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Ryan A. Bailey

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EVALUATING FARM FINANCIAL PERFORMANCE MEASURES IN ILLINOIS

By

Ryan Bailey

B.S., Southern Illinois University Carbondale, 2016

A Research Paper

Submitted in Partial Fulfillment of the Requirements for the
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Ryan A. Bailey

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Fulfillment of the Requirements

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In the field of Agribusiness Economics

Approved by: Dr. Jebaraj Asirvatham

Graduate School
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AN ABSTRACT OF THE RESEARCH PAPER OF

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TITLE: EVALUATING FARM FINANCIAL PERFORMANCE MEASURES IN ILLINOIS

MAJOR PROFESSOR: Dr. Jebaraj Asirvatham

The purpose of this paper is to conduct financial measure analysis specifically Return on Assets (ROA) and Asset Turnover Ratio (ATR) of the 102 counties throughout Illinois and give a better insight of how these farms are performing at the county level; the sample area consists of farms throughout the entire state of Illinois. However, data between counties throughout the state of Illinois have not been widely analyzed in terms of profitability and financial efficiency among counties throughout the state of Illinois. This research acquired data from the United States Department of Agriculture- National Agricultural Statistics Service (USDA-NASS) census years 1997, 2002, 2007, and 2012, to analyze comparison and gauge the change in relationship in better understanding of county and regional performance across the Northern, Central and Southern parts of the state. This research study presents the profitability measure of Return on Assets (ROA) and financial efficiency measure Asset Turnover Ratio (ATR) and presents challenges that agricultural producers face from business, agricultural policy, and financial risk throughout Illinois at the county-level. With continually, changing market conditions this research, suggest the importance of measuring and analyzing county level data to support policy and programs in one of the United States top agricultural producing states of Illinois. Additional data is used to analyze existing and emerging relationships of farm size and assets throughout Illinois counties.

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CHAPTER 1

INTRODUCTION

With recent changes in the farm economy and recent low commodity prices in the agricultural sector, the landscape of the farm economy is restructuring financially. This research will assess a wide variety of profitability measures specifically Return on Assets (ROA) and Asset Turnover Ratio (ATR) and identify challenges that agricultural producers face from the perspective of business, policy, and financial risk. Illinois is one of the top producing agricultural states in the United States. Therefore, it is important ensure support programs are in place to combat the many challenges producers face annually. Additional data is used to analyze existing and emerging relationships of farm size and assets throughout Illinois.

Agricultural finance includes a variety of topics and area disciplines from the market, management, and policy. Which all bring together a collaborative workforce from financial professionals, growers, and public policy makers to develop partnerships that support agriculture with a wide range of products and services. Financial measures are becoming more important to gain a better understanding of how farms are holding up across counties throughout Illinois at the county-level. Evaluating financial measures and determinants of profitability and financial efficiency can help identify factors that create disparities. It would also ensure maximum efficiency is maintained as it becomes ever more important to gauge and analyze these financial measures on farming operations throughout Illinois.

Not only are the financial measures important in the understanding of your financial position to maximize production at the least amount of cost, but also to ensure operations are running efficiently. This paper will bring in better context of the use of best management practices to assess farm performance and compare Return on Asset benchmarks across counties

throughout Illinois. The focus will be on profitability and financial efficiency measures. This research could help policy makers, growers, and financial experts in determining which farms in a county are managing the assets relatively well. Which ultimately will help in future decision making from a budgeting and planning standpoint.

Accordingly, the primary objective of this research is to gain a better understanding of how farm financial profitability measures look over census years 1997, 2002, 2007, and 2012. With this data and analysis, further determination of the effects of agricultural policy over the census years can better judge the benefits of the farm bills impact on financial measures performance. Additionally, this research will split Illinois 102 counties into three separate regions- Northern, Central, and Southern to show a mapping relationship between the regions that are performing consistently. Based on the data: mean, standard deviation, and variance techniques will be used. The literature adds additional knowledge of information on how to improve the operations financial position and increase productivity. With just under 75, 000 farms and Illinois a leading state in exports, they play a vital role in the state's economy and help fuel the ever-growing global demand for high quality agricultural product.

The World Bank states: "the need for investing in agriculture is increasing due to a rising global population and changing dietary preferences of the growing middle class in emerging markets toward higher value foods. With a population expected to reach 9 billion by 2050 the demand and constraints put on the agriculture sector are of great importance and need measured accordingly. Per estimates, demand for food will increase by 70% by 2050, and at least \$80 billion annually in investments will be needed to meet this demand, most of which are expected to come from the private sector" (www.worldbank.org).

In addition, this paper analyzes data on 102 counties throughout Illinois taken from the Census of Agriculture years: 1997, 2002, 2007, and 2012. The United States Department of Agriculture- National Agricultural Statistical Services conducts the census every five years. Economic variables used in the analysis are Income, Expenses, Assets, Demographics, and Farm, Land, and Assets. Based on this data financial analysis will be completed and analyzed for further discussion and analysis. Key terms under profitability: Return on Assets (ROA) & Asset Turnover Ratio (ATR).

“Low prices and incomes cause farmers to ask questions about how to measure their financial performance: “Do I have the financial capacity to weather the storm?” (Purdue Extension, 2012).” Further analysis help answer how counties throughout the state of Illinois are performing across regional and lateral boundaries. Public policy makers, financial experts, and representatives from the Illinois Department of Agriculture, and USDA- Farm Service Agency (FSA) and many others can better use this information to gauge and implement sustainable and efficient farm programs that support agricultural production and growth throughout Illinois 102 county-level region.

The financial measures of Return on Assets (ROA) & Asset Turnover Ratio (ATR) show the relationship of variables that impact farm profitability throughout Illinois farms. The importance of today’s agriculture financial work is to ensure a sustainable and more secure future of significant economic growth to meet the rising demands of today’s agricultural product. “Through the Census of Agriculture, producers can show the nation the value and importance of agriculture, and the can help influence the decisions that will shape the future of American agriculture for years to come” (USDA- Census of Agriculture, Web.) This research will be beneficial to the Illinoisans throughout the state including governmental agencies such as the

Department of Agriculture to show research on how each county is performing specifically.

Regression analysis at the county-level would shed more light on factors that play a role in farm profitability and efficiency, which could prove helpful to neighboring counties to learn best practices or management tactics to improve and increase agricultural financial efficiencies.

This information is important to the policy making process an ensuring that all regions and counties are maximizing agricultural production potential, providing financial stability, and that resources are allocated efficiently throughout the state in terms of federal and state dollars. This research will compare with agriculture policy implement over the census years such as updated and improved farm bills to see if these benefits are being recognized in terms of their economic impacts in the agricultural sector.

CHAPTER 2

REVIEW OF LITERATURE

Uniquely, the diverse and vast field of agricultural fiscal management objective of small and large operations is to have strong financials and grow productive farming operations. The financial characteristics of a farming operation are largely in part what allow experts to determine the risk and challenges in which an operation could face in both the short and long-term. According to Barry and Robinson (2001), most farm managers rely heavily on both debt capital and own equity capital for production and marketing decisions. These decisions include financing capital assets, mechanizing and modernizing farming operations, and formulating marketing and production plans.

According to the United States Department of Agriculture, Farm real estate comprises about 70 percent to 80 percent of total assets from year to year for the U.S. farm sector. Due to the recent spikes in real estate land values of property, a decline in farm incomes, debt-to-asset ratios have increased, as well as a significant decline in working capital. In the 1970s, the debt-asset ratio was in the ranges of 15 to 18 percent. While reaching above 20 percent in the mid-1980s. In the graph below debt-to-asset ratios are on a slight decrease from the early 90s and are picking up a slight increase after 2012. Likewise, a strong increase in debt per tillable acre from 1991 to 2015 has been recorded among Illinois production acres as graphed below. It is noted that this is due to the decline in real-estate values at the time. Barry and Robinson (2001) note that, the dominance of real estate among the farm sector's assets, along with a long-term growth in returns to farm assets (Interrupted in the early 1980s) has meant that much of the farm sector's total economic returns has been unrealized capital gains or, on occasion, capital losses. Therefore, leasing options of farm real estate could be a cost-effective option for producers to

increase financial stability. Locational characteristics become important due to higher rental rates of farmland closer to major cities or larger metropolitan areas. Haixiao, Miller, Sherrick, and Gomez (2006), for example, find spatial patterns between farmland prices and distances to St. Louis and other Illinois cities. More so, these locations and proximity to Illinois cities should influence the price of farmland and the correlation to expenses paid for farm real estate should be reflected in the data. Similarly, this had led to income distribution, differentiation among geographical locations at the county level. These trends toward larger metropolitan area should also have significant variation from those in markets that are more rural.

