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AN EXAMINATION OF CORPORATE AGRIBUSINESS FINANCIAL PERFORMANCE: HOW AGRIBUSINESSES PERFORM OVER TIME AND UNDER VARIOUS CONDITIONS

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AN EXAMINATION OF CORPORATE AGRIBUSINESS FINANCIAL PERFORMANCE:
HOW AGRIBUSINESSES PERFORM OVER TIME AND UNDER VARIOUS CONDITIONS

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THESIS

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A thesis submitted in partial fulfillment of the requirements for the degree of Master
of Science in the College of Agriculture at the University of Kentucky

By

Sierra J. Enlow
Lexington, Kentucky
Director: Dr. Ani Katchova
Lexington, Kentucky
2012

ABSTRACT OF THESIS

AN EXAMINATION OF CORPORATE AGRIBUSINESS FINANCIAL PERFORMANCE:
HOW AGRIBUSINESSES PERFORM OVER TIME AND UNDER VARIOUS CONDITIONS

While several studies examine the managerial structure of privately owned agribusinesses, few studies take a comprehensive look at publically traded agribusiness firms. Our study examines the historical position of agribusiness compared to the market, and then studies the impact of the global economic and financial crisis. The objective of this study is to pinpoint effects of corporate financial management strategies, commonly researched in financial literature on agribusiness firms' performance. Through utilizing a quantile regression we find that agribusiness position in times of financial crisis is directly related to firm performance. As we examine internal factors, several interesting impacts of managerial factors emerge. These results are useful for agribusiness firms seeking to improve their performance, as we show which management strategies related to capital structure, and firm size are associated with an increase in profitability based on the performance record of the agribusiness. Additionally, we examine how these factors impact internal financial distress of the agribusiness firms. Our conclusions clarify the impact of traditional financial management techniques on agribusiness firms and lead to questions for further research. Ultimately, the presented research provides a foundational knowledge of corporate agribusinesses financial performance.

KEYWORDS: Agribusiness Financial Performance, 2008 Financial Crisis, Historical
                Analysis, COMPUSTAT Data, Financial Distress

Sierra J. Enlow

November 15, 2012

AN EXAMINATION OF CORPORATE AGRIBUSINESS FINANCIAL PERFORMANCE:
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November 15, 2012

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To my granddaddy, Goggy, for inspiring me to complete my master's degree

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Chapter One: Introduction

The term agribusiness first appears in publications around the mid-20th century. The concept of agribusiness is introduced by Davis and Goldberg's research at the Harvard Business School (Davis and Goldberg 1957). Early studies into agribusinesses focused on agribusiness role in helping the small farmers (Goldsmith 1985) and on the position of agribusinesses in market structure (Goldberg 1965). Goldberg continued his work defining the role of agribusiness with his article on the role of multinational companies (Goldberg 1981).

Loosely defined the term agribusiness can encompass everything from a production agriculture operation to a multinational company. The USDA Economic Research uses such a definition to define a food and fiber system:

> *"Agribusiness comprises the economic activities of the farms and the firms that assemble, process, and transform raw agricultural commodities into final products for distribution to U.S. and foreign consumers. Agribusiness includes all economic activity that supports farm production and the conversion of raw farm products to consumable goods—for example: machinery repair, fertilizer production, farming itself, food processing and manufacturing, transportation, wholesale and retail trade, distribution of food and apparel, and eating establishments. The income and employment generated within Agribusiness is the income earned and jobs provided by these firms."*

In recent literature the term agribusiness is more commonly utilized to describe larger operations that have a corporate structure, including many that have an international scope. Historically, multinational enterprises in the food system sprawl across national boundaries filling a void in the vertical food system from farm supplier to ultimate consumer and carrying on those functions of input technology, farming, grading, assembly, storage, processing, and distribution that

either are not performed at all or ineffectively performed by others in the total

vertical food system we call 'agribusiness' (Goldberg 1968).

Agribusinesses operate under several different business models.

Cooperatives remain popular in this industry. Traditionally, agriculture

cooperatives are producer-driven providing a retail outlet that yields a higher profit

margin. Other cooperative structures exist in different parts of this market sector,

including consumer cooperatives and cooperatives designed to meet the demand

created by government mandates.

Several authors looked at the role of cooperatives in the agricultural industry

and the unique management strategies associated with those organizations. These

studies have found that managerial factors and consumer relationships are

important strategies for success. Lerman and Parliament (1990) studied the

relationship between the comparative financial performance of cooperatives and

investor-owned firms (IOFs) in the fruit and vegetable processing and the dairy

industries from 1976 through 1987. They found the cooperatives in both industries

were performing as well as or better than the comparable IOFs using profitability,

leverage, and interest coverage measures (Lerman and Parliament 1990). The lack

of significant differences in profitability between the two types of firms suggests

that cooperatives may be following goals similar to IOFs (Lerman and Parliament

1990).

Granted that cooperatives, and several other structures of agribusinesses,

can issue stocks, these businesses are not the publicly-traded firms we consider in

our analysis. Other authors have studied the persistence of profitability in the food

and agribusiness industry (Schumacher and Boland 2003), and included cooperatives in their analysis. Our interest remains predominately focused on the financial performance of those businesses that trade in the public sector.

Publicly-traded agribusinesses are defined as those that trade on the open market (a stock exchange or an over-the-counter market). The owners of the publicly-traded companies are individual and institutional shareholders who hold stocks issued by the company. Publicly-traded companies have greater access to financing because they can issue more stock but are also subject to more regulation in terms of filing requirements and corporate taxes. Publicly-traded agribusinesses have not received much attention in the literature even though substantial indicators point to their economic strength as a market sector.

Chapter Two examines the existing literature related to corporate agribusiness performance. Chapter Three provided information on the data source we use in our analysis. Chapter Four evaluates economic indicators related the market and an agribusiness sample. Chapters Five and Six strive to build upon the foundations of financial literature and apply econometric tools to a new dataset. Chapter Seven contains some general conclusions about the analysis of previous chapters and will evaluate questions for further research.

Chapter Two: Literature Review

Our study focuses on the financial performance of agribusinesses and takes into account the substantial finance literature on firm performance. An overview of existing literature identifies indicators of firm performances, clarifying fundamental differences between types of agribusinesses and other established firms. Agribusinesses operate with various business models. The differing business objectives of these models necessitate defining the separation between publicly-traded firms and other types of agribusinesses.

Researchers examine agribusiness management strategies with various methodologies. Several studies focus on cooperative management strategies; they define a significant portion of agribusinesses and present interesting business models to study. Katz (1997) focuses on the managerial behavior and strategy choices in agribusiness cooperatives while acknowledging that limited empirical research exists in examining the differences in management behavior of cooperatives and investor-owned firms (IOF's). Katz's study utilizes some of the same management strategies we examine throughout our research, including measures of leverage and liquidity. Katz argues that publicly-traded firms are fundamentally different than cooperatives; market-based measures serve as good indicators of firm performance in publicly-traded firms while agribusiness cooperative may have a different focus. Our analysis focuses on market-based measures of financial success compared to Katz's focus on cooperative's member benefit.

Nilsson and Dijk (1997) work to bridge the gap between cooperatives and publicly-traded firms in their book on strategies and structures in the agro-food industries. They examine the impacts of mergers and acquisitions in the performance of the U.S. food industries and the strategic behavior that leads to firm success.

Other authors have looked at the impact of agribusinesses on the global economy. Cook and Chaddad (2000) provide a referential framework on the global economy; their work focuses on providing an overview of the issues related to agro-industrialization and the role of agribusiness management in bridging the gap between agribusiness and foreign development. Cook and Chaddad (2000) also note a shift in the early 1970's from intra-firm to inter-firm analysis in agribusiness management literature.

Wells (1979) supports the examination of U.S. based firms as an indicator of global economic performance. Financial literature often examines the strength of these U.S. based multinational firms. However, strategic examination of financial performance of agribusinesses has rarely been studied.

Existing literature has found that investor and managerial perceptions of firm quality are highly related to measures of financial success. In an analysis of a Fortune survey of firm managers, McQuire et. al (1990) found that although firms with high return on assets and low debt-to-asset ratios were considered successful, other measures of firm success (growth in sales and operating income) were not significantly related to any of the reported qualitative performance indexes of quality. Other studies, particularly those that focus specifically on business growth through exporting, find that sales and sales growth are good indicators of firm success.

Liquidity as a measure of firm success has been studied in depth. Cleary (1999) evaluates existing studies to state the investment decisions of financially-constrained firms are more sensitive to firm liquidity than those of less constrained firms. Cleary's resulting regression finds that investment outlays are less sensitive to liquidity at different

levels of financial constraint. In imperfect capital markets, a firm's ability to make investment decisions impacts long-term corporate planning and success.

Return on assets and return on equity are popular measures of firm performance in financial literature. Hansen and Wernerfelt (1989) utilize return on assets as an organization determinant of firm performance. Johnson and Soenen (2003) provide an overview of literature related to indicators of successful companies while testing out different measures of success for a large sample of firms. The indicators cover several consistent measures of financial performance, including cash relative to assets, return on equity, return on assets, a capital structure ratio and sustainable growth measuring retained earnings relative to equity. Johnson and Soenen (2003) also outline other potential indicators of successful companies; these indicators include measures of advertising expenditures, research and development, cash conversion cycle, and earnings volatility.

Overall these performance indicators provide a basic foundational framework to utilize in our study. As we move forward with additional research, we can examine how combined measures of firm success relate to agribusiness firms. Indicators such as the Economic Value Added (EVA), Sharpe's ratio, and Jensen's alpha could possibly provide an introspective look into firm performance. The Sharpe Ratio (1966, 1994) would provide a look at how agribusinesses perform within a portfolio. Jensen's alpha (1969) signals above market performance and has some ability to indicate free cash flows. Economic value analysis is also used as an additional measure of stock market performance.

The application foundational framework borrowed from financial literature continues through the following chapters of presented analysis. Coad and Rao (2006) utilize a quantile regression to look at market behavior in relation to innovation. Probit regressions are common throughout financial literature in examining questions of likelihood relative to firm distress.

Very few studies apply the methodologies found in financial literature to the study of agribusinesses. Schumacher and Boland (2003) compared the business performance (accounting profitability) for publicly-traded and cooperatively-owned food agribusiness firms. They used return on equity as their dependent variable to study industry and corporate effects. Our analysis of firm performance follows various aspects of the financial literature and applies them to agribusiness firms.

Chapter Three: Data

This overview of corporate agribusiness performance focuses exclusively on those publicly-traded firms for which the financial data is found in the COMPUSTAT North America Data, a database of U.S. and Canadian fundamental and market data. The COMPUSTAT North America database is standardized according to financial statement presentation and specific data item definitions assuring consistent, comparable data for company and industry analysis (Standard & Poor's). Generally Accepted Accounting Principles (GAAP) accepted and defined by the United States federal accounting standards advisory board further standardizes the data definitions in COMPUSTAT.

