple outcomes, this method maximizes multiple log-likelihood functions with respect to a specified reference category of outcome. In our analysis, the reference category used is discharged, so log-likelihood functions are maximized with respect to the log-odds of discharge for both trustee dismissal and friendly dismissal.

An assumption essential to understanding the implications of the multinomial logit is that of the Independence from Irrelevant Alternatives (IIA). This axiom dictates that changes to the set of outcomes will change the probability of outcomes equally (Benson, Kumar, and Tomkins, 2016). As a theoretical issue, the IIA axiom holds in our multinomial specification as there does not appear to be a nesting structure in the specification of outcomes. Any additional alternate outcome, or the removal of an outcome from the categories of final disposition, would not be correlated with any of the other available, and relevant, outcomes (Cameron and Trivedi, 2005).

Coefficients estimated by the multinomial logit method are even less interpretable than the binomial logit. In the multinomial logit model, the coefficient's sign does not indicate the direction of the variable's effect. So, like with the binomial logit, we also present the calculated average marginal effects for this method. Pseudo R-squared is calculated in the same manner as the binomial logit and reported with estimated coefficients. The key difference in interpreting results from multinomial logit estimation, whether they be regression coefficients or calculated effects, is that they are expressed in relevance to the reference category (Woolridge, 2009; Cameron and Trivedi, 2005). Though the multinomial logit model is appropriate for our outcomes, it's effectiveness in our case is limited by the disproportionate number of cases in each of the three groups (Woolridge, 2009). There are 95 discharged cases, 50 trustee dismissals,

but only 13 friendly dismissals in our final set of cases, a very un-balanced data set for this method (Woolridge, 2009). As such, we present this method and results only as illustrating the potential for its use in assessing more varied classifications of bankruptcy outcomes.

CHAPTER 5

RESULTS

We present results, both regression coefficients and calculated average marginal effects, for two modelling efforts, a "base" model and an "individuals only" model, across three specifications of the dependent variable. Discussion of results will largely focus on calculated effects and model fit parameters. All base models in our analysis use 157 observations from our final set of 158 cases, with one case excluded due to missing values; restriction to individuals reduces the observation count to 145. Presented alongside regression coefficients and average marginal effects are standard errors and the following denotations of statistical significance: * for significance at the 10% alpha (α) level, ** for significance at the 5% α level, and *** for significance at the 1% α level. These α levels represent the probability of rejecting the null hypothesis, that a given explanatory variable does not impact outcome, when it should not be rejected (Woolridge, 2009).

Base model 1, presented in Table 4, is shown to have significant effects of total assets and property value. Increased total assets, scaled by $100,000, are associated with a 1.1% decrease in the likelihood of discharge at the 10% significance level. Increased property value, scaled by $1,000, is associated with a 34.2% decrease in the likelihood of discharge at the 1% significance level. Restricting the analysis to filings of individuals only, we observe a loss of any total assets significance to predicting likelihood of discharge. The effect of property value is rather similar across these two models, but with a slight loss of significance. For discharged versus dismissed

dependent variable split, the base and individual only models have Pseudo R^2 of 0.1102 and 0.1106, respectively.

Multinomial regression coefficients and average marginal effects are presented in Table 5 and Table 6 below. The multinomial outcome modeled here, discharged versus friendly dismissal versus trustee dismissal, is the most complex in our analysis. Here we show that total assets and property values are significant factors explaining probability of trustee dismissal. The marginal effects for a multinomial logit model sum to zero, so the effects of our explanatory variables on probability of friendly dismissal and trustee dismissal are relative to discharged outcome. Conversely, the effects of our explanatory variables on the probability of a discharged outcome, being the reference category for this model, are relative to the other alternatives (Woolridge, 2009). The marginal effects of explanatory variables on each of the three classified outcomes can be considered along the lines of the Independence of Irrelevant Alternatives axiom (IIA) discussed previously. Total assets, scaled by $100,000, is shown to have a roughly 1% decrease in the likelihood of discharge, relative to a non-discharged outcome, and roughly 1% increase in the likelihood of trustee dismissal, both significant at the 10% level. Property value is shown to be associated with a 35% increase in the likelihood of trustee dismissal, significant at the 5% level, and associated with a 36% decrease in likelihood of discharge, significant at the 1% level. No explanatory variables are shown to have a significant average marginal effect on probability of a friendly dismissal, relative to a discharged disposition. Putting into place the restriction of individual filings only, significance is lost for total assets relating to discharged, but is maintained relative to trustee dismissal. Effects, in direction and magnitude, are similar for

property value, at the same levels of significance. Pseudo R^2 for the base model of our multinomial dependent variable is 0.1058 and 0.1073 for the individual only restriction.