Technological development required larger investments to exploit economies of scale. Which led to consolidation of farm operations leading to fewer but larger farms. Throughout the 20th century, American agriculture has significantly changed. Early on the agricultural operation focused on large labor participation in small rural areas throughout the country. Modern day agriculture as practiced on many farms throughout Illinois have changed focus to large scale operations focused on technology and efficiency. Where farm employment has also decreased over time significantly. This change has brought along agriculture that is more efficient in the U.S. and created sustainable economic growth. “As part of the transformation spurred by technological innovation and changing market conditions, production agriculture has become a smaller player in the national and rural economies. While the more broadly defined food and agriculture sector continues to play a strong role in the national economy, farming is progressively contributing a smaller share of gross domestic product (GDP) and employed a smaller share of the labor force over the course of the century” (Dimitri, Effland, and Conklin, 2005). Additionally, the increased shift of technology in agriculture has changed the farm economy over time has also seen a decreasing number of farms, although an increase in farm

size has been noted due to technological developments and mechanization. While sectors of agricultural service, manufacturing, and retail trade have significantly increase with agricultural innovation and development.

Historical data from the USDA represents a decline in the number of farms: 1964s census reports the number of farms to be 132,822, with a base land acreage of 29.9 million acres. Moving into the 1992 farms in production fell to 77, 610, with a total base land acreage of 27.2 million acres. Today, per the Illinois Department of Agriculture, Illinois' 74,300 farms cover nearly 27 million acres- about 75 percent of the state's total land area. With an average size of the Illinois, farm coming in at 358 acres. The row crops of corn and soybeans, of which Illinois leads as one of the top producing states across the United States, compromise most Illinois production. Identically, with the large demand of Illinois to produce the fuels and fibers of the world, it has become critical for the states and counties to be productive both financially and in production at the 102 counties across Illinois. "Illinois ranks third nationally in the export of agricultural commodities with \$8.2 billion worth of goods shipped to other countries. Exports from Illinois account for 6 percent of all U.S. agricultural exports" (Illinois Department of Agriculture, 2014). In comparison, from 1910 to 2012 Illinois farms have decreased by 177,913 which have increased average size 271 acres respectively. For Illinois to continue to be a global player/leader, it is vital that Illinois farms produce efficiently and are profitable. As government support, has long played a role in the success of agriculture, it will be important that policies remain to ensure smooth stability and strong financial measures across the county-level as displayed in this research.

CHAPTER 3

U.S. & ILLINOIS FARM POLICY

With the adoption of the Agricultural Adjustment Act (AAA) of 1933, farm support and programs have become a big player in the development of successful agriculture measurements. Spurred after World War I, agricultural took the lead in developing economic opportunities for those affected by the time period. “Supply controls ended with the 1996 Federal Agriculture Improvement and Reform Act, and new forms of income support payments not tied directly to farmers’ current production decisions— “decoupled” payments- replaced the older income support programs. The evolution of farm policy from one based on supply controls and high price supports to one based primarily on decoupled Government payments has undoubtedly reduced the economic inefficiencies of resource misallocation and price distortions associated with farm programs” (Dimitri, Effland, and Conklin, 2005).

With the uncertainty of global markets, unpredictable weather patterns, and increasing regulation in today’s agricultural environment, low commodity prices affect the entire agricultural market at the macro level, including Illinois counties one growing season after another. Risk and uncertainties, have put a strain on the financials of Illinois farms across the 102 counties throughout the state. Coupled with the uncertainty of agriculture support it is vital to the Illinois economy that policy is constructed and protected to ensure Illinois counties remain an economic engine in the United States and are competing strongly financially to innovate and lead future generations with unpredictable measures ahead. Around 25 percent of jobs in Illinois are dependent on the agriculture. In less than 15 years the workforce involved in the Farming sector of agriculture in the United States has dropped nearly 40 percent. Although, agriculture continues to represent many opportunities for jobs and employment outside of direct production

farming. Thus, job creation over recent census years have become more focused on service based industries within the agriculture field.

Beginning around 1930, Crop Insurance developed along with other initiatives to aid agriculture grow from the stalled degeneration impacts of the Great Depression and the Dust Bowl era, a stronger approach to increasing the farm safety net. According to USDA- Risk Management Agency, The Federal Crop Insurance program developed in 1938. In the early stages the program focused on few crops and today has increased to offer protection of many diverse crops as seen throughout the state of Illinois. These experimental stages have allowed the Federal Crop Insurance Program to develop into what has become a more efficient and effective system for the taxpayer and producer alike. With Agriculture support programs through policy, in the Public-Sector such as the Farm Safety Net. These initiatives are put into action to develop a buffer from the financial hardships and damages Illinois crop farmers face across the states. “The public-sector safety net that is now in place to buffer crop farmers from the economic downturn has two dominant components (not including disaster assistance and other programs such as low interest emergency loans) – payments received under the farm program (ARC-CO, ARC-I, or PLC), and subsidized crop insurance. (Langemeier and Boehije, 2016). The main factor contributing to areas of stress among Illinois counties is low commodity prices and significant yield loss.

Therefore, Farm Doc Daily, states that most Midwest corn and soybean farmers favor the Agricultural Revenue Coverage- County Option (ARC-CO) farm program option, which in essence provides a payment per base acre of corn, and soybeans that depends on the level on the level of yields and prices. As stated earlier, the purpose of these programs is to ensure stability of the unpredictability that is often faced often in Illinois agriculture across the counties. As with

other policies implemented through Congress, Crop insurance has created quite a bit of discussion throughout the state and will continue into the foreseeable future as policy makers use judgement on how to go about supporting agriculture in the future both sustainable and economically. Per Farm Doc, Insurance covers yield and revenue losses during the planting and growing season, while payments by insurance to farmers are calculated as net insurance payments, which equals insurance indemnity payments to farm minus the premiums paid by farms.

These programs are important due to the unprecedented risk faced throughout Illinois from varying climate and geographical locations among counties. “Because crop insurance premiums are so heavily subsidized, between 85 and 90 percent of crop acreage is insured in the program. Nevertheless, crop insurance policies must follow sound insurance principles. To make sure that farmers have an incentive to take care of their crop, the policies have a significant deductible” (Babcock and Paulson, 2012). Per the Economic Research Service, in recent farm policy debates, several proposals for a whole-farm revenue safety net program are currently under consideration. Federal crop insurance authorized by congress in the 1930s, as agriculture in the United States was attempting to recover from the Great Depression (Ginder and Spaulding, 2006). Per Ginder and Sapulding, the amount on net acres insured have increased from \$949.395 million in 1994 to 3.712 billion in 2005. Thus, highlighting the importance of crop insurance programs and their importance in agriculture. Today’s crop insurance decisions are focused toward securing a strong farm safety net and highlight the importance of strategic decision making which can affect the bottom line of a county’s economic impacts from crop damages. Likewise, total crop insurance premiums has increased from \$949.395 million in 1994 to \$3.712 billion in 2005.

Some studies suggest that current and future agricultural policies could change the landscape of agricultural practices such as timing of planting, commodity price influence, and premium payments. Meanwhile, crop insurance contracts represented over \$13.068 billion of liability in 1993 versus \$37.188 billion in 2005” (National Summary of Business Report). What exactly lies ahead in terms of the future Farm Bill is mostly unknown at this time. According to Babcock and Paulson, 2012, this could present a significant marketing problem due to the fact if farmers begin making planting decisions based on government regulations, this impact could have strong market implications in farmers receiving lower prices due to the supply-enhancing aspects of current and future US farm bills. However, policy of sustainable development and can aid is support of Illinois agricultural sector that exports commodities around the world, while aiding in combating some of the most challenging problems faced in the 21st century. Furthermore, this upcoming chapter will consider financial measures overall and how these calculations should be measured and financially analyzed to determine farm financial performance.

CHAPTER 4

FARM FINANCIAL PERFORMANCE MEASURES

The following data measurement are using the Farm Financial Standards Council measures and appropriate benchmarks related to grain farms. These guidelines shown below. ¹

The Measure: of Return on Assets is calculated by taking net income generated by all assets, after labor has been compensated but before interest payments, divided by total assets.

Interpretation: The profitability per dollar of assets. ROA allows comparisons over distinct size farms and different types of businesses.