The data for this study is obtained from the Standard & Poor's COMPUSTAT dataset accessed via the Wharton Research Data Service at the University of Pennsylvania. The COMPUSTAT data organizes companies in terms of GVKEY codes and the Standard Industrial Classification (SIC). COMPUSTAT has defined a proprietary identifier, the GVKEY, for each company in the database. The GVKEY can be used to track a company over time, while the company name, CUSIP, or ticker may change over time. The Standard Industrial Classification (SIC) represents a 20th century development on behalf of the United States Government designed to distinguish between companies in a systematic manner. More recently the SIC codes were replaced by North American Industry Classification System (NAICS) starting in 1997. The SIC and NAICS classify companies by their primary type of business. In this study, we utilize SIC codes to maintain consistency with earlier years for which data are available, but there is a close correspondence between SIC

and NAICS codes in terms of company classifications. We also use financial data starting in 1961, although data in earlier years is less reliable so we concentrate most of our discussion on later years.

This dataset contains some limitations for a historical analysis. Data prior to 1960 is unavailable and incomplete in some cases. However, some authors suggest that post-war economies experience a period of structural change (van Ark 1995). This shift in policy changed the position of American companies, allowing them to grow into multinational operation. The fundamental differences in trade policy could possibly warrant the consideration of a separate in depth study for data prior to 1960. Davis (1956) conceptualizes the definition of agribusiness –"sum total of all operations involved in the production and distributions of food and fibers"— referring to the post-WWII phenomenon of increasing "unified functions" and the "interdependency" between the agricultural production sector and the pre- and post-farm gate business world.

For this analysis we consider agribusiness firms that produce food and kindred products with SIC 2-digit codes of 20 (TABLE 3.1). Specifically, these food manufacturing and processing agribusinesses produce meat products, dairy products, canned, frozen, and preserved fruits and vegetable products, grain mill products, bakery products, sugar and confectionary products, fats and oils, and beverages. Most of the observations (in terms of company's quarterly financial data) are for beverages, meat products, canned, frozen, and preserved fruits and vegetables. There are 483 unique agribusinesses that are classified as food product manufacturing companies for the period of 1961 to 2011. On average, they report

data for 52 quarters (13 years), for a total of 25,283 quarterly observations of data

for agribusiness firms. Jointly with the rest of the companies, there are 31,741

unique companies in the COMPUSTAT data from 1961 to 2011 that we use in the

analysis for all firms.

Table 3.1 SIC Codes for Agribusiness Firms

Industry Groups	SIC Codes	Number of Observations
Food and Kindred Products (major group for industry groups listed below)	20	25,283
Meat Products	201	4,044
Dairy Products	202	1,959
Canned, Frozen, and Preserved Fruits, Vegetables, and Food Specialties	203	3,613
Grain Mill Products	204	2,643
Bakery Products	205	1,689
Sugar and Confectionery Products	206	2,726
Fats and Oils	207	700
Beverages	208	7,909
Miscellaneous Food Preparations and Kindred Products	209	0

Notes: SIC 2-digit codes represent the major group and SIC 3-digit codes represent the industry. Number of observations is the number of firms-quarter observations in Compustat for 1961-2012.

Furthermore, COMPUSTAT lacks bankruptcy data in the North American

Quarterly Fundamentals database. The inclusion of this information would

strengthen the analysis of historical financial performance and firm financial

distress. In this study, we use S&P credit ratings to indicate financial distress of a

company. Companies which are also borrowers are rated on a scale from AAA to D

to indicate ranges from financial strength to financial distress. These scores are

based on a number of metrics and COMPUSTAT's record of S&P ratings reflects the

current S&P rating system, adjusting historical scores to be comparable with today's classification of corporations.

Additional information not included in COMPUSTAT and needed for our analysis has been found through several other sources. Information on periods of economic decline is available through the National Bureau of Economic Research (NBER). The National Bureau of Economic Research identifies several different periods of economic decline since 1961. To accommodate a more dynamic viewing range, FIGURE 3.1 shows those periods of economic decline that occur between 1985 and the present; these periods are shaded on the tables. The July 1990-March 1991 8-month decline was initiated by monetary policy and intensified by the gulf crisis and followed by a period of strong growth. The burst of the dot-come bubble brought this period of growth came to an end in March 2001 and ushered in another 8-month decline that was intensified by September 11th. A short recovery lasted until an 18-month decline that began in December 2007 and ended in June 2009. This period includes the Financial Crisis of 2008 and holds the notable achievement of the longest period of decline since the Great Depression, which lasted 43 months.

Notably, the period of decline from December 2007 to June 2009 has the most volatile impact on total sales. This recession is characterized by a global impact and is significant because it demonstrates that it takes a global recession to impact multinational companies. We find that the 2008 Recession had differing impacts on Agribusinesses with respect to size and utilize the 2008 Financial Crisis in our research as our variable of systematic shock. The interesting impacts of the

FIGURE 3.1 Quarterly Performance of Agribusiness Sector and Market Total Sales
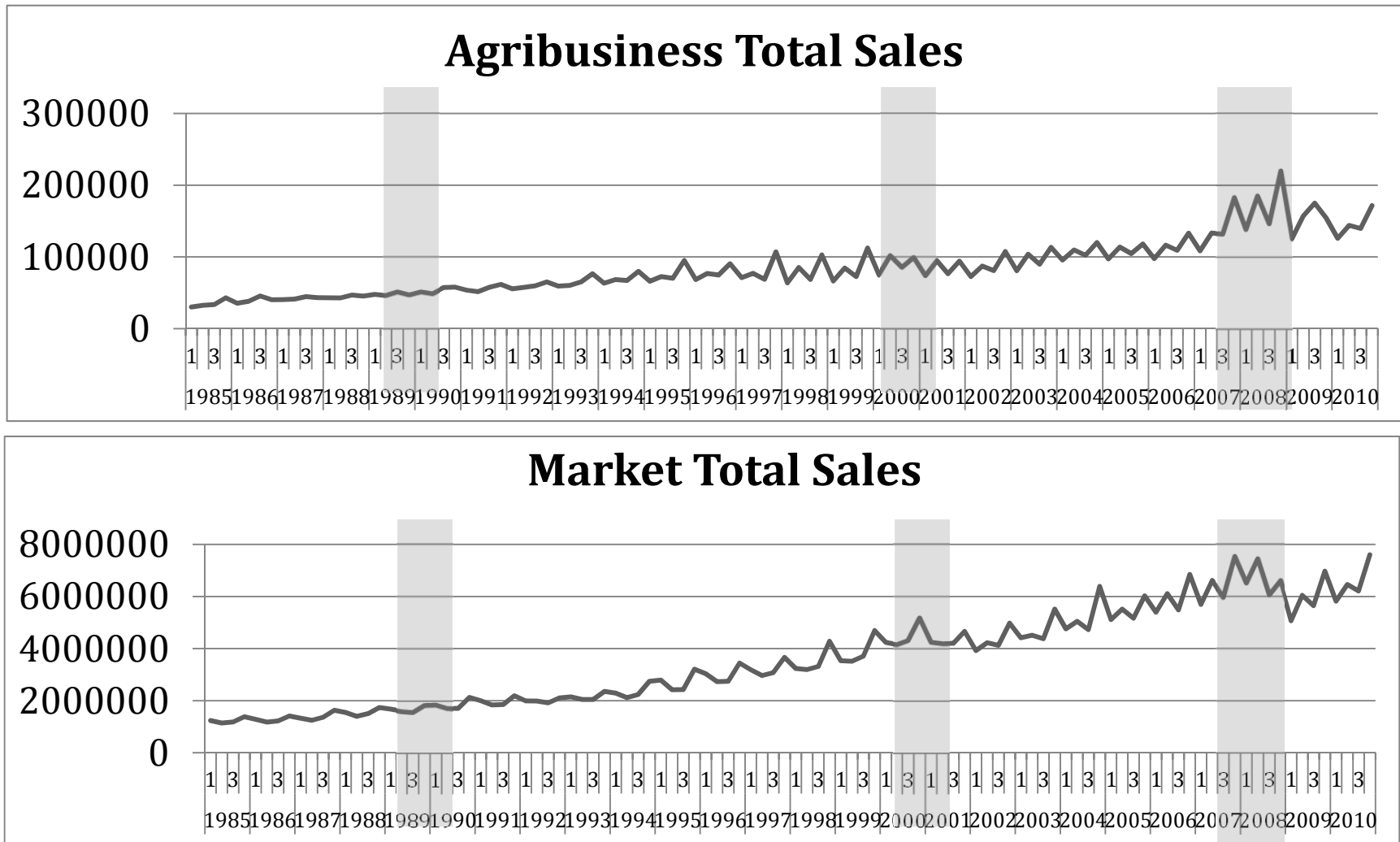
2008 Financial Crisis will be examined further in depth with a quantile regression in chapter five.

For common financial ratios, constructed out of COMPUSTAT data but not included in the actual database, we consult financial literature and have made notations when the ratios are incorporated in our research.

Chapter Four: Historical Performance of Agribusiness

The financial and economic climate in which agribusiness perform has been characterized by several ebbs and flows in the time period from 1961 to the present. Very little research has been done to examine the historical financial performance of agribusinesses. As we strive to fill this gap in existing research, we draw information from the financial literature to determine the indicators to define successful agribusiness performance.

We begin our analysis by providing a basic overview of S&P credit ratings comparing agribusiness and all firm performance. The S&P credit ratings signal financial stability and financial distress to investors. TABLE 4.1 outlines the comparison, and we see that agribusinesses have performed somewhat better than all firms in terms of the proportion of companies falling into each of the credit ratings.

We find that no agribusinesses have moved into liquidation and they exhibit higher percentages of companies with S&P ratings above the score of C, when compared to the market of all firms. The market of all firms shows 33 percent of companies signaling financial distress with an S&P credit rating of C or lower. This is compared to the agribusiness sample where only 20% earn that classification, showing lower proportion of agribusiness firms are in distress. Slightly fewer agribusinesses are in the process of reorganization, demonstrated by the S&P credit rating of D. During this time period, no agribusinesses were classified in the stages of corporate liquidation.

TABLE 4.1 S & P Credit Ratings

S&P Credit Rating	All Firms Frequency	All Firms Percent	Agribusiness Frequency	Agribusiness Percent	Distress Classification
A+	9,378	1.86	1,182	13.50	Financial Stability
A	17,796	3.54	625	7.14	
A-	26,376	5.24	461	5.26	
B+	67,487	13.41	1,280	14.62	
B	95,221	18.92	1,839	21.00	
B-	116,706	23.19	1,629	18.60	
C	132,810	26.39	1,202	13.72	Financial Distress
D	37,169	7.39	540	6.17	
LIQ	335	0.07	-	0	
Total	503,278	100	8,758	100	

As we continue examining financial performance of companies, one can examine either the absolute performance in terms of the scale of operation (balance sheet and income statement items) or the relative performance in terms of financial ratios. Ratios allow us to scale for factors, such as size, that vary within an industry and across industries. These measures facilitate the comparison between companies and allow us to examine agribusiness performance versus all firm performance. These financial performance measures can be used to compare performances over time, across industries, against benchmarks, or within segments of a particular business.