Our final dependent variable specification, positive outcome versus trustee dismissal, results in similar calculated effects as previously shown, but with improved model fit parameters. Estimates and calculated marginal effects for this model are presented in Table 7. Total assets, scaled by $100,000 and property value, scaled by $1,000, are shown to be significant across both the base model and the individual only restriction. Relative to previous models, magnitude changes slightly, while direction and significance level do not change. Increased total assets are associated with a decrease in likelihood of positive outcome at the 10% level for both the base and individual only models. Higher property value is negatively associated with a positive outcome at the 5% significance level for both models. The base model restriction results in a pseudo R^2 of 0.1268, while the individual only restriction results in a pseudo R^2 of 0.1187.

To illustrate the benefit of restricting analysis to unique and complete cases, provided below in Table 8 is a breakdown of the goodness-of-fit measures and outcome classifications for the same model specifications with and without these restrictions. This improvement in modelling outcomes based on characteristics at filing, just by restricting analysis to complete and unique cases, highlights the analytical value of these restrictions and supports our efforts to satisfy necessary and conceptual econometric assumptions. That we improve goodness of fit, despite reducing the number of observations in each analysis, is evidence of effective and practical data synthesis.

To complete our discussion of econometric results and interpretations, Table 9 presents standard errors of marginal effects calculated by three different methods: conventional, robust,

and clustered. The model associated with each of these methods is the base model specification for positive outcome versus trustee dismissal. Conventional standard errors are calculated under the assumption that residuals are not heteroskedastic, meaning correlated with values of explanatory variables, or correlated across groups of observations. Robust standard errors relax the assumption regarding heteroskedasticity and are calculated by normalizing variance across observations to a constant level (Woolridge, 2009). Clustered standard errors, while assuming homoskedasticity, calculate standard errors across groups, or clusters, of observations. This accounts for unobserved factors or randomness within subsets of our data set to be accounted for in evaluating statistical significance. Here we have clustered standard errors across the author-created National Agricultural Statistics Service (NASS) regions in the state of Georgia. Doing so allows for regional variation in agricultural practices and industry characteristics to be considered when assessing the impacts of our explanatory variables on chapter 12 bankruptcy outcomes.

Conventional standard errors and robust standard errors present very similar values and levels of significance for the same two explanatory variables, total assets and property value. Clustering standard errors across NASS regions results in very different indications of significant variables. While total assets and property value remain significant, albeit with smaller standard errors than with the other methods, also shown to be significant are both land use share variables and real GDP change. This is an interesting result because not only are these variables shown to be newly significant by clustered standard errors, they are shown to be significant at the 5% level, a marked difference from an insignificant marginal effect. Though we observe a decrease in the standard errors for total assets and property value, which are significant across model

specifications and standard error calculation methods, the explanatory variables whose standard errors decrease the most are the land share variables and real GDP change. Other variables, which are consistently insignificant, show relatively minor change in standard errors by the clustering method.

Table 4: Discharged versus Dismissed, Logistic Regression Results and Average Marginal Effects.