This paper provides wide varieties of financial measures that are of main importance to guide appropriate benchmarks are appropriate in making a judgement on the financial performance of an Illinois county. Illinois agriculture is a sophisticated, capital-intensive, and highly decentralized business (Young and Burke, 2001). In addition, when a farm business manager or public policy makers want to conduct analysis on such farm or region throughout the state it is important that all benchmarks be of equal analysis and measurement. 'To accomplish this task, the manager must decide how the evaluation will be conducted, collect data that accurately reflects the performance of the business, and develop a set of standards or benchmarks for measuring Return on Assets (ROA). Currently, Purdue Extension benchmark standards state a median for Return on Assets (ROA) is 8.9%, with an average upper quartile reading of 21.1%. If performance is not within satisfactory benchmarks standing management should assess best practices from neighboring counties to look at improving measurement across census years. Using (ROA) & (ATR) financial measures can ensure the organization maximizing profitability and financial efficiency and is at its best, decision making, and short or long-term goals are

¹ Measuring & Analyzing Farm Financial Performance, Purdue Extension

achievable and maintained through performing strong financial analysis. Per Babb, 1992, the economic performance of various systems of production and marketing is critical to public and private decisions.

In addition, the Farm Business Associations in Illinois such as the Illinois Farm Business Farm Management are a resource of comparison of data and analysis procedures. This allows producers who are looking for appropriate financial measures to choose benchmarks from farms that are very similar to their own farm (Purdue Extension, 2012). Taking time to fully insure and understand what the data is telling you as a producer can be important in deriving information to make the best possible decision on behalf of your operation. Financial performance measures include the farm sector's receipts and expenses; gross and net value added; and both net cash farm income and net farm income (USDA-ERS Web.). Periods of harsh weather impacting yields/profitability or fluctuation in commodity prices are important in understand how these events affect financial measures when computing ratios and making inferences on data for current and future decision-making. Ratios and percentages are the main importance is measuring the financial characteristics to gain a better understanding of financial performance. Measures also include changes in the sector's assets, debt, and overall wealth, as well as financial ratios that depict solvency, liquidity, and efficiency (USDA-ERS, Web.). Annual U.S. net farm income is the single most watched indicator of farm sector well-being, as it captures and reflects the entirety of economic activity across the range of production processes, input expenses, and marketing conditions that have persisted during a specific time period (Schnepf, 2012). Along with farm income, asset values are an important note is terms of looking at profitability over the long-term. "Debt/asset ratios tend to be greater for younger farm operators who are on the outset of their farming career. Likewise, debt/asset ratios tend to be lesser for

older farmer operators as the seasoned farm operator has had a lifetime to pay down debt initially acquired at a young age” (Zwilling, Raab, Krapf, 2017).

²Additionally, net farm income measures profitability:

- Net farm income is a value of production measure, indicating the farm operator’s share of the net value added to the national economy within a calendar year, independent of whether it is received in cash or noncash form. In contrast to net cash income, net farm income includes the value of home consumption, changes in inventories, capital replacement, and implicit rent and expenses related to the farm operator’s dwelling that are not reflected in cash transactions during the current year. Thus, once a crop is grown and harvested it is included in the farm’s net income calculation, even if it remains on-farm storage.

This article from the Congressional Research Service shows the role government plays in supporting agriculture and ensure stability given the many factors and variables that arise. As supply and demand have a strong role in the choice of making commodity-marketing decisions. Conversely, an interesting question could be asked: Does farm size relate directly to increased profitability? According to Farm Doc, “During the period of low profitability (1998-2002), operations between 500 and 1,500 acres earned an average net farm income of \$67 to \$68 per acre, or more than \$10 per acre more than farms with less than 500 acres. Larger farms, operating more than 1,500 acres, also had higher average net farm income than smaller farms but the difference was only \$4 per acre” (Kern and Paulson, Web.). One can make an inference from this scenario by saying size does not necessarily profitability. Although, farm size could play a

² More information of the definitions Net farm income can be found by accessing the Congressional Research Service, *U.S. Farm Income*. (Schnepf, R. 2012).
http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1898&context=key_workplace

role is increased profitability opportunities, producers who focus on maintaining quality and efficiency with resources they have can prove to be more profitability and financially efficient from a production standpoint. Also, factors such as marketing, operator input decisions, and growing conditions will play a significant role in the outcomes of profitability “During the period of moderate profitability (2002-2004), operations with up to 1,500 acres reported similar net farm income numbers averaging \$96 to \$97 per acre. Larger operations with more than 1,500 acres reported slightly lower net farm incomes with an average of \$88/acre” (Kern and Paulson, Web.).

Therefore, it is important for the manager of an operation to ensure resources are being used and maximized efficiency and effectively even on smaller acreage operations. Depending on the marketing year, one could gain a competitive advantage depending on farm size and ensure a better financial position for the coming year.

Profitability Measure- Return on Assets

Return on Assets (ROA) = the net income generated by all assets, after labor has been compensated but before interest payments, divided by total assets.

(ROA) Benchmark Standards

Strong: >12%

Moderate: 3-12%

Needs Improvement: < 3%

Financial Efficiency Measure- Asset Turnover Ratio

Asset Turnover Ratio (ATR) = gross revenues /total assets

(ATR) Benchmark Standards

Asset Turnover Ratio (ATR) depends on the type of production operation while also indicates how efficiently farm assets are generate revenues by the asset base. This measure also, depends on the amount on land owned/leased. The higher the percentage the more efficiently and productive the operation is with their assets.

Higher Asset Turnover Ratios represent increased efficiency

CHAPTER 5

THE FUTURE OF AGRICULTURE FINANCE

The future of agricultural finance looks promising, although much work must continue to ensure a smooth transition to a technology driven, larger scale operation, and innovative agriculture future. This chapter will focus on five main points, which will ensure a promising future in the agricultural world.³ Challenges that agricultural related financial institutions face are the transaction cost of reaching remote rural populations. Higher perceptions of non-repayment due to sector-specific risks, such as production, price and market risks, and Financial institutions' lack of knowledge of how to manage transaction cost, agriculture-specific risks and how to market financial services to agricultural clients. These topics include, but are not limited to long-term investments, infrastructure, climate change, and the role women and youth will play in shaping the future growth and success of agriculture, and technological development.

Moreover, when farming operations throughout Illinois look at growing or making large capital purchases towards property and equipment, long-term financing gains traction in becoming a key factor in making decision to minimize future risk and mitigate unexpected problems that could arise. All of which highlight the importance of the farm safety net and ways of spreading risk through insurance protection and conducting strong analysis to maximize efficiency and development. The importance of quality infrastructure in agriculture stretches across a vast area of roads, bridges, elevators, and ports that ship and transport agricultural commodities throughout Illinois and around the world. The reduction of transportation costs increase efficiency and ensure a more economically sufficient operation while supporting a moderate price in commodity markets. Farm asset values are forecast to decline by 1.1 percent in

³ The discussion on Agriculture finance was primarily take from The World Banks topic of the financial sector on agriculture finance.

2017, and farm debt is forecast to increase by 5.2 percent (Economic Research Service, 2017).

The volatility in agriculture from year to year show how quickly one year can affect another and highlight the importance of consistent financial measurement analysis. “The rise in farm debt is driven by higher real estate debt (up 7.3 percent). Financial liquidity measures, including working capital, forecasted to weaken in 2017, as are solvency measures such as the debt-to-asset ratio. The debt-to-asset measure is now above its average over the previous ten years” (Economic Research Service, 2017).

Per, Kraf and Zwilling, 2017, in a period of low farm returns producers should cautiously analyze the debt capacity they currently face and how to best move forward with uncertainty risk factors. As commodity prices continue to remain low with consistently high input cost, producers will want to consider the increased cost of inputs in terms of what they believe the return of economic value will be from the given inputs increased expense. Also, taking notice of increased interest rate is a key factor in the debt expense that can be accumulated throughout production years. In addition, with some farm assets decreasing in value, this can also lead to higher debt-to-asset ratios even without and additional debt. Establishing or maintaining good recordkeeping will assist producers in identify areas of concern faster and allow for efficiency in decision making. As noted in the figure graph below interest expense has increased substantially since 1991.

Additionally, the increasing challenge of unpredictable weather patterns have become an increased risk and concern for food security. Investment towards decreasing these agriculture risks through irrigation use on land that face extremely dry conditions, technologies such as genetically engineered: herbicide and insecticide resistant seeds to reduce the amount of inputs

plants need to survive while produce high yields at the least amount of cost, and maintain the landscape through strong conservation and sustainability practices.