4.1 Financial Ratios

We include five different types of financial ratios into our analysis to measure profitability, liquidity, firm activity, solvency and market performance for a total of twelve specific ratios. In addition to these financial ratios we also report measures of various items from the balance sheet and income statement. TABLE 4.2 reports

Table 4.2 Financial Ratios Definitions and Formulas

Financial Ratios	Indicators	Formulas	Compustat Code
Profitability	Return on Equity	Net Income/Equity	NIQ/CEQQ
	Return on Assets	Net Income/Total Assets	NIQ/ATQ
	Gross Margin Ratio	(Net Sales - Cost of Goods Sold)/ Net Sales	(SALEQ-COGSQ)/SALEQ
	Profit Margin Ratio	Net Income/ Net Sales	NIQ/SALEQ
Liquidity	Current Ratio	Current Assets/Current Liabilities	ACTQ/LCTQ
	Quick Ratio	(Current Assets - Inventories)/Current Liabilities	(ACTQ-INVTQ)/LCTQ
Activity (Efficiency) Ratios	Asset Turnover	Net Sales/Total Assets	SALEQ/ATQ
Solvency Ratios	Debt to Asset Ratio	Total Debt/Total Assets	LTQ/ATQ
	Long Term Debt to Asset Ratio	Long Term Debt/Assets	DLTTQ/ATQ
	Asset to Equity Ratio	Total Assets/Equity	ATQ/CEQ
Market Ratios	Earnings Per Share	Net Earnings/Number of Shares	EPSPXQ
	P/E Ratio	Market Price Per Share/Diluted Earnings Per Share	PRCCQ/EPSFXQ
Balance Sheet and	Total Assets	Total Assets	ATQ
Income Statement	Total Liabilities	Total Liabilities	LTQ
	Equity	Equity	CEQ
	Sales	Net Sales	SALESQ
	Net Income	Net Income	NIQ
	Retained Earnings	Retained Earnings	REQ

the major financial ratios, the specific indicators used to measure these financial ratios, the formulas used for calculating them, and the COMPUSTAT codes for calculating these financial ratios based on the Quarterly COMPUSTAT database.

The long-term profitability of a company is vital for the company's survival and to ensure that adequate benefits are received by its shareholders. Profitability examines the amount of profit a company generates on its sales at different stages of an income statement. Profitability can be measured in a number of different ways. Return on equity (ROE) examines firm performance relative to equity. Return on assets (ROA) examines firm performance in terms of total assets and evaluates how efficiently assets are used. The gross margin ratio looks at gross profit (net sales – cost of goods sold) for the net sales that a company generates, whereas a net profit marking ratio looks at net income to net sales. The profit margin ratio serves as an indicator of how well a company controls internal costs to generate profits from its sales.

Liquidity ratios measure the company's ability to pay off its short-term debt obligations. This is done by comparing company's most liquid assets (those that can easily be converted to cash) to short-term liabilities. We use two ratios to measure liquidity. The current ratio is a measure of the company's short-term financial strength. Acceptable current ratios ranges differ from industry to industry, but ratios above 1 indicate ability to cover short-term liabilities. Our measure of current ratio is calculated as currents assets divided by current liabilities. Similar to the current ratio, the quick ratio measures company's financial health in the short run but it excludes inventories which are not as easily converted to cash.

Activity ratios provide a measure of the company's resource utilization. The asset turnover ratio reflects net sales relative to total assets. A high asset turnover ratio demonstrates effective utilization of company assets, an operating efficiency we like to see in the analysis of financial performance. Other activity ratios could include the cash conversion cycle or a measure of change in operating leverage.

Other ratios examine the solvency position of the firms. They measure the company's overall debt load in relation to the mix of debt and equity. The greater the amount of debt held by a company, the greater the financial risk of a bankruptcy. The debt-to-asset ratio measures total debt relative to total assets and the long-term debt-to-asset ratio examines a firm's long-term position by dividing long-term debt by total assets. The third included solvency ratio measures assets relative to equity, which is also named equity multiplier.

We include two market ratios into our analysis. Stockholders often consult earnings per share to gauge a company's position. Companies are required by federal law to report on earnings per share as an item on their income statement report; this item is available in the COMPUSTAT database. Also, the price earnings (P/E) ratio is included as measure of market performance. The P/E ratio examines the market price of common stock per share relative to the company's earnings per share.

While ratios provide scaled comparisons between companies and industries, finite measures of firm performance allow us to examine characteristics of agribusiness compared to all firms. We including six balance sheet and income

statement items to continue to examine the performance of agribusinesses: total

assets, total liabilities, equity, sales, net income, and retained earnings.

4.2 Results and Findings

We use financial ratios to compare the financial performance of food producing

agribusinesses to the performance of all publicly-traded companies. Table 3 reports

the financial ratios as well as balance sheet and income statement items for

agribusinesses and all firms using quarterly COMUPSTAT data for 2008-2011. We

concentrate on comparing the performance measures using medians as opposed to

means. Financial ratios typically contain outliers that skew the means for these

financial ratios, while the use of medians does not suffer from this problem.

TABLE 4.3 shows that the median agribusiness performance compares very

well to the all-firm median with respect to profitability. Agribusinesses yield higher

performance on three out of four of the profitability ratios that we utilize in our

analysis. For the last four years, the agribusiness median exceeded the all firm

median on return on equity and profit margin ratio. The agribusiness median also

exceeded the median for the all firms in two out of the four previous years.

Agribusinesses slightly underperformed the all-firm median on gross profit margin.

The median return on equity ranged from 2.4% to 3.4% in the previous four years

for agribusinesses while it was between 1.1% and 1.7% for all firms. We expect

return on assets to be lower than return on equity after accounting for financial

leverage. Median return on assets varied between 0.9% to 1.5% for agribusinesses

and between 0.1% and 0.3% for all firms, which are somewhat low numbers

reflecting the effects of the recent economic recession.

Table 4.3 Financial Performance of Agribusinesses and All Firms by Year

	Agribusinesses				All Firms			
	2008	2009	2010	2011	2008	2009	2010	2011
Return on Equity	0.024	0.034	0.034	0.028	0.013	0.011	0.017	0.017
Return on Assets	0.009	0.014	0.015	0.012	0.001	0.001	0.003	0.002
Gross Margin Ratio	0.326	0.345	0.347	0.339	0.354	0.355	0.375	0.379
Profit Margin Ratio	0.024	0.034	0.034	0.028	0.013	0.011	0.017	0.017
Current Ratio	1.512	1.605	1.710	1.642	1.744	1.767	1.828	1.837
Quick Ratio	0.820	0.981	1.032	1.018	1.302	1.339	1.403	1.392
Asset Turnover	0.291	0.287	0.281	0.274	0.137	0.127	0.131	0.127
Debt to Asset Ratio	0.513	0.493	0.468	0.481	0.549	0.553	0.534	0.529
Long Term Debt to Asset Ratio	0.157	0.159	0.131	0.138	0.086	0.079	0.066	0.064
Asset to Equity Ratio	1.871	1.897	1.762	1.796	1.885	1.835	1.793	1.807
Earnings Per Share	0.100	0.180	0.190	0.170	0.010	0.000	0.030	0.040
P/E Ratio	41.659	42.903	49.078	44.667	18.500	11.963	29.643	30.000
Total Assets (Million $)	433.268	492.406	461.297	538.814	291.124	288.075	306.020	350.460
Total Liabilities (Million $)	174.575	203.001	192.451	270.723	124.330	124.781	126.674	143.610
Equity (Million $)	170.642	181.085	217.498	222.723	95.430	89.786	102.483	120.786
Sales (Million $)	129.430	135.608	133.251	165.706	31.928	30.090	32.206	37.170
Net Income (Million $)	1.925	4.240	6.618	5.217	0.277	0.187	0.719	0.842
Retained Earnings (Million $)	48.202	31.162	53.870	78.711	-0.054	-1.885	-1.136	-0.715
Number of Firm/Quarter Observations	542	527	513	497	43,495	43,046	43,132	41,969

Notes: Calculations are based on quarterly data from COMPUSTAT for selected years. The reported numbers are medians.

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Over the previous four years, agribusinesses demonstrate a slightly lower current ratio of 1.642 than the median ratio for all firms of 1.834 for 2011. Given that the current ratio acceptable ranges differ across industries, these results show adequate liquidity. The quick ratio for agribusinesses has gradually risen over the years, indicating that either inventories have decreased or that the relationship between current assets and current liabilities has changed.

Agribusinesses outperform all firms with respect to the asset turnover ratio with ratios of 0.274 for agribusinesses and 0.127 for all firms in 2011; this result suggests agribusinesses generate twice more sales from their assets. This ratio varies across industries, and the result is likely attributed to that variation. Our dataset excludes agribusinesses retailers, which is substantial to note when interpreting this result. Retailers typically have the highest asset turnover ratios as a reflection of the competitive and high turnover nature of their industry. Future research with an expanded dataset including retailers would likely further support our conclusions for the asset turnover ratio.

Agribusinesses have slightly more long-term debt compared to assets than the all firm median result, but have slightly lower overall debt-to-asset ratios. The comparison theorizes that agribusinesses structure less of their debt in short-term liabilities and more in long-term debt. This is a particularly interesting result regarding the structure of agribusiness debt compared to the all firm median.

In terms of market performance, we find that agribusinesses outperform all firms in terms of median performance. Agribusinesses show strong earnings per share compared to all firms. As an important note, the median P/E ratio for

agribusinesses is drastically higher than the all-firm median. To the average

investor comparing stock performance, with knowledge of the P/E ratio,

agribusinesses would appear to be a less desirable investment than a firm with the

median P/E of all firms. However, acceptable P/E ratios differ with the industry and

our result is useful in providing information on how the agribusiness sector

compares to other sectors.

When examining balance sheet and income statement items, we note that the

median agribusiness tends to be larger in size than the median of all firms. We find

that agribusinesses have higher sales, assets, net income and retained earnings than

all firms. However, agribusinesses also have higher total liabilities. These results

provided some basic information on agribusinesses and expand the comparison

provided by our analysis of financial ratios.

In addition to the statistics in TABLE 4.3 presented for 2008 to 2011, we plot

some of the financial ratios over longer periods of time for a more comprehensive

overview of agribusiness performance compared to all firms. Financial data in the

1960s in COMPUSTAT is frequently missing or less reliable; therefore, each of the

charts displayed in FIGURE 4.1 show the trends of agribusinesses compared to all

firms from 1971 to 2011. The trends over time correspond with our previous

results from Table 4.3; we find that agribusinesses outperform all firms in several

categories. The median current ratio and median quick ratio show agribusinesses

have lower liquidity than that for all firms, showing differences in the food

manufacturing sector. The solvency ratios also show changes over time, but similar

overall ratios. Agribusinesses consistently show higher asset turnover ratios over