Discharged versus Dismissed, Logistic Regression Results and Average Maringal Effects

	Base Model					Individuals Only				
	Obs. 157					Obs. 145				
	Pseudo R^2: 0.1102					Pseudo R^2: 0.1105				
Outcome	*Dismissal*					*Dismissal*				
Variable	Coef.		Std. Err.	AME	Std. Err.	Coef.		Std. Err.	AME	Std. Err.
Debt-to Asset Ratio	-0.338		0.302			-0.513		0.352		
Total Liabilities	-0.007		0.031	-0.006	0.005	0.008		0.033	-0.005	0.005
Total Assets	0.020		0.035	0.011 *	0.007	0.008		0.036	0.011	0.007
Real Property Share	-0.961		0.833	-0.155	0.168	-0.334		0.983	0.004	0.198
Secured Liability Share	0.669		1.257	0.254	0.232	0.252		1.398	0.221	0.246
Individual Filer	-0.209		0.692	-0.038	0.144			-		
Cropland Share	0.809		2.050	0.141	0.426	-0.099		2.125	-0.049	0.443
Pastureland Share	2.144		2.172	0.388	0.451	2.034		2.237	0.325	0.461
Government Payments	-0.102		0.476	-0.010	0.097	0.186		0.487	0.050	0.098
Property Value	1.726	**	0.675	0.342 ***	0.128	1.685	**	0.684	0.328 **	0.129
% Δ Total Employment	3.198		6.481	0.761	1.333	5.637		6.594	1.112	1.349
% Δ Real GDP	-3.438		3.984	-0.828	0.816	-3.059		4.019	-0.758	0.823
Prime Rate Lagged	-0.256		0.191	-0.049	0.039	-0.233		0.198	-0.041	0.040
Constant	-6.585	**	2.777			-6.354	**	2.900		

Table 5: Multinomial Outcome, Logistic Regression Results and Average Marginal Effects

Discharged versus Friendly Dismissal versus Trustee Dismissal, Multinomial Logistic Regression Results and Average Marginal Effects

	Base Model								Individuals Only							
	Obs. 157								Obs. 145							
	Pseudo R^2: 0.1058								Pseudo R^2: 0.1073							
Outcome	*Friendly Dismissal*				*Trustee Dismissal*				*Friendly Dismissal*				*Trustee Dismissal*			
Variable	Coef.	Std. Err.	AME	Std. Err.	Coef.	Std. Err.	AME	Std. Err.	Coef.	Std. Err.	AME	Std. Err.	Coef.	Std. Err.	AME	Std. Err.
Debt-to Asset Ratio	-0.203	0.499			-0.411	0.339			-1.018	0.817			-0.437	0.374		
Total Liabilities	-0.016	0.058	-0.001	0.003	-0.001	0.033	-0.004	0.005	0.051	0.076	-0.001	0.003	0.004	0.035	-0.004	0.005
Total Assets	0.001	0.065	0.001	0.004	0.021	0.036	0.010 *	0.006	-0.059	0.090	0.001	0.004	0.018	0.037	0.009 *	0.006
Real Property Share	-1.351	1.434	-0.083	0.104	-0.907	0.897	-0.078	0.156	-0.620	1.690	-0.018	0.121	-0.291	1.068	0.015	0.187
Secured Liability Share	1.969	2.368	0.155	0.164	0.275	1.373	0.103	0.224	0.598	2.680	0.103	0.167	0.149	1.508	0.119	0.239
Individual Filer	0.092	1.257	0.012	0.090	-0.284	0.738	-0.046	0.133								
Cropland Share	-2.427	3.469	-0.240	0.257	1.840	2.262	0.383	0.407	-3.054	3.611	-0.246	0.268	0.728	2.341	0.202	0.425
Pastureland Share	-0.225	3.512	-0.104	0.257	2.968	2.430	0.499	0.437	-0.380	3.711	-0.114	0.263	2.696	2.481	0.444	0.443
Government Payments	0.354	0.724	0.034	0.052	-0.279	0.528	-0.049	0.094	0.547	0.768	0.037	0.053	0.074	0.535	0.007	0.094
Property Value	0.908	0.935	0.012	0.065	2.147 ***	0.818	0.355 **	0.138	1.055	1.005	0.021	0.068	1.967 **	0.807	0.322 **	0.137
% Δ Total Employment	0.937	10.505	-0.045	0.758	5.025	7.280	0.981	1.310	8.011	10.530	0.395	0.771	5.678	7.386	0.835	1.318
% Δ Real GDP	1.135	6.548	0.215	0.477	-5.170	4.455	-1.099	0.792	2.303	6.758	0.227	0.485	-4.752	4.462	-1.019	0.791
Prime Rate Lagged	-0.190	0.311	-0.006	0.022	-0.313	0.216	-0.048	0.038	-0.201	0.328	-0.005	0.023	-0.266	0.221	-0.0390	0.0391
Constant	-4.382	4.199			-8.548 ***	3.272			-3.119	4.756			-8.210 **	3.331		