⁴Table 1: *Off-Farm Income/Work*

<u>1930</u>	<u>1945</u>	<u>1970</u>	<u>2002</u>
30 percent of farmers worked off farm for an average of 100 days	27 percent of farmers worked off farm	54 percent of households had off-farm income	93 percent of households had off-farm income

The role our youth and women play in the future of agriculture will become of foremost importance to bring diversity and innovation into one of the most demanding fields of the future. Agriculture must continue to do a respectable job in implementing policies such as, the young farmer program, which gives incentives and aids the younger generation to become operators and build a farming operation. The average age of an Illinois farmer is currently 58 years old, as the age of farmers throughout Illinois and the country continues to increase exponentially it is important that producers alike are building and sharing knowledge among men, women, and youth to ensure generations to come with have a safe and financially friendly food source for Illinoisans, those in the domestic United States, and in the international market place as well.

Additionally, one of the biggest advancements in the last century has been the adoption and evolution that technology had played in the role of production agriculture. These advancements have made operations more efficient and simplify growing seasons from planting

⁴ Source: The 20th Century Transformation of U.S. Agriculture and Farm Policy: Compiled by Economic Research Services, USDA. Share of workforce employed in agriculture, for 1900-1970, Historical Statistics of the United States; for 2000, calculated using data from Census of Population; agricultural GDP as part of total GDP, calculated using data from the Bureau of Economic Analysis.

to harvest. Although, advancements in technology and innovation must continue to lead the success with data management and decision making which can lead to making better fiscal management decisions on behalf of the manager.

Specifically, in Illinois one of the agriculture communities' biggest supporters and spokesperson is the Illinois Farm Bureau. The Illinois Farm Bureau's mission is to "Improve the economic well-being of agriculture and enrich the quality of farm family life." Listed below are several legislative priorities the Illinois Farm Bureau is pushing in 2016:

- ⁵Seek passage of a state budget that provides funding for core agriculture programs including strategies to efficiently and effectively provide services.
- Maintain tax incentives for agriculture that protect the economic well-being of farmers.
- Seek legislation that will maintain reduced property tax assessments on agriculture filter strips so these important tools for nutrient management and the reduction of soil erosion remain economically viable
- Seek legislation amending expedited review procedures for new large, complex utility projects that will better protect landowners' property rights.
- Seek legislation allowing Governor to increase overweight tolerances for divisible loads of agriculture commodities during a declared harvest emergency
- Oppose an increase in Illinois' minimum wage that is believed to be inflationary and would negatively impact Illinois' business climate.

⁵ Additional information and bullet points from The Illinois Farm Bureau can be found under the Policy & Issues tab at www.ilfb.org

- Seek legislation to reduce the current traffic and criminal conviction surcharge paid of truck overweight fines.

CHAPTER 6

DATA, METHODS AND RESULTS

The research procedures for the cross-sectional data research analysis required data to be collected from the United States Department of Agriculture – National Agricultural Statistics Service Quick Stats (USDA-NASS). Determinates of Farm Income (FI) were collected to derive factors that determine farm income. The Census of Agriculture provides the only source of uniform, comprehensive and impartial agricultural data for every county in the nation.

In conducting analysis data was collected from multiple areas across: sector, group, commodity, and year. The census of agriculture year a wide variety of descriptive measures were collected to bring into picture the dispersions among Return on Assets (ROA) across census years Asset Turnover Ratio (ATR). These two Profitability and Financial Efficiency measures are important in supporting relationships of change and improvement among census years.

Using additional data from multiple industries such as government related programs and crop insurance, conservation & wetland programs brought into picture the impact these programs were having on financial measures and correlation among participation and improvement throughout census years.

The results of the census on agriculture study show a robust correlation and improvement specifically from census years 1997 to 2012, reliable improvement is noted from census year to census year including many of the Return on Asset (ROA), measurements reaching upper quartiles in between census year 2007 and 2012. Likewise, Asset Turnover Ratio (ATR) showed a decline of 17.18% from 1997 to 2012. However, all ATR values remain above 100% in the study across census years. Asset Turnover Ratio ranks are as follows from high to low: 1997, 2007, 2012, and 2002. Additionally, Farm Income- Receipts were as follows:

2012: \$1,667,993,000,

2007: \$471,213,000

2002: \$213,085,000

1997: \$155,464,000

Census Year 1997: Beginning with census year 1997 the mean Return on Assets (ROA) averaged out at 2.39, with a 2.26 trimmed mean after 5% of the upper and lower values were excluded for outlier analysis. Thus, representing some outliers existed in census year 1997, those respective counties are Cook (12.77%) and Pope County (5.14%). At the 95% Confidence Interval for the Mean the Lower Bound value reflects 2.1% with an Upper Bound of 2.68%. A median value of 2.26 is represented, with a Standard Deviation calculation of 1.48 data spread. The Minimum and Maximum percentage ranges are .44% & 12.77% respectively. The data also represented a positive Skewness of 7.28%. Asset Turnover Ratio (ATR) data shows an efficiency percentage average reading of 123.34%, the highest respective ratio across all census years in the research study. Highest: DuPage- Northeast (217.35%) Lowest: Williamson- Southwest (42.62%)

Census Year 2002: With a 5-year improvement mean Return on Assets (ROA) increased around 3.11%, with a 2.86 trimmed mean after 5% of the upper and lower values were excluded for outlier analysis. Thus, representing some outliers existed in census year 2002, the respective counties are from highest to low: DuPage (14.49%), Cook (12.61%), Lake (9.76%), and Will County (5.61%). At the 95% Confidence Interval for the Mean the Lower Bound value reflects 2.73% with an Upper Bound of 3.48%. A median value of 2.66 is represented, with a Standard Deviation calculation of 1.9 data spread. The Minimum and Maximum percentage ranges are .6% & 14.49% respectively which equates a Range of 13.89%. The data also represented a

positive Skewness of 3.82%. In the year 2002, Asset Turnover Ratio (ATR) decreased nearly 22.47% points, to 100.87% the lowest recorded efficiency mean calculated among all census years. Highs and Lows are Putnam County- Northwest (242.40%) and Perry County- Southwest (43.07%).

Census Year 2007: Moving 10-census years away from 1997 Return on Assets (ROA) Mean increased around 5.59%, increasing its stability performance, with a 4.3 trimmed mean after 5% of the upper and lower values were excluded for outlier analysis. Thus, representing some outliers existed in census year 2007 as well, the respective counties are from highest to low: DuPage (80.74%), Cook (14.91%), Lake (15.97%), McHenry (8.02%), and Kane County at (8.54%). In census year 2007 DuPage compiled that largest ROA value among census year 1997, 2002, 2007, and 2012. At the 95% Confidence Interval for the Mean the Lower Bound value reflects 3.84% with an Upper Bound of 7.34%. A median value of 4.28 is represented, with a Standard Deviation calculation of 8.9 data spread. The Minimum and Maximum percentage ranges are 1.9% & 80.74% respectively which equates to the largest Range among census years of 78.84%. The data also represented a positive Skewness of 7.28%. 2007 also saw an increase in (ATR) up from census year 2002 around 121.21%. Highs and Lows are DuPage County- Northeast (332.98%) and Pope County- Southeast (28.83%)

Census Year 2012: In the final and most recent Census of Agriculture published to date the Year 2012 saw the largest improvement in means sitting at 11.30% moving toward strong percentage standing, census year 2012 also saw the best ROA consistency percentage values among all descriptive statistic calculations, increasing its stability performance, with a 10.96% trimmed mean after 5% of the upper and lower values were excluded for outlier analysis. Thus, representing some outliers existed in the final census year as well, the respective counties are

from high to low, (Cook 30.67%), (Clay 23.2%), (Lake 21.84%), (DuPage 20.63%), and Wayne County at (20.88%). At the 95% Confidence Interval for the Mean the Lower Bound value reflects 2.73% with an Upper Bound of 3.48%. A median value of 10.89% is represented, with a Standard Deviation calculation of 4.23 data spread. The Minimum and Maximum percentage ranges from 4.97% & 30.67%. The data also represented a Skewness of 1.41% and an Asymmetric distribution. 2012 was represented the second highest Asset Turnover Ratio of 106.16% trailing the record high of 1997 (ATR), showing a decrease in farm efficiency from 1997. The respective high and lows for 2012 are: DeKalb- Northeast (168.58%) and Johnson-Southwest (30.26%).