FIGURE 4.1 Financial Ratios for Agribusinesses and All Firms for 1971-2011
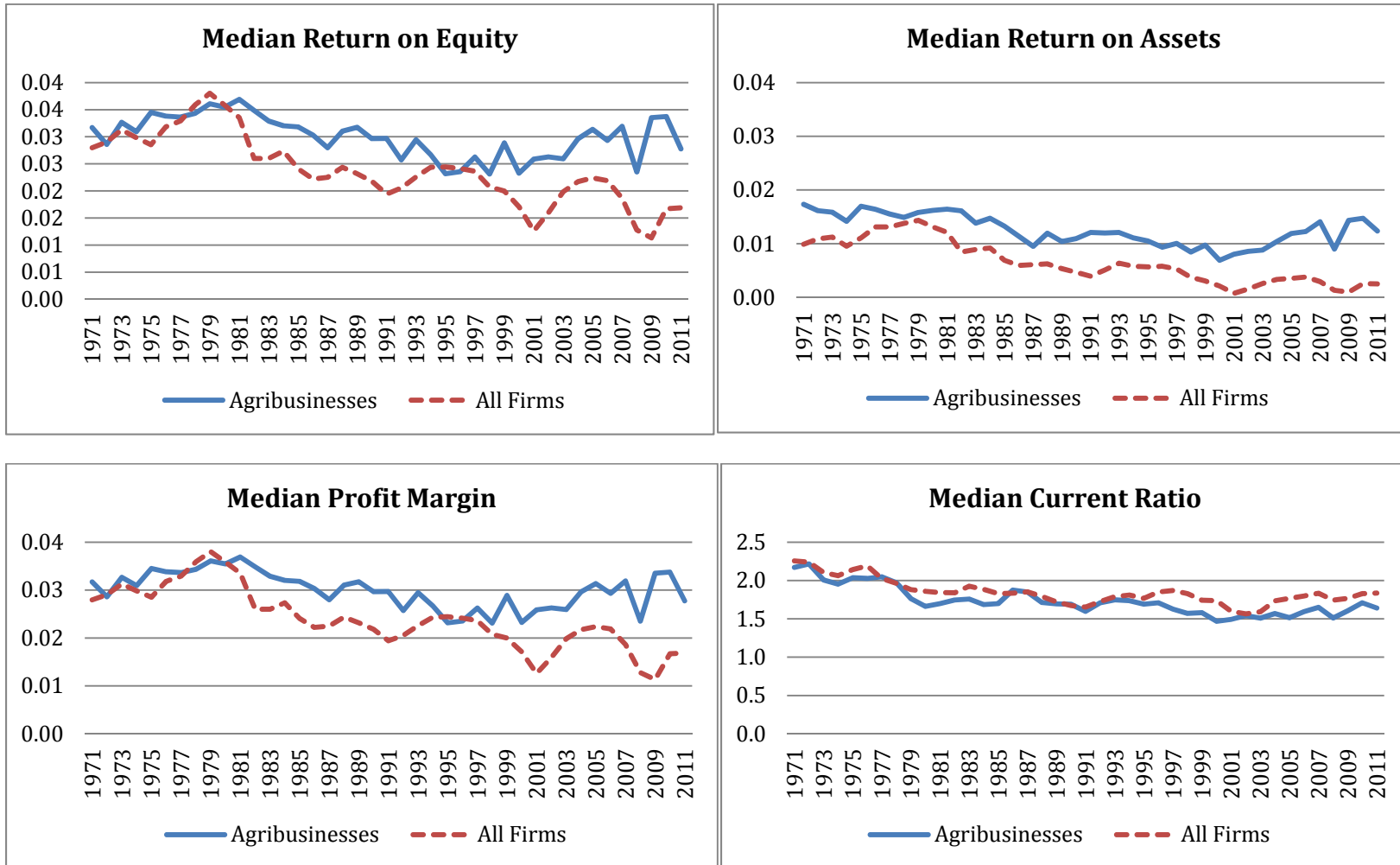
FIGURE 4.1 Financial Ratios for Agribusinesses and All Firms for 1971-2011 (Continued)
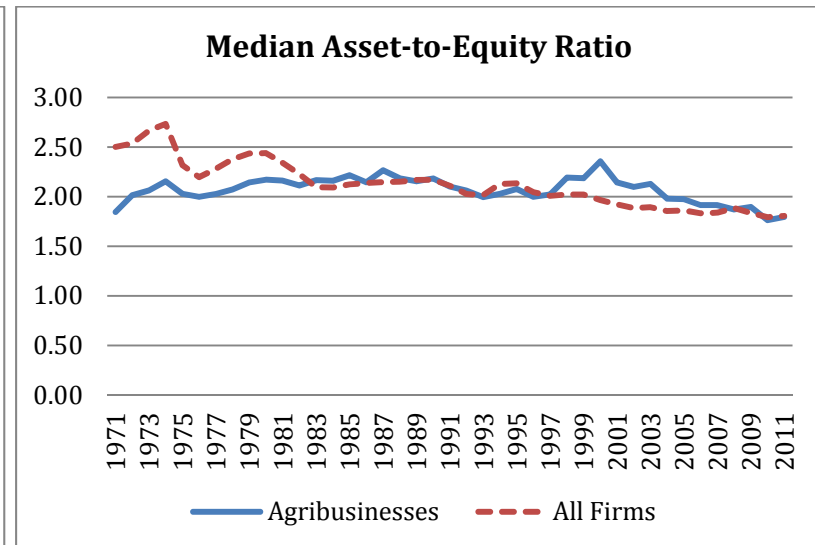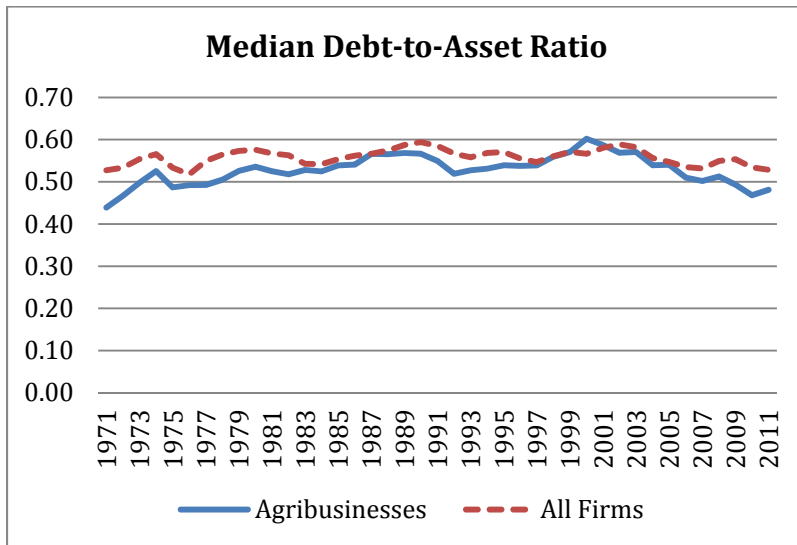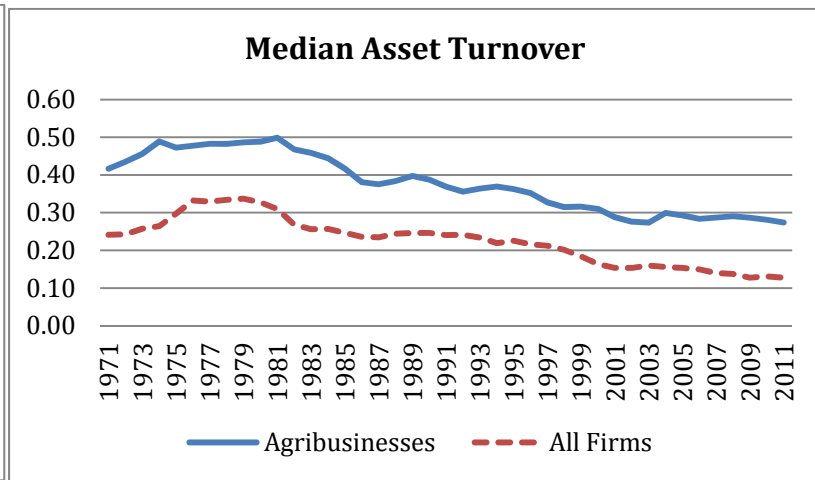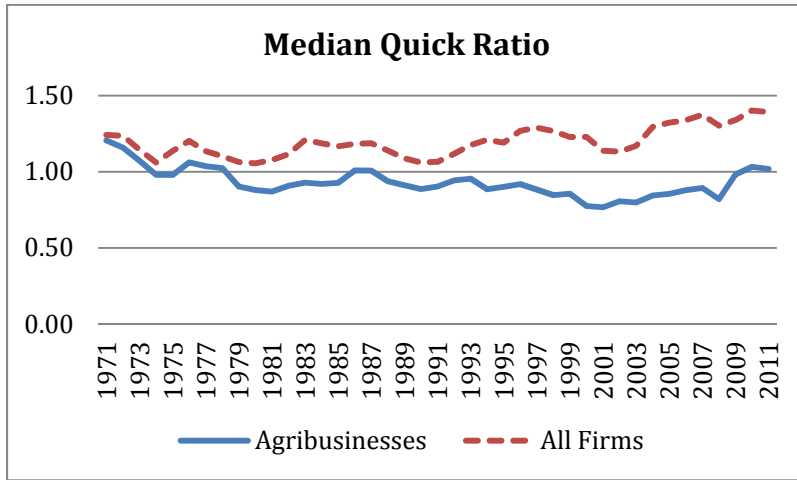
the last 40 years. In terms of profitability measures such as return on equity and return on assets, agribusinesses consistently show better performance in the past four decades.

4.3 Concluding Remarks

We acknowledge existing literature and apply the techniques found in the literature to an agribusiness sample in order to examine their historical corporate performance. Chapter three strives to examine how publicly-traded agribusinesses perform financially compared to all firms over the period from 1961 to 2011. We utilize indicators of company success, including financial ratios and balance sheet/income statement items, to compare agribusiness firms to all firms in the market. We perform the analysis annually and for companies that represent the median and the 25th and 75th percentiles of performance.   We find that agribusinesses outperform at the median the group of all firms in terms financial ratios related to profitability, liquidity, and market ratios, but they have slightly lower liquidity and debt ratios. The strong financial performance of food processing agribusinesses makes them valuable investing options particularly during the recent economic recession. These findings contribute to existing research by examining the common indicators of corporate success on agribusinesses, providing the foundational knowledge to conducted additional analysis on agribusiness financial performance.

Questions for further research have arisen throughout the presented analysis. There are several points that could strengthen our examination of the financial performance of agribusinesses. Examining if structural breaks exist in the

data would identify specific periods to focus on for further analysis. Regression analysis could contribute to answering the question as to what factors separate agribusinesses from all firms in terms of performance. Better data would allow the inclusion of indicators such as free cash flows and export sales. While the presented research in chapter three contributes to literature by identifying the impacts of common measure of financial success on agribusiness, it does not identify measures that separate agribusinesses from the rest of the market.

The objective the research presented in the following chapters focuses on examining the internal and external influences and their effect on corporate agribusinesses' performance. Managerial factors impact agribusinesses at an internal level while market factors influence agribusinesses across the board, but have different impact on high performing and low performing firms. As this chapter discussed the historical performance of agribusinesses, following chapters will examine the market impact on agribusiness performance, particularly the impact of a global financial crisis, and examine the internal health of agribusiness firms.

Our examination into the impact of a global event on agribusiness performance looks at the impact of financial crisis, how it differs among high and low performing firms and how various managerial decisions can compensate for systematic shocks to the market. As we continue to expand this section of analysis in the future, we will work to identify characteristics that separate agribusiness firm from the market and if there are management strategies specific to agribusinesses that help them stand the test of time.

Chapter Five: Agribusiness Performance under global systematic shock.

The global economic and financial crisis has had a direct impact on the performance and wealth position of agribusiness firms, similar to other types of industrial firms. Risks related to the global economic recessions as well as particular industry risks have impacts on agribusiness firms in terms of deteriorating in their equity positions. Therefore, various risk management and alternative different business management strategies have been implemented to maintain equity growth rates. These strategies can be grouped into asset management, financial management, and revenue management strategies conducted by agribusiness firms and have been shown to affect equity growth of farm businesses (Escalante and Barry, 2002). Furthermore, identifying the effects of different management strategies on equity growth has been shown to vary across the distribution of equity growth rate (Hennings and Katchova, 2008). In particular, their findings show that the various management strategies have different effects on the equity growth for low- and high-growth farm businesses. Both of these studies were conducted for farm businesses, with no similar studies being conducted for agribusiness firms.