Table 6: Multinomial Outcome, Average Marginal Effects for Discharged Outcome (Reference Category)

Multinomial Outcome, Average Marginal Effects for Discharged

	Base Model		Individuals Only	
Outcome	*Discharged*			
Variable	AME	Std. Err.	AME	Std. Err.
Total Liabilities	0.005	0.005	0.005	0.005
Total Assets	-0.011 *	0.007	-0.010	0.007
Real Property Share	0.162	0.168	0.004	0.199
Secured Liability Share	-0.259	0.234	-0.222	0.247
Individual Filer	0.034	0.145		
Cropland Share	-0.143	0.428	0.044	0.445
Pastureland Share	-0.395	0.452	-0.330	0.462
Government Payments	0.015	0.097	-0.044	0.098
Property Value	-0.367 ***	0.131	-0.343 ***	0.131
% Δ Total Employment	-0.936	1.343	-1.229	1.356
% Δ Real GDP	0.885	0.818	0.793	0.825
Prime Rate Lagged	0.054	0.039	0.044	0.041

Table 7: Positive Outcome versus Trustee Dismissal, Logistic Regression Results and Average Marginal Effects.

Positive Outcome versus Trustee Dimissal, Logistic Regression Results and Average Marginal Effects

	Base Model					Individuals Only				
	Obs. 157					Obs. 145				
	Pseudo R^2: 0.1268					Pseudo R^2: 0.1187				
Outcome	*Trustee Dismissal*					*Trustee Dismissal*				
Variable	Coef.		Std. Err.	AME	Std. Err.	Coef.		Std. Err.	AME	Std. Err.
Debt-to Asset Ratio	-0.390		0.332			-0.345		0.362		
Total Liabilities	0.001		0.032	-0.004	0.005	0.000		0.034	-0.004	0.005
Total Assets	0.021		0.035	0.010 *	0.005	0.023		0.036	0.009 *	0.005
Real Property Share	-0.720		0.867	-0.078	0.156	-0.208		1.040	0.016	0.187
Secured Liability Share	0.057		1.345	0.124	0.222	0.131		1.476	0.140	0.237
Individual Filer	-0.309		0.716	-0.047	0.133					
Cropland Share	2.192		2.207	0.384	0.407	1.165		2.283	0.200	0.425
Pastureland Share	3.001		2.374	0.496	0.437	2.713		2.425	0.437	0.443
Government Payments	-0.341		0.512	-0.050	0.094	-0.021		0.516	0.006	0.094
Property Value	2.029	**	0.807	0.356 **	0.138	1.827	**	0.792	0.323 **	0.136
% Δ Total Employment	4.857		7.127	0.963	1.311	4.570		7.205	0.823	1.319
% Δ Real GDP	-5.255		4.359	-1.083	0.791	-5.023		4.368	-1.012	0.790
Prime Rate Lagged	-0.288		0.211	-0.049	0.038	-0.239		0.215	-0.040	0.039
Constant	-8.417	***	3.223			-8.217	**	3.272		

Table 8: Goodness of Fit and Case Outcomes due to Restrictions.

Goodness of Fit and Case Outcomes due to Restrictions

	Without Restrictions		With Restrictions	
	Discharged versus Dismissed			
	Base Model	Individuals Only	Base Model	Individuals Only
# Cases	188	163	158	146
Discharged	112	99	95	89
Dismissed	76	64	63	57
Regression				
Obs:	187	162	157	145
Pseudo R^2:	0.1089	0.101	0.1102	0.1106
	Discharged versus Friendly Dismissal versus Trustee Dismissal			
	Base Model	Individuals Only	Base Model	Individuals Only
# Cases	188	163	158	146
Discharged	112	99	95	89
Friendly Dismissal	16	14	13	12
Trustee Dismissal	60	50	50	45
Regression				
Obs:	187	162	157	145
Pseudo R^2:	0.1052	0.0965	0.1058	0.1073
	Positive Outcome versus Trustee Dismissal			
	Base Model	Individuals Only	Base Model	Individuals Only
# Cases	188	163	158	146
Positive Outcome	128	113	108	101
Trustee Dismissal	60	50	50	45
Regression				
Obs:	187	162	157	145
Pseudo R^2:	0.1176	0.1008	0.1268	0.1187

Table 9: Standard Error Calculation Methods and Significance. Standard errors for average marginal effects of explanatory variables on trustee dismissal, relative to a positive outcome, for the base model specification.