Overall, Northern Illinois counties had a significantly consistent higher ROA measurement, specifically Cook County, which has values ranked in the top 5% over all census years in the study. A correlation of less Agriculture land acres and a lower machinery asset value, with high farm incomes were present. These northern counties relied on more labor-intensive commodity groups. Whereas, the central and southern counties on study focused on production of copious amounts of row crops in which labor is reduced and strong reliance on heavy farm assets are critical to the success and efficiency of the operation. Additionally, a spread of southern and central counties included in top ROA values over census years but were not consistent with north eastern counties.

In looking at survey data, acquired by the Cook County Farm Bureau, our results over census year matched their conclusions in survey findings. Nearly, 80% of Cook County's agricultural product sales came from the sectors of floriculture crops, including a heavy reliance on nurseries and greenhouses. These labor intensive and high sales are credited to the high supply and demand within the county, in which producers are able to maximize market potential.

Cook County also reported 377 acres of vegetable production, with 71 acres of pumpkin, and additional 80 acres of sweet corn. A scenario which presents significant crop differentiation from downstate Illinois. Livestock such as equine horses and bee production were also more readily present in upstate Illinois. This difference among the states three different regions of Northern, Central and Southern present the scenario that downstate production compromised in massive quantities of corn, soybeans, and wheat which are largely dependent on national, and international market to maximize supply and demand and gain a quality price for their agricultural production.

CHAPTER 7

DISCUSSION

The results of this study show present an interesting relationship among counties throughout Illinois. The relationship of improvement in Return on Assets (ROA) and Depreciation Expense Ratio among Census of Agriculture Years 1997, 2002, 2007, 2012 was increased at impressive rates. In comparison, the largest significant players of high ROAs were represented by Northern Illinois Counties. These finding concluded that Norther Illinois Counties were compromised of more urban environment. The northern and suburban markets and demanding of more labor-intensive practices. The northern counties were compromised of less asset value and remained marginally high farm incomes. Whereas, a larger number of Central and Southern Illinois counties relied heavily on Asset heavy operations, although showed significantly increased performance in measurement over census years.

Additionally, more key variables and variety factors were analyzed and explained by the data represented by the United States Department of Agriculture- National Agriculture Statistics Survey (USDA-NASS). Such as, the adoption of producers to government implemented programs and support such as the federally subsidized crop insurance program involvement nearing 13% from 2002 to 2012. Government supported and encourages program such as the Conservation reserve & wildlife acers utilized to promote sustainability saw a sizeable acreage increase from 743,681 acres in 1997 to a jump of 986,719 acres in 2012, which represents the increased improvement in ROA measures throughout all counties in census years 1997, 2002, 2007, and 2012.

Moving onward, Asset Turnover Ratio has significant variability in percentage ratio among census years 2012, 2007, 2002, and 1997.

One limitation of the study is the diversity of agriculture within Ag Districts at the county-level in terms of crops, livestock, floriculture, etc. with implications spatial location the commodity price received in each of these sectors can fluctuate given outside influences as well as the commodity price or producer decision to sell. This price received for these agriculture products are also affected by national and international markets, which impact farm income and farms at the county-level throughout the state of Illinois.

Given the role agriculture has long played in the economic growth of Illinois counties and the nation's economy it will remain vital that policy and successful financial measurement remain to ensure the strong export state on Illinois will remain competitive in the global market place. With global population expected to reach over 9 billion around 2050, the demands put on Illinois as one of the United States top producers of agriculture product will present the opportunity for increased export market opportunities. If agriculture becomes increasingly more financially efficient with the help of policy, technology development and statistical data. Illinois contribution to help combat the future challenges, volatility of markets, important management decisions can best implement best practices and aid the many challenges producers face to ensure agriculture remains a thriving and supporting industry.

BIBLIOGRAPHY

- Barry, Peter J., and Lindon J. Robison. "Agricultural finance: Credit, credit constraints, and consequences." *Handbook of agricultural economics* 1 (2001): 513-571.
- The World Bank, Agriculture Finance, Accessed at: www.worldbank.org
- Huang, Haixiao, Gay Y. Miller, Bruce J. Sherrick, and Miguel I. Gomez. "Factors influencing Illinois farmland values." *American journal of agricultural economics* 88, no. 2 (2006): 458-470.
- Dimitri, Carolyn, Anne BW Effland, and Neilson Chase Conklin. *The 20th century transformation of US agriculture and farm policy*. Vol. 3. Washington, DC: US Department of Agriculture, Economic Research Service, 2005.
- Illinois Department of Agriculture, Accessed at: www.agr.state.il.us
- Ritchie, Mark, and Kevin Ristau. "US farm policy." *World Policy Journal* 4, no. 1 (1986): 113-134.
- Bekkerman, Anton, Eric Belasco, and Amy Watson. 2015. "Decoupling direct payments: potential impacts of the 2014 farm bill on farm debt." *Agricultural Finance Review* 75, no. 4: 434-449. *Academic Search Complete*, EBSCOhost (accessed December 20, 2016).
- Langemeier, M., and M. Boehlje. "An Update on the Farm Safety Net." *farmdoc daily* (6):190, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, October 7, 2016.
- Dismukes, Robert and Durst, Ron, Whole-Farm Approaches to a Safety Net (June 2006). USDA-ERS Economic Information Bulletin No. 15. Available at SSRN: www.ssrn.com/abstract=923881 or www.dx.doi.org/10.2139/ssrn.923881
- Zulauf, C., G. Schnitkey, J. Coppess, and N. Paulson. "Farm Payments by Countercyclical and Insurance Programs Since 2002." *farmdoc daily* (6):230, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, December 8, 2016.
- Miller, A., C. Dobbins., M. Boehlje, F. Barnard, and N. Olynk. "Measuring and Analyzing Farm Financial Performance." Purdue Extension (2012). Link: www.extension.purdue.edu/extmedia/ec/ec-712-w.pdf

National Sustainable Agriculture Coalition, NSAC, Accessed at:
www.subsustainableagriculture.net

Schnepf, R. (2012). *U.S. farm income*. Washington, DC: Congressional Research Service.

Garcia, Philip, Steven T. Sonka, and Man Sik Yoo. "Farm size, tenure, and economic efficiency in a sample of Illinois grain farms." *American Journal of Agricultural Economics* 64, no. 1 (1982): 119-123.

Babcock, Bruce, and Nick Paulson. "Potential Impact of Proposed 2012 Farm Bill Commodity Programs on Developing Countries." *ICTSD Programme on Agricultural Trade and Sustainable Development, Issue Paper 45* (2012).

Kern, M., and N Paulson. "Profitability and Farm Size on Grain Farms in Illinois." *Farmdoc daily*. Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, May 3, 2011

Illinois Farm Bureau, IFB, Accessed at: www.ilfb.org

USDA Economic Research Service, ERS, Accessed at: www.ers.usda.gov

USDA Foreign Agriculture Service, FAS, Accessed at: www.fas.usda.gov

Ginder, Matthew G., and Aslihan D. Spaulding. "Factors affecting crop insurance purchase decisions in northern Illinois." In *Selected Paper Prepared for Presentation at the American Agricultural Economics Association Annual Meetings, Long Beach, California*, vol. 26. 2006.

Recommended citation format: Zwilling, B., D. Raab, and B. Krapf. "Trends in Working Capital and Financial Solvency." *farmdoc daily* (7):10, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, January 20, 2017.

Featherstone, Allen M., and Bruce J. Sherrick. "Financing vertically coordinated agricultural firms." *American Journal of Agricultural Economics* 74, no. 5 (1992): 1232-1237.

USDA, Census of Agriculture, Accessed at: www.agcensus.usda.gov/

Young, H. Peyton, and Mary A. Burke. "Competition and custom in economic contracts: a case study of Illinois agriculture." *American Economic Review* (2001): 559-573.

USDA, Risk Management Agency, Accessed at: www.rma.usda.gov/

Krapf, B., D. Raab, and B. Zwillig. "Agricultural Debt Continues to Increase." *farmdoc daily* (7):30, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, January 20, 2017.