The 2008 financial crisis provided a unique opportunity to examine the ability of managerial decisions to compensate for shocks to the system. While other financial crisis have remained domestic or have small impacts globally, the 2008 financial crisis provided worldwide implications. In the study of multinational businesses, this reflects a distinct opportunity to identify factors contributing to strategic position. By examining the management strategies that played a

predominate role in elevating an agribusiness to a high performing position during the economic recession we can deliberate on coping strategies for economic recession. Our evaluation will yield concluding remarks on the implementation of policy to safeguard against economic downturn.

Existing research into the impact of the financial crisis on industrial firms has taken different approaches to examine the influence of a constrained economy on financial performance. At least two known studies evaluated management practices and perception of the financial crisis through a survey of Chief Executive Officers (Campello et al.). Erkens, Hung and Matos (2009) have used Compustat data to examine the impact of the financial crisis in corporate governance policy. Grinder et al (1985) investigated the impact of the farm financial crisis on agribusiness firms. While very little work has been done on the impact of the 2008 financial crisis for agribusinesses, these studies among others provide background information on corporate response.

This portion of our analysis focuses exclusively in agribusiness firms, bridging a knowledge gap to provide an introspective look on food-sector performance during an economic crisis. Our analysis utilizing firm-level data obtained through Compustat is unique in the examination approach; a quantile regression segments under- and over-performers in the agribusiness industry. This approach allows the examination of management factors that are common to over performing firms within the agribusiness sector.

The objective of this study is to pinpoint effects of corporate financial management strategies, commonly researched in literature, on the agribusiness

firms' performance. In addition, we seek to understand how these effects differ for low- and high-performing agribusiness firms, primary in the presence of a the global economic crisis. The study contributes to the existing literature by examining the impacts of economic and financial crises in an industry with considerable heterogeneity.

We use a quantile regression analysis to study the effect of the business management strategies along the distribution of equity growth positions. This approach allows for the evaluation of how different strategies affect the equity growth of agribusiness firms with respect to their position in the equity distribution, assuming that heterogeneity exists compared to the OLS regression estimation. The inter-quantile estimation is used to further confirm that estimated parameters from the quantile regression are significantly different from one quantile to the next.

A quantile regression compares the influence of various factors on median regression within each quantile. We find distinguishing differences between factors in each quantile. As a result we can draw preliminary conclusions regarding impact of different management strategies on return on equity and return on assets.

5.1 Econometric Model-Quantile Regression

Our study uses two estimation models: ordinary least squares regression (OLS) and quantile regression. Koenker and Bassett (1978) introduced quantile regression, where the conditional quantiles are expressed as a function of explanatory variables. The quantile regression opens the possibility for us to examine the impact of different variables based on their profitability position. The distribution of firms within the quantile regression is the conditional result of their

profitability performance. Low-performing firms fall into the left tail of the distribution while their high-performing peers move into the right tail. The nature of this conditional distribution can be used to quantify the effects management strategies, market position and the impact of the 2008 Financial Crisis on profitability for low- medium- and high-performing firms.

An OLS regression utilizes a regression at the mean to explain the impact of explanatory variables on the dependent variable. Comparatively the quantile regression considers regressions at median, 25th and 75th points to illustrate the relationship of our explanatory variable on our dependent variable. The presence of homoskedasticity in our model will result in continuity between the parameter estimates of our OLS and quantile regression model will be similar tol each other at corresponding points of distribution. On the other hand, a heteroskedasticity condition creates a situation where the parameter estimates from our quantile regression significantly differ from the OLS regression and the quantile regressions at different points. Consequently, the quantile regressions will allow us to examine the marginal differences of the dependent variable in terms of the change in the explanatory variables at points above and below the industry median. Moreover, while the quantile estimators have comparable efficiency to least squares estimators for normally distributed errors, they may be more efficient than the least squares estimators for non-normal error distributions (Koenker and Bassett, 1978). Koenker and Bassett (1978) describe a quantile regression model as follows:

$$(1) \qquad y_i = x_i'\beta_\theta + e_{\theta i}$$

where y_i denotes the return on equity for firm i, x_i is a vector of explanatory variables, β_θ is an unknown vector of regression parameters associated with the θth quantile ($0<\theta<100$) of the conditional distribution of y_i, and $e_{\theta i}$, is an unknown error term. The conditional quantile function can be expressed as

$$(3) \qquad Q_\theta(y_i|x_i) = x_i'\beta_\theta .$$

Thus, the quantile regression estimator $\hat{\beta}_\theta$ is the solution to the following minimization problem:

$$(4) \qquad \underset{\beta_\theta}{Min}\left\{ \sum_{y_i \geq x_i'\beta_\theta} \theta\,|y_i - x_i'\beta_\theta| + \sum_{y_i < x_i'\beta_\theta} (1-\theta)\,|y_i - x_i'\beta_\theta| \right\}$$

The coefficient $\hat{\beta}_\theta$ can be interpreted as the marginal change in the firm return on equity from a marginal change in the x_i strategy variable conditional on being in the θth quantile. Our study utilized three quantile regressions at 25th, 50th and 75th quantiles. We utilize the STATA codes reg and qreg to perform our OLS and quantile estimates respectively.

5.2 Variable Selection and Description

Multiple financial measures adequately demonstrate profitability of a firm over a specific financial period. Utilizing return on equity (ROE) allows us to examine the return to investment over a specific time frame; this is particularly well suited to the nature of the financial crisis issue. Compared two other financial crisis periods in our dataset, the 2008 financial crisis was characterized by the limitation of funding distributed by banks. Our results will determine if outside factors other

than the availability to funds, particularly equity, negatively influenced company performance during this time.

Compared to other measures of financial growth, the return on equity ratio presents with several advantages and disadvantages. Return on equity represents a good indicator of the intangible characteristics of company quality and is independent of public perception of the company. Other measures of company success, including stock prices, remain more of an influence of public perception than one of actual company growth. Additionally return on equity grants us the ability to measure the efficiency of the company within limited resources. Companies with higher return to equity demonstrate greater efficiency with available resources leading to greater financial performance for these companies during the economic downturn.

Financial literature and our overview of the historical performance of agribusinesses argue for the inclusion of return on assets (ROA) as a measure of firm performance. We include this as a separate independent variable, and will also strive to explain the impact of financial crisis on this financial performance ratio.

For the purposes of the paper we'll be using the COMPUSTAT Codes NIQ (Net Income-Quarterly) and CEGQ (Common/Ordinary Equity Quarterly Data) to calculate return on equity. To calculate return on assets COMPUSTAT Codes NIQ (Net Income-Quarterly) and ATQ (Assets-Total Quarterly Data) are utilized.

As previous identified in Chapter One, the financial crisis of 2008 had the defined characteristic of global impact. Federal Reserve defines the financial crisis of 2008 in terms of bank lending and the atmosphere of takeovers; the financial

limitations of this time had a profound impact on the financial performance of major companies.

Commonly regarded as the most significant year of the financial crisis, 2008 is characteristically measured by indicators of economic strength. In 2008, U.S. households suffered the worst one-year decline in household net worth relative to income in a century of recordkeeping—and amount equal to about a year of nominal GDP in that year (Reinhart 2011). The National Bureau of Economic Research (NBER) identifies 2008 as a recession business cycle that lasted for 18 months starting in December 2007 and continuing through June 2009. The financial crisis variable we utilize in our analysis reflects the NBER identification of period of economic crisis surrounding the 2008 Financial Crisis. Additionally we have excluded other periods of financial decline occurring since beginning of our data sample in 1960. Preliminary studies demonstrated no significance in our model for the periods of economic decline outside of the 2008 financial crisis, substantiating our theory that it takes a global event to impact multinational firms.

The data presented is this study utilizes sales as a measure of firm size, which is consistent with the majority of financial literature, even though some studies contradict this measure. Pagano and Schivardi (2003) offer that measuring size by employment seems preferable to an indicator such as sales, which critically depends on the intensity of intermediate inputs. From our overview of historical agribusiness performance that sales for agribusinesses are a defining factor of agribusinesses; it remains important to gauge how this continues to impact agribusinesses is situations of financial crisis.

Our other variables include a Market Value Ratio, liquidity measures (Cash) and long-term leverage (Debt-to-Assets). By including a market value ratio we can see if the market valuation played a role in our regression. For the purposes of our study we used price to earnings ratio to define our market value. The Debt-to-Asset Ratio represents the proportion of a companies assets being financed through debt. The 2008 Financial Crisis is characterized by fluctuations in financial sector and corporate financing became an issue during this period. Even though some of these indicators are somewhat related a simple correlation matrix justified their inclusion.

The inclusion of the Altman Z-score serves, as an indicator of internal financial health allow us to gauge the impact of indicators that failed to have significance individual but have a combined impact on agribusiness financial performance. In our correlation tests the Altman Z-Score failed to show a high correlation score to justify its exclusion from our analysis.

TABLE 5.1 Variable Descriptions

Variable Name	Variable Description	Mean	SD
ROE	Dependent Variable; Net Income (NIQ)/Equity(CEQQ)	0.262488	6.36
ROA	Dependent Variable; Net Income (NIQ)/Total Assets (ATQ)	-0.07875	4.51
Recession	Dummy Variable; 4th Quarter 2007-2nd Quarter 2009	0.037183	0.18
Altman Z-Score	Calculated using Altman's Industry Formula	0.375618	2.79
Debt-to-Assets	Liabilities (LTQ)/ Total Assets (ATQ)	1.478779	37.01
Sales	Quarterly Sales (SALESQ)	4.138779	2.36
Market Value Ratio	Price at Closing (PRCCQ)/ Retained Earnings (REQ)	0.403606	50.04
Cash	CASH (CHQ)	284.7477	934.45

5.3 Quantile Regression Results

Our test for heteroskedasticity failed to show evidence to keep the null hypothesis of constant variance. This is consistent with the differing coefficient estimates results among our quantiles. Both of these indicators suggest that a benefit exists to utilizing quantile regression to examine the impact of our independent variables on our dependent variables return on equity and return on assets.   Initially, our results with a small annual dataset accepted the null hypothesis; this problem was resolved with a more dynamic larger dataset that included quarterly observations and more an expanded time frame.

For our model explaining return on equity and our model explaining return on assets we find that recession is only significant for the low-performing firms. Other independent variables yield similar results in both of our models. The Z-score variable has positive significance to top performers and companies at the median, consistent to the nature of this score. We would expect the factors compiled in this measure to yield benefit to top performers.

The debt-to-asset ratio was significant across all levels of firm performance, a consistent effect with our previous research with a smaller dataset. This independent variable has different impacts at performance level, with top performers receiving a positive impact for a higher debt-to-asset ratio.

Market-value ratio continues the trend of consistent impacts across both models. We find that Market-value is significant to all level of performance with a larger impact to high performing firms.

Sales have a significant impact low-performers; an increase in sales boosts the financial performance of the firm. From our look at historical performance of agribusinesses, we have discovered that this sector of the economy has higher sales growth than the market. Additional research would clarify if this is an industry result or consistent across the market.