Positive Outcome, Average Marginal Effects and Standard Error Methods

		Standard Error Method		
Outcome	*Trustee Dismissal*			
Variable	AME	*Conventional*	*Robust*	*Clustered*
Total Liabilities	-0.004	0.005	0.005	0.004
Total Assets	0.010	0.005 *	0.006 *	0.003 ***
Real Property Share	-0.078	0.156	0.161	0.164
Secured Liability Share	0.124	0.222	0.220	0.242
Individual Filer	-0.047	0.133	0.120	0.137
Cropland Share	0.384	0.407	0.409	0.178 **
Pastureland Share	0.496	0.437	0.425	0.192 **
Government Payments	-0.050	0.094	0.091	0.062
Property Value	0.356	0.138 **	0.118 ***	0.046 ***
% Δ Total Employment	0.963	1.311	1.219	1.868
% Δ Real GDP	-1.083	0.791	0.763	0.480 **
Prime Rate Lagged	-0.049	0.038	0.035	0.033

CHAPTER SIX

CONCLUSIONS

Showing improvements in model fit based on classification of outcomes lends support to the hypothesis that dismissals do not inherently represent bad outcomes for filers. These demonstrated improvements in characterization of final dispositions provide a framework for further efforts to analyze chapter 12 filings and outcomes. By showing that discharged cases and cases voluntarily dismissed are more closely aligned than dismissals as a catch-all category of outcomes, we impact the understanding of farm financial distress and outlets for remediation. Further work should assess whether the alternative arrangements proxied by the friendly dismissal category are a result of filing for chapter 12, by forcing a creditor to come to the bargaining table, or potentially viable solutions available to distressed operations prior to bankruptcy.

The data work associated with this research presents an important contribution to the understanding of chapter 12 case dynamics, the study of filing rates, and implications to the larger farm and agricultural financial sector. By establishing certain restrictions made here, namely that of cases representing unique and complete financial characteristics for a given farming operation, we are able to satisfy assumptions necessary in order to reliably use established econometric methods. We limit interconnectedness among filings and generate a subset that can be assumed to be free of endogeneity, thus creating a homogenous set of cases and outcomes that can be analyzed efficiently and effectively. Unique to this research, we link

IDB data and information collected from case-specific court documents accessed via PACER. This allows us to overcome a major limitation presented by the IDB data, which is the presence of redundant and correlated cases.

It was mentioned in the Data chapter that our case restriction process alters the characterization of chapter 12 bankruptcy dispositions in the state of Georgia. If we were to compare the share of cases that are discharged after using our restriction process, it would place Georgia squarely in the range of national averages, 59.4% nationally over the 2011-2013 period (Farm Bureau, 2020). However, previous studies have not assessed the viability, uniqueness, or completeness of filings, as has been done here. This suggests a potential limitation to the study of chapter 12 bankruptcies across geographic specifications. Fair and reasonable comparison of chapter 12 filing rates, as a proxy for farm financial stress, and outcomes cannot be made between states, or to national levels, without adequately and consistently satisfying the necessary assumptions in order to do so. This is important because it indicates a potential to generalize the process used here to other states, regions, and potentially a national level, allowing for more accurate and readily comparable findings. Future research on chapter 12 bankruptcies, particularly that which addresses multiple states or a national interest, should work towards this. Establishing distributions of chapter 12 outcomes, unique cases, and related filings, using the methods described here, would allow for better comparison and more effective control parameters to be used in econometric analysis.