USDA, Census of Agriculture Historical Archive, Accessed at:
www.agcensus.mannlib.cornell.edu

FSC: Farm Financial Standards Council: www.ffsc.org/wp-content/uploads/2013/12/2014-Financial-Guidelines-for-Agriculture.pdf

Cook County Farm Bureau, Accessed at www.localfarmproducts.org

APPENDICES

Table 2: Combined (ROA) Census Years Descriptive Statistics

(ROA) Descriptive Statistics	2012 Statistics	2007 Statistics	2002 Statistics	1997 Statistics	
Mean	11.30%	5.59%	3.11%	2.39%	
95% Confidence Interval for Mean	-Lower Bound	10.46%	3.84%	2.73%	2.1%
	-Upper Bound	12.13%	7.34%	3.48%	2.68%
5% Trimmed Mean	10.96%	4.3%	2.86%	2.26%	
Median	10.89%	4.28%	2.66%	2.05%	
Variance	17.96%	79.21%	3.61%	2.19%	
Std. Deviation	4.23%	8.9%	1.9%	1.48%	
Minimum	4.97%	1.9%	0.6%	0.44%	
Maximum	30.67%	80.74%	14.49%	12.77%	
Range	25.7%	78.84%	13.89%	12.33%	
Interquartile Range	4.88%	1.89%	1.36%	1.44%	
Skewness	1.44%	7.28%	3.82%	3.59%	
Kurtosis	3.89%	56.49%	15.65%	22.94%	

Table 3: Combined (ATR) Census Years Descriptive Statistics

(ATR) Descriptive Statistics	2012 Statistics	2007 Statistics	2002 Statistics	1997 Statistics	
Mean	106%	121%	101%	123%	
95% Confidence Interval for Mean	-Lower Bound	99%	114%	95%	117%
	-Upper Bound	113%	129%	107%	129%
5% Trimmed Mean	106%	121%	99%	123%	
Median	109%	123%	101%	122%	
Variance	12%	15%	10%	9%	
Std. Deviation	34%	38%	32%	30%	
Minimum	30%	29%	43%	43%	
Maximum	187%	333%	242%	217%	
Range	2%	304%	199%	175%	
Interquartile Range	43%	45%	33%	34%	
Skewness	7%	120%	122%	8%	
Kurtosis	-33%	838%	404%	90%	

Table 4: Machinery Asset Value \$/Operation

Machinery Asset Value Measured in \$/Operation				
County	2012	2007	2002	1997
Mean	\$ 200,864.14	\$ 134,783.40	\$ 102,170.98	\$ 85,823.53
Standard Deviation	72088.55	43485.33	34124.18	27897.37

Table 5: Machinery Asset Value \$/Acre

Machinery Asset Value Measured in \$/Acre				
County	2012	2007	2002	1997
Mean	\$736.12	\$753.53	\$708.26	\$775.49
Standard Deviation	337.37	343.93	326.70	354.00