One variable differed in impact across our models. Cash was only significant to high performers in our model examining the impacts to return on assets. The same variable in the model examining return on equity yielded a significant positive impact to all levels of performance with a greater magnitude of impact on high performers. Including other liquidity measures, such as at the quick ratio or current ratio, could possibly provide more accurate results. Frequently, ratios are interrelated and such relationship require additional research to decide the best route for further research.

A visual representation of a quantile regression shows the differing impact of independent variable in the two models measuring firm performance. FIGURE 5.1 and FIGURE 5.2 illustrate the varying impacts.

In presenting these results, we acknowledge that long time-series present opportunities for auto-correlation. Our correlation matrix demonstrated satisfactory scores across our variable, yet this issue still warrants further research. As we conduct studies in the future to test for structural breaks, the information that we have presented here will provide a baseline from which we can improve our analysis; distinguishing between important factors that impact agribusinesses long-term and over cycles in the economy.

TABLE 5.2 ROA OLS Regression Results

ROA	Coefficient	Std. Err.	t	P>|t|	95% Confidence Interval	
Recession	.0092519	.011584	0.80	0.425	-.013465	.0319687
Z-Score	-.0881843	.0151973	-5.80	0.000	-.117987	-.0583816
Debt-to-Assets	-.0726847	.0011109	-65.43	0.000	-.0748632	-.0705062
Sales	.0240859	.002301	10.47	0.000	.0195735	.0285984
Market Value	.0001053	.000374	0.28	0.778	-.0006281	.0008387
Cash	-.000016	6.28e-06	-2.54	0.011	-.0811079	-3.66e-06

TABLE 5.3 ROA Quantile Regression .25 Results

ROA	Coefficient	Std. Err.	T	P>|t|	95% Confidence Interval	
Recession	-.0036345	.001807	-2.01	0.044	-.0071782	-.0000908
Z-Score	.0076846	.0022078	3.48	0.001	.0033551	.0120142
Debt-To-Assets	-.0807095	.0001558	-518.15	0.000	-.0810149	-.080404
Sales	.0079445	.0004001	19.85	0.000	.0071598	.0087292
Market Value	.0000801	.0000276	2.90	0.004	.000026	.0001343
Cash	8.55e-08	6.91e-07	0.12	0.902	-1.27e-06	1.44e-06
_cons	-.0070414	.001903	-3.70	0.000	-0.017733	-.0033095

TABLE 5.4 ROA Quantile Regression .50 Results

ROA	Coefficient	Std. Err.	T	P>|t|	95% Confidence Interval	
Recession	-.0015014	.0012044	-1.25	0.213	-.0038632	.0008605
Z-Score	.0129119	.0015440	8.36	0.000	.0098823	.0159415
Debt-to-Assets	-.0560923	.0000986	-568.75	0.000	-.0562857	-.0558989
Sales	.0041419	.0002392	17.31	0.000	.0036728	.004611
Market Value	.0001433	.0000136	10.54	0.000	.0001166	.0001699
Cash	6.87e-07	6.47e-07	1.06	0.289	-5.82e-07	1.96e-06
_cons	.0152177	.0011725	12.98	0.000	.0129183	.0175171

TABLE 5.5 ROA Quantile Regression .75 Results

ROA	Coefficient	Std. Err.	T	P>|t|	95% Confidence Interval	
Recession	-.0021275	.0015976	-1.33	0.183	-.0052606	.0010055
Z-Score	.0190786	.0021577	8.84	0.000	.0148473	.0233099
Debt-to-Assets	-.0376062	.0001103	-340.96	0.000	-.0378225	-.0373899
Sales	.0018056	.0003002	6.01	0.000	.0012168	.0023943
Market Value	.0001841	.0000108	16.97	0.000	.0001628	.0002054
Cash	2.25e-06	7.03e-07	3.20	0.001	8.79e-07	3.63e-06
_cons	.0283396	.0015335	18.48	0.000	.0253323	.0313469

TABLE 5.6 ROE OLS Regression Results

ROE	Coefficient	Std. Err.	T	P>|t|	95% Confidence Interval	
Recession	.1574555	.0969557	1.62	0.105	-.03268	.3475911
Z-Score	.0976051	.127198	0.77	0.443	-.1518373	.3450476
Debt-to-Assets	.0020081	.0092979	0.22	0.829	-.0162256	.0202417
Sales	-0.479553	.0192593	-2.49	0.013	-.0857238	-.0101868
Market Value	.0012276	.0031301	0.39	0.695	-.0049106	.0073659
Cash	.0000641	.0000526	1.22	0.223	-.000039	.0001672

TABLE 5.7 ROE Quantile Regression .25 Results

ROE	Coefficient	Std. Err.	T	P>|t|	95% Confidence Interval	
Recession	-.00574	.0026734	-2.15	0.032	-.0109827	-.0004973
Z-Score	.0017812	.0037185	0.48	0.632	-.005511	.0090735
Debt-to-Assets	.00074	.0002898	2.55	0.011	.0001717	.0013083
Sales	.006284	.0005656	11.11	0.000	.0051748	.0073933
Market Value	.0009705	.0000505	19.20	0.000	.0008714	.0010696
Cash	2.73e-06	1.43e-06	1.91	0.056	-7.39e-08	5.54e-06
_cons	-.0258206	.0027807	-9.29	0.000	-.0312737	-.0203674

TABLE 5.8 ROE Quantile Regression .50 Results

ROE	Coefficient	Std. Err.	T	P>|t|	95% Confidence Interval	
Recession	-.0029911	.0018912	-1.58	0.114	-.0066998	.0007177
Z-Score	.01519	.0024781	6.13	0.000	.0103304	.0200496
Debt-to-Assets	.0021759	.0001805	12.05	0.000	.001822	.0025299
Sales	.0030865	.000375	8.23	0.000	.002351	.0038219
Market Value	.0010279	.0000213	48.20	0.000	.000986	.0010697
Cash	4.53e-06	1.01e-06	4.50	0.000	2.55e-06	6.50e-06
_cons	.0074052	.0018542	3.99	0.000	.003769	.0110414

TABLE 5.9 ROE Quantile Regression .75 Results

ROE	Coefficient	Std. Err.	T	P>|t|	95% Confidence Interval	
Recession	-.0026167	.0036068	-0.73	0.468	-.0096899	.0044564
Z-Score	.030203	.0054133	5.58	0.000	.0195871	.0408189
Debt-to-assets	.0078326	.0002975	26.33	0.000	.0072492	.0084159
Sales	-.0001509	.0007911	-0.19	0.849	-.0019024	.0014005
Market Value	.0010908	.0000246	44.36	0.000	.0010425	.001139
Cash	8.56e-06	1.53e-06	5.60	0.000	5.56e-06	.0000116
_cons	.042537	.0038013	11.19	0.000	.0350824	.0499916

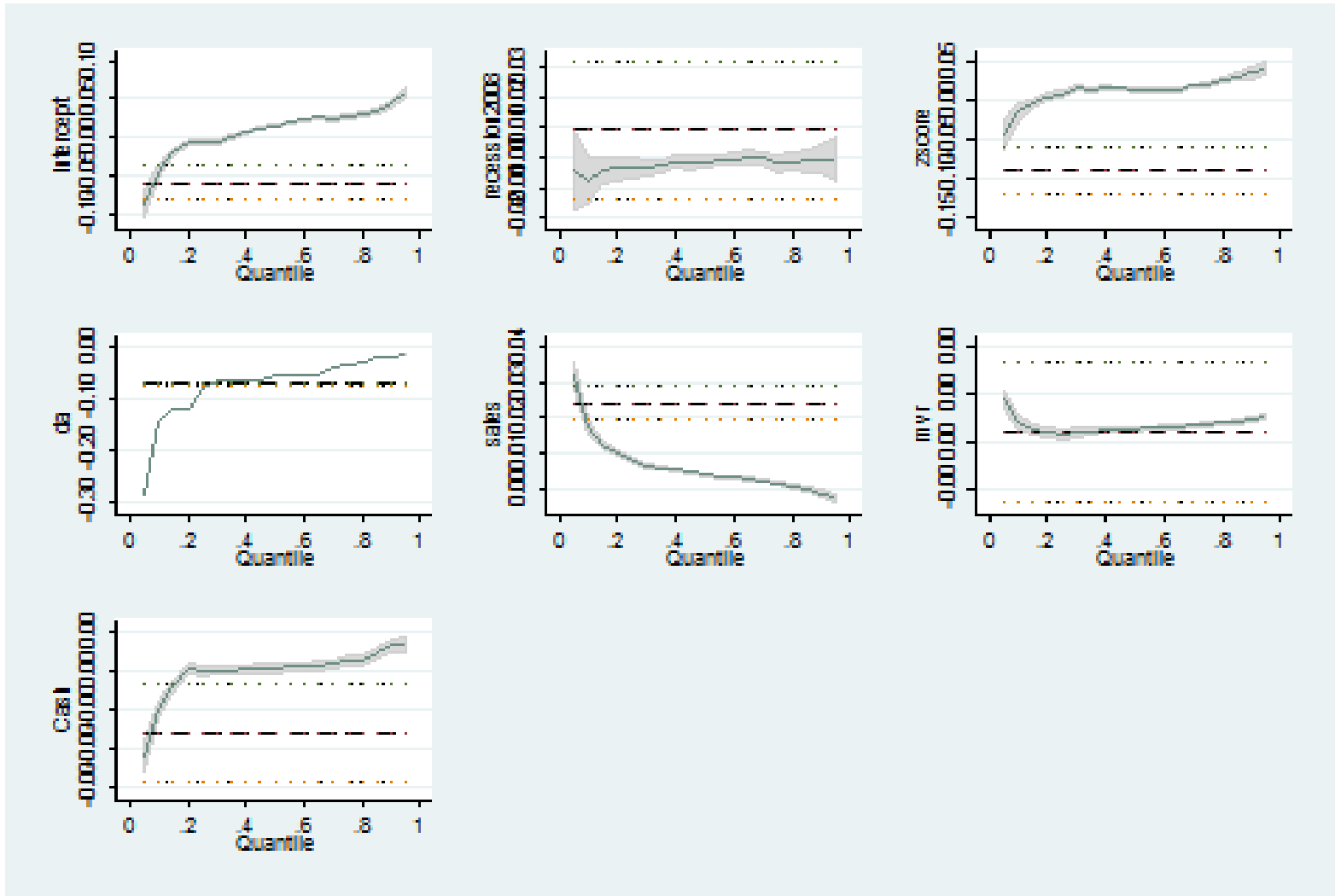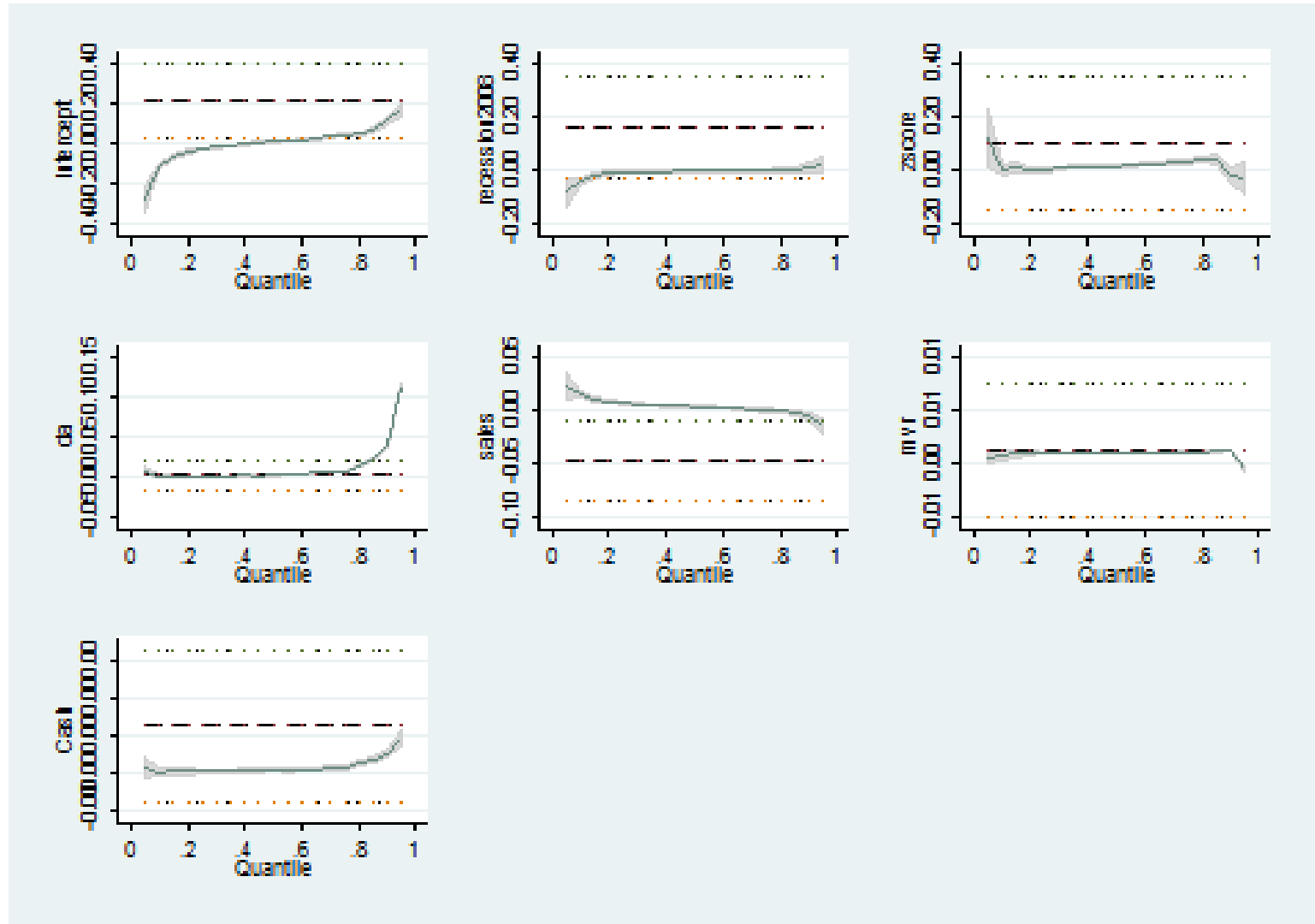FIGURE 5.1 ROA Quantile Regression