Across model specifications, total assets and property value are significant factors affecting probability of outcomes. The positive direction of both average marginal effects on probability of trustee dismissal indicates the willingness, or flexibility, of creditors to accept debts

restructured by the court in a manner favorable to debtors. Having already reached a confirmed plan, our methods estimate the impacts of these factors on cases that aim to work through the chapter 12 process. Increased total assets could signal to creditors that a debtor might be able to repay more debts than provided for under proposed chapter 12 plans. Through a series of legal objections, the final result might be a plan that is too demanding for a debtor complete, thus failing to discharge. Likewise, lower total assets might incentivize creditors to accept plan provisions and scheduled repayments. In an effort to beat-out other creditors in an attempt to be repaid from a pool of diminished assets, some major crediting parties may also be more willing to seek, or accept, arrangements made outside the purview of the courts. By making some arrangement outside the plan, a debtor may no longer find the protections and structure of the court an optimal financial strategy and request a voluntary dismissal, which we classify as a positive outcome. Total assets are also perhaps the best proxy for farm size and complexity included in our modelling efforts, so we can also interpret the effects of this variable as indicative of larger and more complex operations finding difficulty navigating the chapter 12 bankruptcy process.

Increased property value at time of filing being associated with a trustee dismissal has a similar interpretation to total assets. A state-level factor varying year-to-year, and not case-by-case or geographically, increased property value at time of filing serves as an indication of the opportunity cost of land, a major consideration for creditors making lending decisions. Like with total assets, increased property values, often collateralizing secured debts, signal to creditors a debtor's ability to repay debts. As such, property value levels and trends should be expected to affect the willingness of creditors to work with debtors or accept plan provisions. Likewise, a

debtor's real property assets, and associated secured liabilities, are inextricably linked with a major provision of chapter 12: the "cram down" benefit. Due to this, increased property values limit the ability of filers to restructure debts favorably. Constrained by increasing property values, a debtor may find himself unable to write-down existing debts to a level at which he could complete a plan.

Modelling efforts for this research included an effort to calculate standard errors by three methods: the conventional approach, robust to account for potential heteroskedasticity, and clustered across NASS regions to consider unobserved factors and randomness associated with agricultural activity. That standard errors and significance did not change dramatically seems to point to our model satisfying the assumption of homoskedasticity. However, the rather substantial changes observed by clustering standard errors indicates that further work is needed to understand the unobserved, or random, aspect of chapter 12 bankruptcy outcomes. As we have included a number of spatially varied explanatory variables, like land shares and change in real GDP, it is plausible that these clustered standard errors point to additional unobserved variables being spatially correlated. It has been stated that plan provisions, and the business and economic conditions faced while working through said plan, likely contribute to the ultimate disposition of chapter 12 filings. These factors, certainly unobserved at filing, and likely geographically sensitive, might allow for an easier assessment of the ideal standard error calculation method for this type of research.

Our conclusions around the willingness of creditors to accept plan provisions, challenge proposed repayment provisions, or work with debtors on arrangements alternative to those set forth by the court facilitate an interesting discussion around chapter 12 plan characteristics and

highlight a limitation to our research. We do not have data on repayments, other actions mandated under chapter 12 plans, or data on the process by which debtors and creditors arrive at a confirmed plan. We have established plan confirmation as a decisive step in the bankruptcy process between filing and ultimate outcome, but the actual points of consideration and actions taken by all parties is highly specific to each case. Though standards exist for plan repayments (e.g., equivalence to repayments under liquidation), there is no reliable data for the process by which debtors, creditors, and court-appointed trustees formulate these plans. It is this process which dictates the exact structure of plan payments, debtor requirements, and various other actions to remedy delinquencies. Lacking insight into this critical period of chapter 12 bankruptcy and data analysis of all parties involved, we are limited in our ability to assess how and why certain plan considerations are made. As such, our analysis can only attempt to capture characteristics at the time of filing, at which point specific plan provisions have not yet been made. Future research should assess the development and modification of chapter 12 plans, the unique provisions made relative to filing characteristics, and impacts on ultimate case outcome. By the same token economic conditions and changes in a debtor's financial situation over the duration of a case's proceedings would be valuable additions to the study of chapter 12 bankruptcies and likely allow for a more complete causal modelling of outcomes and the development of a panel data set.