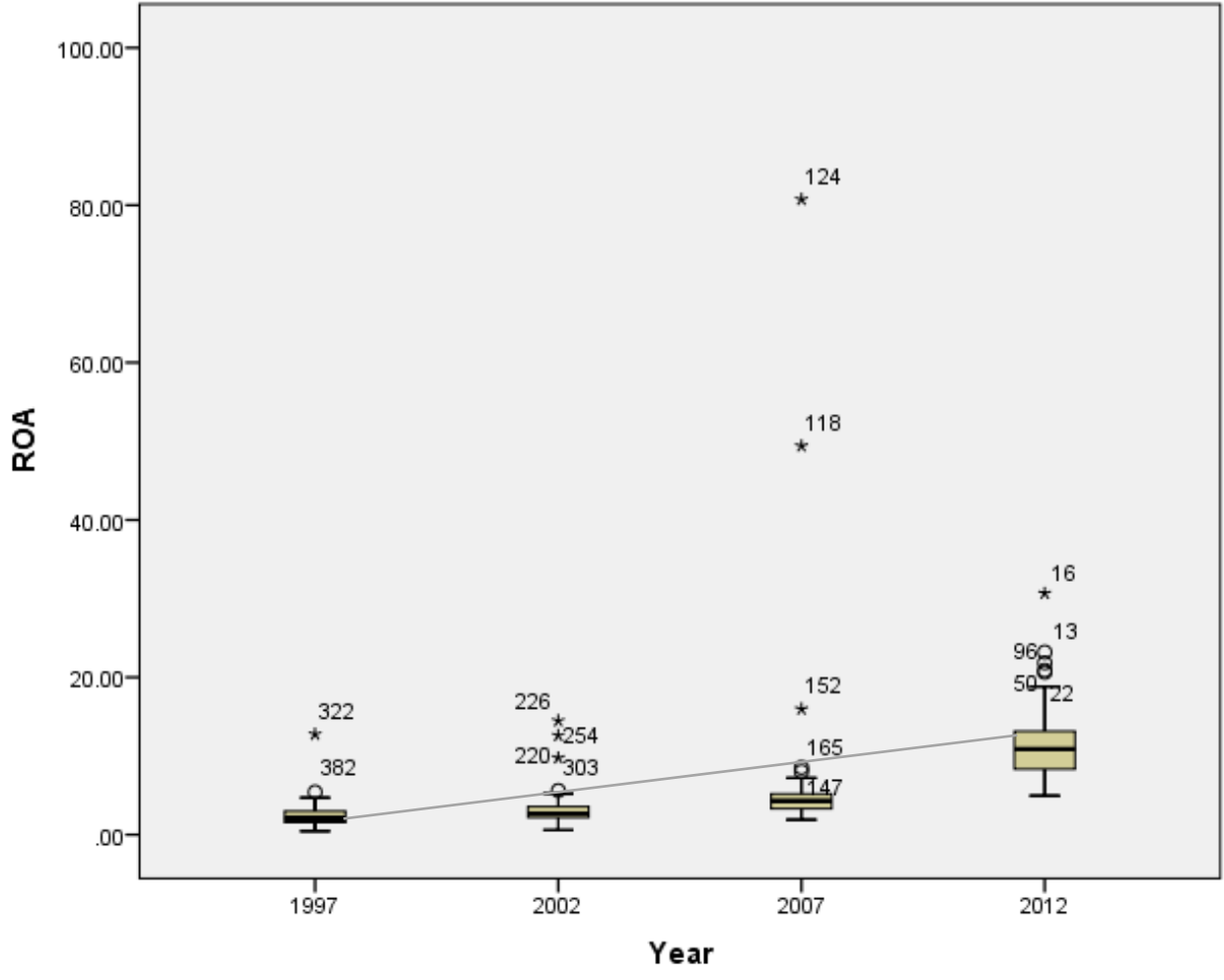


Figure 1: Combined (ROA) Box Plot

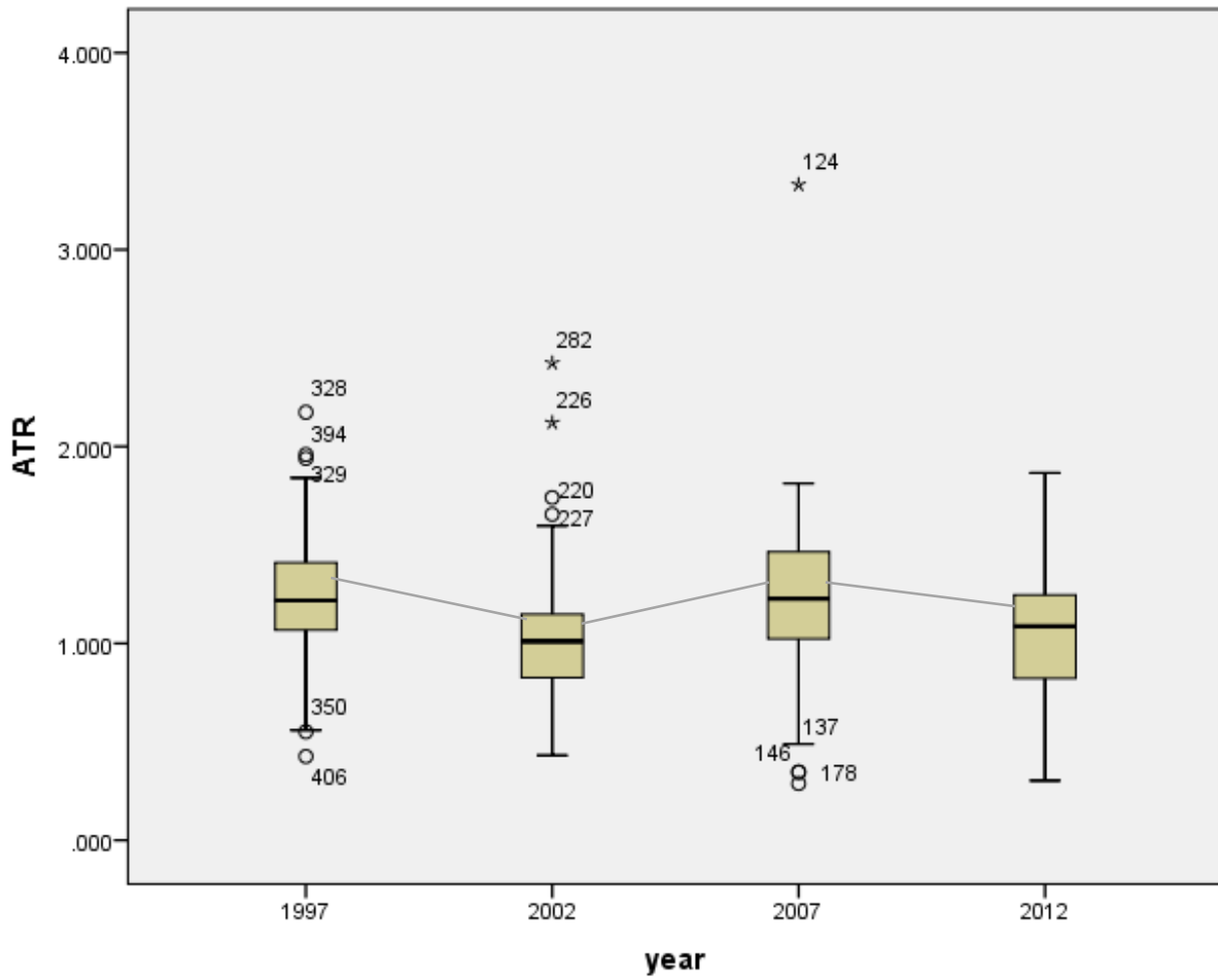


Figure 2: Combined (ATR) Box Plot

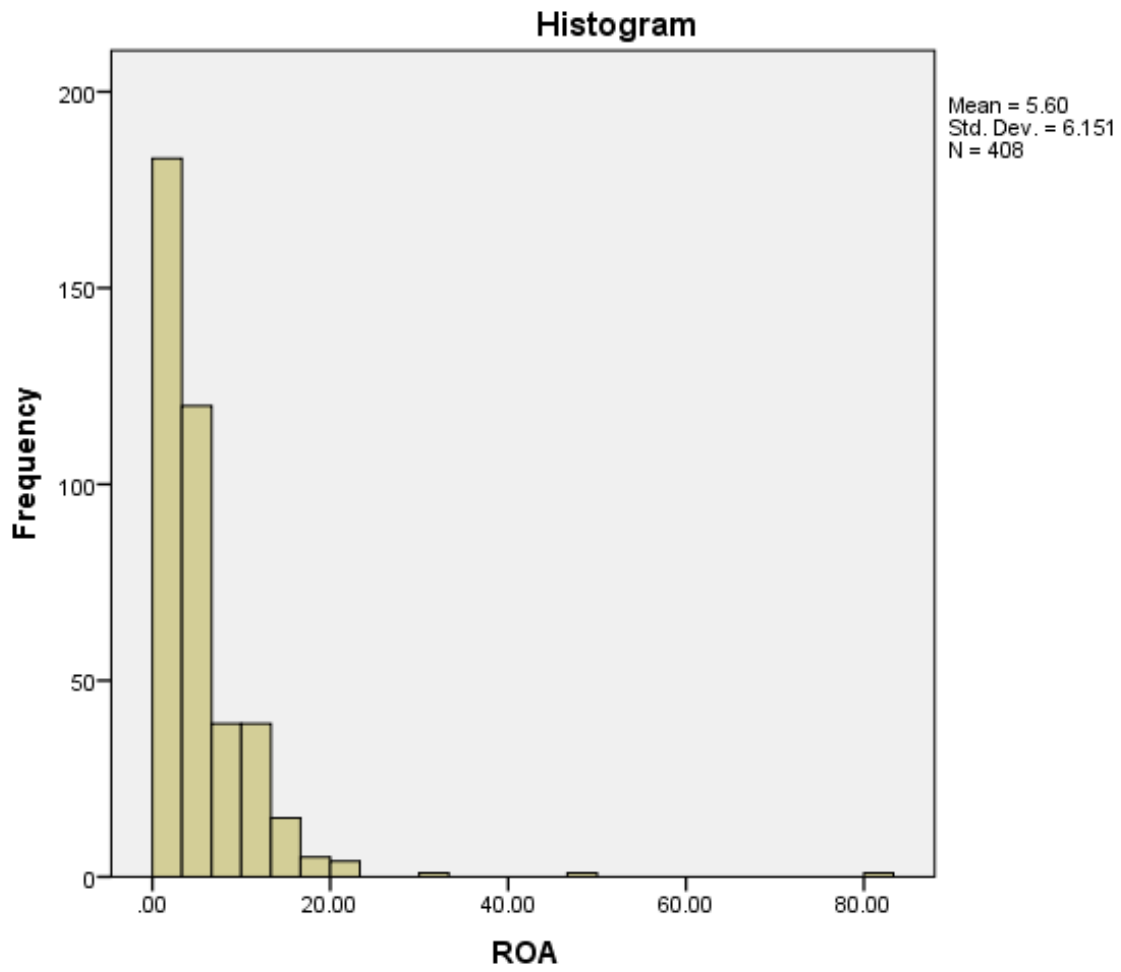


Figure 3: (ROA) Combined Histogram Analysis

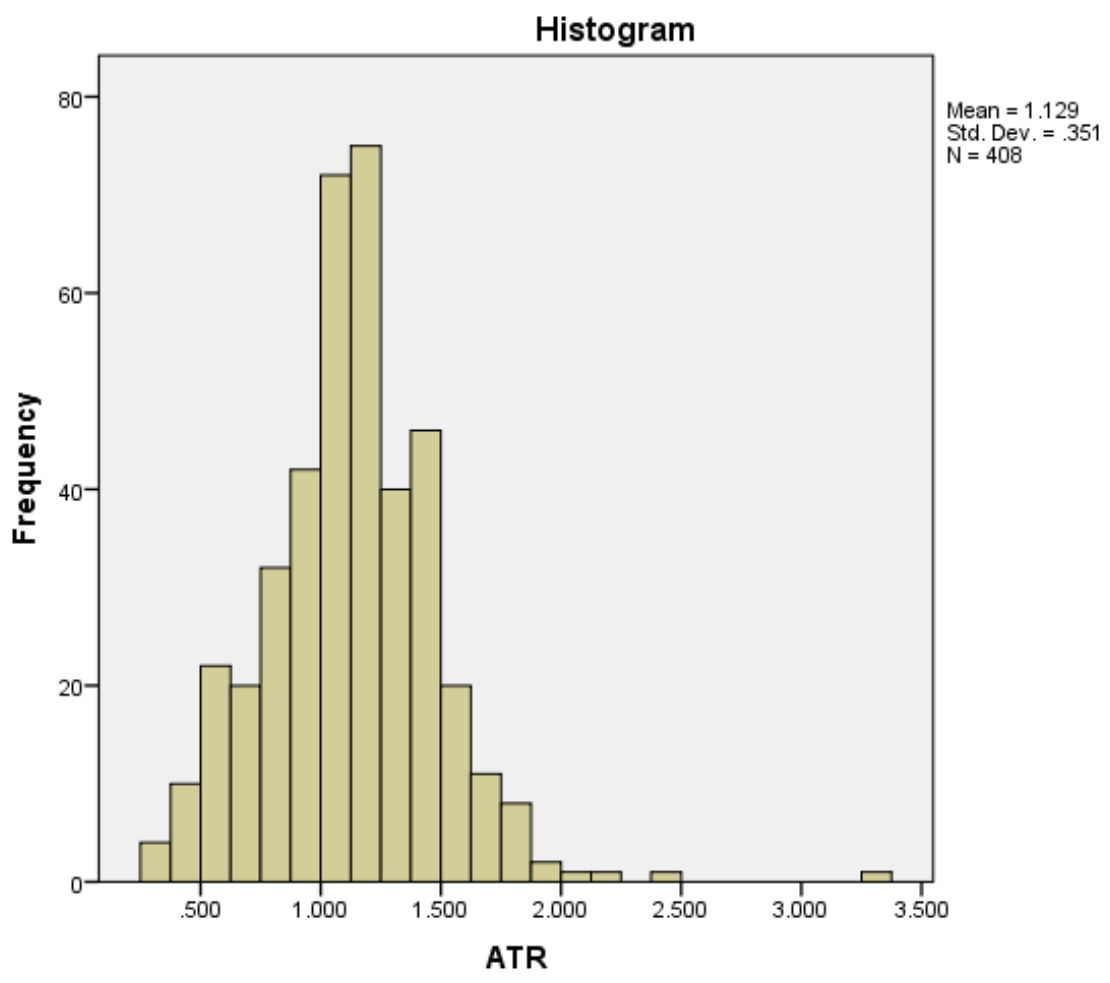


Figure 4: (ATR) Combined Histogram Analysis

Table 6: (ROA) Extreme Value Census Performance

(ROA) Extreme Values				
			County, Ag District	ROA %
Census Year 1997	Highest	1	Cook, Northeast	30.67
		2	Clay, East Southeast	23.2
		3	Lake, Northeast	21.84
		4	Wayne, Southeast	20.88
		5	DuPage, Northeast	20.63
	Lowest	1	Monroe, Southwest	4.97
		2	Union, Southwest	5.08
		3	Rock Island, Northwest	5.18
		4	Peoria, Central	5.51
		5	Carroll, Northwest	5.56
Census Year 2002	Highest	1	DuPage, Northeast	14.49
		2	Cook, Northeast	12.61
		3	Lake, Northeast	9.76
		4	Will, Northeast	5.61
		5	Tazewell, Central	5.23
	Lowest	1	Hardin, Southeast	0.6
		2	White, Southeast	1.22
		3	Randolph, Southwest	1.41
		4	Hamilton, Southeast	1.42
		5	Morgan, West Southwest	1.46
Census Year 2007	Highest	1	DuPage, Northeast	80.74
		2	Cook, Northeast	49.41
		3	Lake, Northeast	15.97
		4	Kane, Northeast	8.54
		5	McHenry, Northeast	8.02
	Lowest	1	Johnson, Southwest	1.9
		2	Gallatin, Southeast	2.08
		3	Morgan, West Southwest	2.51
		4	Jackson, Southwest	2.74
		5	Christian, West Southwest	2.75
Census Year 2012	Highest	1	Cook, Northeast	30.67
		2	Clay, East Southeast	23.2
		3	Lake, Northeast	21.84
		4	Wayne, Southeast	20.88
		5	DuPage, Northeast	20.63
	Lowest	1	Monroe, Southwest	4.97
		2	Union, Southwest	5.08
		3	Rock Island, Northwest	5.18
		4	Peoria, Central	5.51
		5	Carroll, Northwest	5.56

Table 7: (ATR) Extreme Value Census Performance

(ATR) Extreme Values				
			County, Ag District	ATR %
Census Year 1997	Highest	1	DuPage, Northeast	217%
		2	Edgar, East Southeast	196%