FIGURE 5.2 ROE Quantile Regression

5.4 Concluding remarks on agribusiness performance in conditions of systematic shock

The information gathered from our study is particularly useful in the formation of corporate policy, particularly for safeguarding against the financial recession. This study also examines the effect of economic recession on agribusiness firms. The results show that recessions have a negative impact on agribusiness firms' equity growth rates and return on assets, as expected. Because of considerable heterogeneity in firm performance, the effects of the global recession are shown to affect low-growth firms differently from high-growth firms. The magnitude of the coefficients are lower in absolute values for higher ROE firms, which means that low-performing agribusiness firms have been more negatively affected by the economic crisis.

The findings of this study suggest that management strategies, which include asset management, financial management and revenue management, have an influence on the equity growth of agribusiness firms. Furthermore, these strategies jointly help to explain the increase and decrease in equity growth positions for agribusiness firms. Financial ratios reflecting these strategies are: debt-to-asset ratio and price-to-earnings ratio.

The findings from this study have important implications for improving the financial position and equity growth rates of agribusiness firms. We show considerable heterogeneity in firm performance (as shown by the use of quantile regression methods). Therefore asset, revenue, and financial management strategies intending to improve the financial position of agribusiness firms would affect them differently as shown by our results. In addition, the global economic

recession is shown to affect all types of firms but have a larger effect on low-performing as opposed to high-performing agribusiness firms. These results are useful for agribusiness firms seeking to improve their performance, as we show which management strategies (diversification, capital expenditures, firm size) are associated with increase in equity growth rates based on the performance record of the agribusiness.

Chapter Six: Examining the internal health of agribusiness firms.

The longevity and strength of a publically traded agribusiness depends on a number of inter-related factors. After looking at characteristics of Agribusiness performance compared to the market and the impact of systematic shock on agribusiness firms, we can look at the internal factors that signal firm financial distress. A look at agribusiness firms compared to the entire market sample acknowledges that agribusiness have historically exhibited less financial distress than non-agribusiness firms, yet our finding show that managerial factors impact both set of firms in similar ways.

The Modigliani-Miller theorem offers under efficient market conditions a firm's value is unaffected by how the firm is financed (Modigliani and Miller 1958). Conditions of financial distress alter the relationship between financial conditions and firm performance. Firms see a state of financial distress as a costly position to maintain. A firm in this position faces limited access to credit and deteriorated relationships with stakeholders; this results in derivations from the firm optimal capital structure. Ultimately this places the firm in a position where perceived financial distress can induce an aggressive response by competitors seizing the opportunity to gain market share, indicating a competitor drive loss in market share. Firms in financial distress also face market threats from customer-driven losses and manager-driven reductions.

Other studies have examined how capital structure impacts agribusiness firms (Sporleder and Moss 2001). These studies focus on equity vs. debt distribution and introduce the topic of capital structure within agribusinesses. The

firm's response to these costs differs with anticipated situation of financial distress and the event of an unanticipated condition of financial distress; each case has an impact on firm performance.   Previous studies have shown that existing market distress has a differing impact on firm performance (Enlow and Katchova 2011). Comparatively, the information presented in this new study contributes to the existing literature through the analysis of the factors associated with financial distress in individual agribusiness firms.

Initially, we designed this study to look at the impact of various management and consumer-driven factors on financial performance; applying a methodology suggested in 1994 study by Opler and Titman that looked at depressed industries. This study demonstrates that a positive relationship exists between financial condition of a firm and firm performance in indentifying conditions of an industry downturn. During these downturns, more highly leveraged firms tend to lose market share and experience lower operating profits than their competitors (Opler and Titman 1994). Our hypothesis suggested that by examining the impact of corporate decision-making, we can look into some methods that reduce the impact of a financial decline under distressed conditions. It appears that financial distress can simultaneously cause substantial and costly losses of business while promoting needed changes in operation (Opler and Titman 1994).

Our initial model ran three OLS Regressions that with the same independent variable presented in our study and featuring stock returns, operating income and sales growth as dependent variables. These three measures of financial performance outlined by Opler and Titman, showed that Z-scores, Sales, and credit

ratings had different impacts on financial performance but with little significant in the OLS regressions. Opler and Titman's study had the advantage of examining a large berth of firms, indentifying depressed industries and then utilizing those samples to examine the impact of certain factors within those industries. Since we want to focus exclusively on Agribusiness firms with this study, Opler and Titman model had several interesting features that were un-implementable. In particular the methodology they presented had the advantage of selecting distressed industries and comparing those to distressed firms in non-distress industries. Given that we want to look at financial distress specifically within agribusinesses our study lack the advantage of a distress industry variable.

Other studies show that the independent variables that we could incorporate from the Opler and Titman study worked well in a binary model. At least one study measured the ability of these independent variables to predict financial distress and performance of distressed stocks with the logit model (Campbell et al. 2010). Others have sought to advance the state of art in financial distress modeling by explicating the theoretical and empirical value of the mixed logit model (Jones and Hensher 2004). Kahya and Theodossiou (1999) utilize a more dynamic CUSUM methodology to predict corporate financial distress. Leclere (1999) states that researchers in financial accounting often use qualitative response model in choice-based empirical research, including that most of the research relies on the familiar techniques of dichotomous probit or logistic regression.

Our model utilized the information that we understand from our OLS regressions based off of Opler and Titman's study and incorporates the factors into a

methodology widely accepted in financial research and underexplored within the agribusiness industry. Thus we can take the significant information from our initial regressions and utilize these management factors in our probit model, measuring the likelihood of the impact that each of these factors had upon agribusiness financial distress.

6.1 Econometric Model—Probit

This chapter focuses exclusively firm financial distress and strives to provide in introspective look on the performance of a sector of the economy. Our analysis utilizing firm-level data obtained through Compustat facilitates the examination of the factors that lead to poor S & P performance in today's market. This approach allows the examination of management factors and consumer-driven common in business firms. Porter (1991) identifies these factors as two categories of activities related to firm strategy.

Our study looks at the impact of independent management decisions on achieving a higher Standard and Poor Rating. Standard and Poor ratings occur in eight categories ranging from A+ to D; an ordered probit model would have allowed us to examine the contribution of the identified management factors on individual ratings. However for the purposes of this study, we are concerned about the ability of management factors to signal financial distress. To create a measure of distress vs. non-distressed firms we grouped the high-scores A+, A, A-, B+, B, B- together to indicate a good S & P rating. To indicate a distressed score we grouped S & P ratings C, D, and LIQ together; these scores represent the lowest acceptable score (C) and the 'In reorganization' score (D) as well as the 'Liquidation' score (LIQ). In

examining poor financial performance for future research, including the lower B

scores would differentiate between below average and above average performance.

However, for this set up models today we're exclusively concerned with the idea of

distress, which is better demonstrated by S & P ratings below C.

From this procedure we then have a binary independent dummy variable

that's suited for a probit model. Logit and probit are the most widely used methods

for estimating the relationship between choices binary choices and the attributes of

alternatives or two alternative situations (Hausman and Wise 1978). The probit

model takes the form:

$$\Pr(Y = 1 \mid X) = \Phi(X'\beta)$$

Where the dependent variable Y represents a distresses agribusiness firm indicated

by S &P Ratings. For the right hand side of the equation Φ represents the

cumulative distribution function of a standard normal distribution and β is

estimated by the maximum likelihood estimation. The independent variables X

represent our identified management decisions.

6.2 Variable Selection and Description

Our study focuses on four independent variables that were found to be

significant in financial literature. These four variables include logged sales, a

profitability measure, cash, and Z-score. Sales represent a valuable variable as a

measure of firm size and allow consumer confidence in the firm. Our profitability

measure is included as the ratio for return on assets; we have found this a dynamic

measure of profitability that gives us insight into the firm.   We include the Z-score

as an established measure to predict the likelihood of firm financial distress; this

score represents a blended measure of several financial ratios and has been widely

accepted as a measure of predicting financial distress in other studies.

The S & P ratings within the dataset were normally distributed with more

than sixty percent of the firms demonstrating the median S&P B-rating. Based on S

&P Scores, notable differences between exist between agribusinesses and the

market. This will be discussed more in the conclusions of the study as a consistency

with our anticipated hypothesis that agribusinesses exhibit strong financial

performance. Our independent variables were consistent with financial literature

and have been utilized in farm and firm agribusiness analysis.