Indicated previously, the positioning of distressed operations, particularly those needing court-supported debt restructuring, lie at an extreme on the spectrum of farm financial situations. Because of this, drawing conclusions is difficult and demands refinement of research questions, data, and methodology. Yet, the general conclusions drawn by this body of work –

data restrictions, classification of outcomes, and the apparent willingness of creditors to work with debtors based on key filing characteristics - are justified and make a valuable contribution to the study of agricultural finance and bankruptcy analysis.

REFERENCES

Works Cited

Agin, W. 2019. Predicting Chapter 11 Bankruptcy Case Outcomes Using the Federal Judicial Center IDB and Ensemble Artificial Intelligence. *Georgia State University Law Review.* Volume 35, Issue 4. Pages 1093 – 1115.

Benson, A., Kumar, R., and Tomkins, A. 2016. On the Relevance of Irrelevant Alternatives. *Proceedings of the 25th International Conference on World Wide Web.* Pages 963 – 973.

Berk, J. and Demarzo, P. 2014. Corporate Finance, Third Edition.

Cameron, A.C., Gelbach, J., and Miller, D. 2011. Robust Inference with Multiway Clustering. *Journal of Business and Economic Statistics.* Volume 29, Issue 2. Pages 238 – 249.

Cameron, A. and Trivedi, P. 2005. Microeconometrics: Methods and Applications, First Edition.

Dinterman, R. 2020. Historical Bankruptcies. *Retrieved from https://www.robertdinterman.com/historical-bankruptcies/FAQ*

Dinterman, R. and Katchova, A. 2017. Farm Bankruptcies and Land Value Trends: The Effects of Land Value Fluctuations on Financial Stress. *Agricultural and Applied Economics Association Annual Meeting, Selected Paper.*

Dinterman, R. and Katchova, A. 2020. Survival analysis of farm bankruptcy filings: Evaluating the time to completion of chapter 12 bankruptcy cases. *Agribusiness: An International Journal.* Pages 1 – 24.

Dinterman, R., Katchova, A., and Harris, J. 2018. Financial stress and farm bankruptcies in US agriculture. *Agricultural Finance Review.* Volume 78, Issue 4. Pages 441 – 456.

Dixon, B., Nan, M., Ahrendsen, B., Settlage, L., and Stam, J. 2003. Factors Affecting State-Level Chapter 12 Filing Rates: A Panel Data Model. *Emory Bankruptcy Developments Journal.* Volume 20, Issue 2. Pages 401 – 426.

Faiferlick, C. and Harl, N. 1988. The Chapter 12 Bankruptcy Experience in Iowa. *Journal of Agricultural Taxation and Law*. Volume 9, Issue 2. Pages 302 – 331.

Feiveson, A. 2021. Explanation of the delta method. Stata. *Retrieved from https://www.stata.com/support/faqs/statistics/delta-method/*

Greene, S., Parina, P., and Porter, K. 2017. Cracking the Code: An Empirical Analysis of Consumer Bankruptcy Outcomes. *Minnesota Law Review. Agribusiness, an International Journal.* Volume 101. Pages 1031 – 1098.

Harl, N. 1992. Chapter 12 Bankruptcy: A Review and Evaluation. *Agricultural Finance Review.* Volume 52. Pages 1 – 11.

Harl, N. 2006. Bankruptcy Reform and the Effects on Chapter 12 Bankruptcy for Farmers. *Agricultural Finance Review*. Volume 66, issue 1. Pages 7 – 16.

Kim, J. 2020. Determinants of Corporate Bankruptcy: Evidence from Chaebol and Non-Chaebol Firms in Korea. *Asian Economic Journal*. Volume 34, Issue 3. Pages 275 – 300.

Kim, M. and Kim, M. 2003. A Note on the Determinants of Outcomes of Bankruptcy Petitions: Evidence from Korea. *Journal of Business Finance and Accounting*. Volume 26, Issue 7-8. Pages 997 – 1011.

LoPucki, L., and Doherty, J. 2015. Bankruptcy Survival. *University of California – Los Angeles Law Review.* Volume 62, Issue 4. Pages 970 – 1015.