TABLE 6.1 S & P Rankings

S & P Ranking	Frequency	Percent
A	625	7.14
A+	1,182	13.50
A-	461	5.26
B	1,839	21.00
B+	1,280	14.62
B-	1,629	18.60
C	1,202	13.72
D	540	6.17
Total	8,758	100

Firm sales represent an important measure of firm size. Opler and Titman

(1994) and (Kahya and Theoddossiou) have examined the impact of firm size on

financial distress. We include firm sales in our models as a logged variable enabling

smoothing of years of extraordinary sales growth or sales loss. Under normal

financial circumstances, it is common practice for financial economists utilized a

smoothed variable. Given that we have an acknowledged financial crisis in our

dataset as identified in chapter 5 and shown to impact agribusiness firms, smoothing this variable removes some of the systematic risk inherent to the market.

We include the Altman Z score in this study as it incorporates several factors that failed demonstrate statistical significance individually in our original OLS model. However, the Altman Z score shows statistical significance in at least one of the OLS regressions and is a widely accepted measure of firm distress. This index scores results in a combined measures of financial performance where a high score indicated strong financial health and a low score indicated proximity to bankruptcy. Firms in Altman's original sample whose Z scores were below the so-called "zone of ignorance" experienced an average decline in the market value of their common stock of 45 per cent from the time the model first predicted bankruptcy until the actual failure date (Altman 1968).

Findings indicate that highly leveraged firms lose market share to their less leverage competitors in industry downturns (Opler and Titman 1994). Chapter five identifies the debt to asset ratio as impacting high-performing firms and low-performing firms in differing magnitudes, with low-performing firms weathering a more harmful impact. The inclusion of a leverage ratio as independent variable in this study furthers previous research and allows us to examine the impact of the leverage on financial distress.

Campbell et. al (2010) focuses on the impact of low stock prices in predicting financial distress. To examine the impact of low stock prices on financial performance and dummy variable is created to indicate a low stock price. Stock close prices below $30 are marked and indicated in the model. Realistically stock

prices are a measure of consumer confidence in the firm. While stock prices themselves might not be a good indicator of firm financial performance, depressed stock indicate consumer perception of the stock. First introduced by Porter (1991), consumer-driven factors related to firm strategy play an important role in predicting financial distress as discussed by Opler and Titman (1994). Other variables could potentially indicate consumer-confidence in stock. The price-to-earnings ratio is often utilized to determine if a stock is undervalued and the percentage change in stock-value would provide a smoothed variable to accommodate market shocks. Additionally, with improved information we could examine the trading volume for each company. However, there is significant conversation in financial fields about the concept of a comfortable trading range for consumer, with the theory that consumers ideally like to purchase stocks approximately between $30 and $80. The inclusion of the depressed price variable allows us to explore the value of existing conversation within the financial field.

While the Altman-Z score includes some measures of profitability, we also include the ratio return on assets as an independent measure of profitability. Our correlation matrix shows little correlation between the variables, even as we utilize two measure of profitability in our model. Theoretically, the more profitable a firm is the lower the likelihood of financial distress.

We include cash as a measure of liquidity. Too much cash may encourage managers to take it easy, expand their perks, or empire-build with money that should be returned to stockholders (Johnson and Soenen 2003). Other measures of

liquidity, including measures of free cash flow hold the potential to strengthen our

research and offer other opportunities for further exploration.

TABLE 6.2 Variable Descriptions

Variable Name	Description	Mean	St. Dev.
Distress S&P Score	Dependent Variable	0.1989039	0.39
LogSales	Independent Variable	4.1387790	2.36
Profitability	Independent Variable	-0.0716614	4.06
Leverage Score	Independent Variable	1.4195970	64.03
Price	Independent Variable	0.4212569	0.49
Cash	Independent Variable	0.0827769	0.12
Altman Z-Score	Independent Variable	-0.0581244	2.81

6.3 Probit Results

The results of our model show that both managerial and consumer-driven

factors impact low S&P ratings. The chi-squared test for our model shows

appropriate results, suggesting that we reject the null hypothesis and that at least

one of our regressors is not equal to zero. Our results show that two of our

independent variables have a negative impact on the likelihood that a firm will have

a low score. The Altman-Z score has a negative coefficient, which is consistent with

the nature of this score. We know that low Altman-Z scores indicate bankruptcy,

while a higher score would indicate less financial distress in the firm.   Financial

literature substantiates this finding. Additionally, firms with higher profitability

have a lower likelihood of signaling financial distress thru low S & P scores. Since

profitability, particularly in terms maximization of return on available resources,

represents a strong indicator of financial health we expect this result.

Conversely, we have three factors increase the likelihood of low S & P rating.

Our low price dummy variable results in positive coefficient, suggesting that a low

stock closing price for the quarter increases the likelihood of a low S & P rating. A

low-price variable related to the consumer confidence in the firm and firms with

lower anticipated confidence should result with lower S&P scores in our model.

Surprisingly, we find that increased cash on hand increases the likelihood of a low S

& P rating. The implication of this will be discussion further in our study

conclusions.

Surprisingly, firms with higher smoothed sales experience increased

likelihood of a low S & P score. This is inconsistent with our hypothesis that

consumer-driven choices have a positive impact on firm performance suggests that

firms with higher consumer confidence, i.e. those with products that consumers

trust and want to buy, perform better than their counterparts. This result warrants

further research, as it runs counter-intuitive to established literature.

The final independent variable in our study, the leverage score variable failed

to show statistical significance. Our other variables showed significance at the 10%

level, with three variables showing significance at the 5% level.

TABLE 6.3 Probit Results

Variable	Marginal Effects	Std. Err.	z	P>z	[95% Confidence Interval]	
LogSales*	0.0712873	.0368536	1.93	0.053	-.0009443	.143519
Profitability**	-6.252968	1.129852	-5.53	0.000	-8.467437	-4.038499
Leverage Score	-.0040019	.0082397	-0.49	0.627	-.0201514	.0121477
Price**	1.355424	.1935587	7.00	0.000	.976056	1.734792
Cash*	1.624443	.9150291	1.78	0.076	-.1689814	3.417867
Z-Score**	-35.1344	4.564236	-7.70	0.000	-44.08014	-26.18866

*Indicates significance at the 10% level
**Indicates significance at the 5% level
Psuedo R^2 = .3852
N=772

6.4 Concluding remarks on financial distress in Agribusiness Firms

Consumer-Driven factors impact S & P scores. Our initial framework the discussion on financial distress focused on consumer and manager driven impacts on corporate performance. We continue to see the consumer impact on signaling financial distress with the probit model presented. Low consumer confidence in the company, expressed through the depressed stock price, increased the likelihood of financial distress (Campbell et. Al). Our model supports the existing literature related to this relationship as we find that a depressed stock price indicated increased likelihood of a low S & P score. The impact of the consumer-drive factors presented here again strengthen the points Porter (1991) identifies as aspects to consider in developing a dynamic business strategy.

Our model shows unanticipated impacts from our sales variable. Existing literature establishes that low sales can indicate lower consumer confidence in a company's ability to honor product performance (Opler and Titman 1994). Further exploration into our dataset could lead to better explanation of this result. Utilizing a logged-variable for sales resulted in several dropped observations. The majority of dropped observations reflected companies that had reported financial information every other quarter; this resulted in dropped observations more likely to impact the sales result than other results.   As we proceed with our research on this subject, we'll examine different ways to decrease the number of dropped observations and to strengthen the quality of this variable.   Our inconsistent result with this variable could also be a function of the market conditions during our selected time range;

further research is needed to explore if this result is unique to agribusinesses or affects firms across the market as an impact of the 2008 financial crisis.

Overall, management factors impact S&P scores in a manor consistent with financial literature. We would anticipate that higher profitability of the firm would lower the likelihood of an S & P score that signals financial distress. Additionally, our study has the same finding as other studies that substantiate the Altman Z-score. With these similarities to established research, we can conclude that agribusinesses perform in a similar manner to non-agribusiness firms in terms of managerial practices impacting the likelihood of financial distress.

Cash has an interesting impact on the increased likelihood of low S & P scores; our anticipated result for this variable would suggest firms with large volumes of cash-on-hand to demonstrate lower likelihood of financial distress. However, after examining the literature again with our result in mind, we find that firms signaling financial distress might be expected to keep larger cash reserves to cover debt.

This model demonstrates the impact of management decisions in predicting financial distress as defined by the availability of information on the Compustat Database. While an adequate measure of financial distress, the addition of bankruptcy data to this study would allow a deeper look into the impact of managerial factors and customer driven losses that lead to financial failure. Additionally, the inclusion of other independent variables could illuminate other strategies, such as managerial turnover (Gilson 1989), that alternatively impact a firm's ability to weather financial distress and assume a position of competitive

strategy within the firm. The inclusion of more variables outlined in previous

research (Johnson and Soenen 2003) would continue to strengthen our analysis of

indicators of successful and financial stable agribusinesses.

The contribution of this study to literature relates to its singular look at

agribusiness firms. Additional research into strategy regarding performance of

agribusiness firms in conditions of financial distress will benefit from the look at

'drivers' impact on distressed firm.   Drivers constitute the underlying sources of

competitive advantage, and make competitive advantage operational (Porter 1991).

Chapter Seven: Overall Conclusions.

Several interesting conclusions have been made about agribusiness financial performance throughout this research. These conclusions contribute to existing research by examining the impact of common indicators of corporate success on agribusinesses.

Historically, we found that agribusinesses outperform our market sample in some unexpected ways. Agribusinesses are less likely to fall into financial distress and are more likely to outperform the market in terms of average market sales. Our conclusions substantiate the theory that there is considerable strength in agribusiness performance compared to a market sample.

Additionally, by looking at the strategies that can compensate for a financial crisis we were able to identify management strategies characteristic of high-performing firms and low-performing firms within the agribusiness sector. These management strategies elucidate some of the tools that agribusinesses utilize to compensate for market-wide shocks to our economic and financial marketplace.

Having examined what influences agribusiness market position, we then looked at the internal health of agribusiness firms and what market and consumer-driven factors impact likelihood of financial distress. We've discovered that agribusinesses, while they outperform the market, benefit from many of the same managerial decisions implemented by non-agribusiness firms and consistently examined in financial literature.

Questions for further research have arisen throughout the presented analysis. There are several points that could strengthen our examination of the

financial performance of agribusinesses. Accessing bankruptcy rates would allow us to better measure financial distress, and predict indicators of company performance. Additionally, better data would allow the inclusion of independent variables such as research and development and free cash flows. An examination of additional variables would strengthen the identification of factors unique to agribusiness success. While our presented research contributes to literature by identifying the impacts of common measure of financial success on agribusiness, it does not identify measures that separate agribusinesses from the rest of the market.

Overall, the presented analysis lays a solid foundation for future research. We acknowledge existing literature and apply the techniques found in this literature exclusively to an agribusiness sample to examine the corporate financial performance of agribusinesses, their historical performance and how they perform under various conditions. Our contribution to literature represents a foundational application of measures of financial performance to agribusinesses, and provides the final conclusion that even though agribusinesses follow expected outcomes consistent with existing financial literature, additional research is needed to identify the factors that separate agribusinesses from all-firms in terms of corporate performance.

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