Newton, J. 2020. The Verdict is In: Farm Bankruptcies Up in 2019. Market Intel. *Retrieved from https://www.fb.org/market-intel/the-verdict-is-in-farm-bankruptcies-up-in-2019*

Patrick, K., Kuhns, R., and Borchers, A. 2016. Recent Trends in US Farm Income, Wealth, and Financial Health. *Choices: Agricultural and Applied Economics Association*. Volume 31, Issue 1. Pages 1 – 8.

Porter, K. 2011. The Pretend Solution: An Empirical Study of Bankruptcy Outcomes. *Texas Law Review.* Volume 90. Pages 103 – 162.

Rabinowitz, A., Secor, W., Wyche, D., and Collins, J. 2020. A Spatial and Time Series Analysis of Georgia Farm Bankruptcies. *Georgia Farm Bureau*.

Schnitkey, G. 2018. Incidence of High Debt-to-Asset Ratios Grow Over Time. Weekly Farm Economics. University of Illinois - farmdocDAILY.
Retrieved from https://farmdocdaily.illinois.edu/2018/12/incidence-of-high-debt-to-asset-ratios-grow-over-time.html

Stam, J. and Dixon, B. 2004. Farmer Bankruptcies and Farm Exits in the United States, 1899-2002. USDA – ERS. *Agriculture Information Bulletin Number 788.*

Stam, J., Dixon, B., and Rule, W. 2003. Sixteen Years of Chapter 12 Bankruptcy: Evolution of Filing and Disposition Rates. *Agricultural Finance Review*. Volume 63, Issue 1. Pages 93 – 108.

StataCorp. 2019. Stata 16 Base Reference Manual. College Station, TX: Stata Press.

United States Court system (US Courts). 2021. Chapter 12 – Bankruptcy Basics. *Retrieved from https://www.uscourts.gov/services-forms/bankruptcy/bankruptcy-basics/chapter-12-bankruptcy-basics*

United States Department of Agriculture (USDA) – Economic Research Service (ERS). 2021. Assets, Debt, and Wealth. *Retrieved from https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/assets-debt-and-wealth*

USDA – ERS. 2021. Cash receipts by commodity State ranking. *Retrieved from https://data.ers.usda.gov/reports.aspx?ID=17844*

USDA – ERS. 2021. Farming and Farm Income. *Retrieved from https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/*

USDA – NASS. 2021. Prices Paid and Received: All Farm Index by Month, US. *Retrieved from https://www.nass.usda.gov/Charts_and_Maps/Agricultural_Prices/allprpd.php*

University of Minnesota Extension (UMN – Extension). 2018. Ratios and Measurements in Farm Finance. Farm Finance. *Retrieved from https://extension.umn.edu/farm-finance/ratios-and-measurements#solvency-796061*

Walker, J., Suri, M., and Goeringer, P. 2020. A Practical Guide to Chapter 12 Bankruptcy for Maryland Farmers and Fishermen. *University of Maryland Extension*.

Wooldridge, J. 2009. Introductory Econometrics: A Modern Approach, Fourth Edition.

Data Sources

Bureau of Economic Analysis. United States Department of Commerce. *Retrieved from https://www.bea.gov/*

Census of Agriculture. USDA – National Agricultural Statistics Service (NASS). *Retrieved from https://www.nass.usda.gov/AgCensus/*

Federal Reserve Economic Data. St. Louis Federal Reserve – Federal Reserve System of the United States. *Retrieved from https://fred.stlouisfed.org/?gclid=CjwKCAiA1eKBBhBZEiwAX3gql6T0Hce3qF5TxkvuXMesuaWXKZzmM6YhMAGVGUTMfIlvi_uaMjH5oRoCaEUQAvD_BwE*

Georgia Northern, Middle, and Southern District Bankruptcy Courts Case Management/Electronic Case Files (CM/ECF) systems , accessed via the US Courts' Public Access to Court Electronic Records (PACER). US Courts system. *Retrieved from https://pacer.uscourts.gov/*

Integrated Database. Federal Judicial Center. *Retrieved from https://www.fjc.gov/research/idb*