		3	Stark, Central	194%
		4	Carroll, Northwest	184%
		5	DeKalb, Northeast	177%
	Lowest	1	Williamson, Southwest	43%
		2	Johnson, Southwest	55%
		3	Jefferson, Southeast	56%
		4	Pope, Southeast	60%
		5	Hardin, Southeast	74%
Census Year 2002	Highest	1	Putnam, Northwest	242%
		2	DuPage, Northeast	212%
		3	Edgar, East Southeast	174%
		4	Cook, Northeast	166%
		5	Clinton, Southwest	160%
	Lowest	1	Perry, Southwest	43%
		2	Williamson, Southwest	45%
		3	Hardin, Southwest	46%
		4	Pope, Southeast	49%
		5	Franklin, Southeast	52%
Census Year 2007	Highest	1	DuPage, Northeast	333%
		2	Putnam, Northwest	181%
		3	Carroll, Northwest	180%
		4	DeKalb, Northeast	175%
		5	Logan, Central	163%
	Lowest	1	Pope, Southeast	29%
		2	Johnson, Southwest	35%
		3	Hardin, Southeast	35%
		4	Williamson, Southwest	49%
		5	Calhoun, West Southwest	60%
Census Year 2012	Highest	1	DeKalb, Northeast	187%
		2	Putnam, Northwest	186%
		3	Knox, West	177%
		4	Carroll, Northwest	168%
		5	Kane, Northeast	166%
	Lowest	1	Johnson, Southwest	30%
		2	Hardin, Southeast	39%
		3	Williamson, Southwest	43%
		4	Crawford, East Southeast	48%
		5	Perry, Southwest	48%

Table 8: (ROA) Census Years Top Performers

<i>Return on Assets (ROA)</i>			
2012	2007	2002	1997
Cook	DuPage	DuPage	Cook
Clay	Cook	Cook	Pope
Lake	Lake	Lake	Stark
DuPage	McHenry	Will	Schuyler
Wayne	Kane	Tazewell	Calhoun

Table 9: (ATR) Census Years Top Performers

<i>Asset Turnover Ratio (ATR)</i>			
2012	2007	2002	1997
DeKalb	DuPage	Putnam	DuPage
Putnam	Putnam	DuPage	Edgar
Knox	Carroll	Edgar	Stark
Carroll	DeKalb	Cook	Carroll
Kane	Logan	Clinton	DeKalb

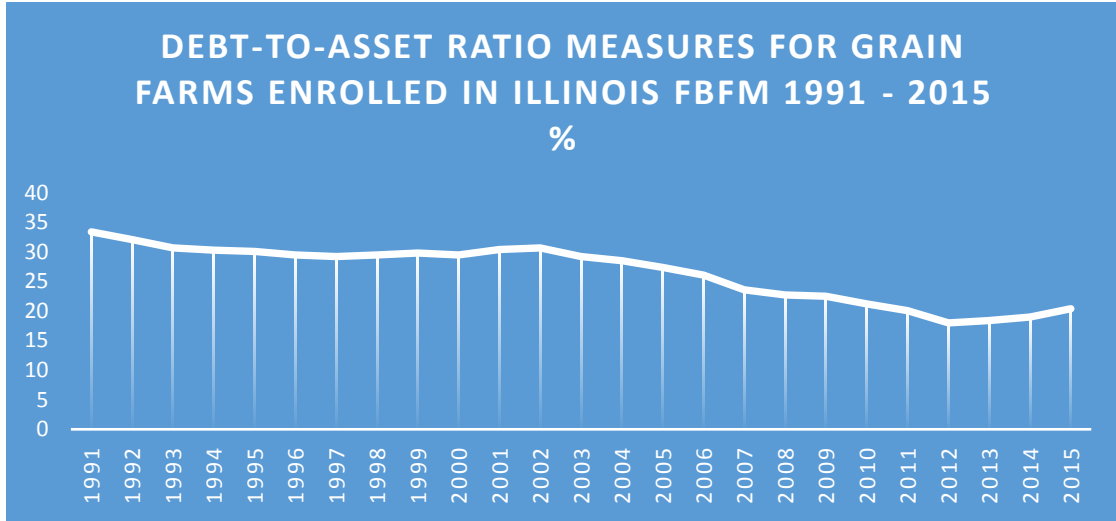


Figure 7: 1991-2015 Debt-to-Asset Ratios in Illinois

Source: Illinois FBFM

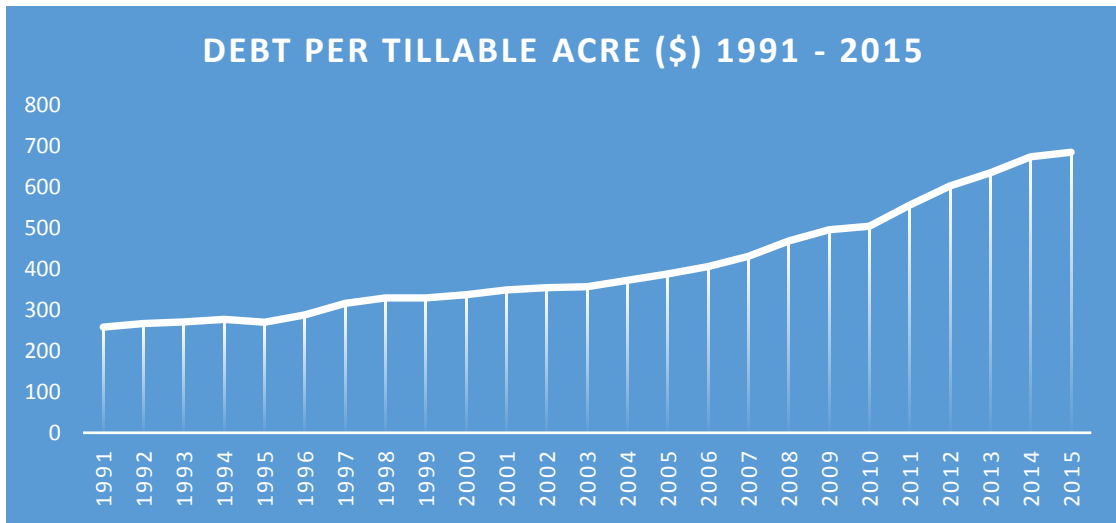


Figure 8: 1991-2015 Debt-per-tillable acre in Illinois

Source: Illinois FBFM

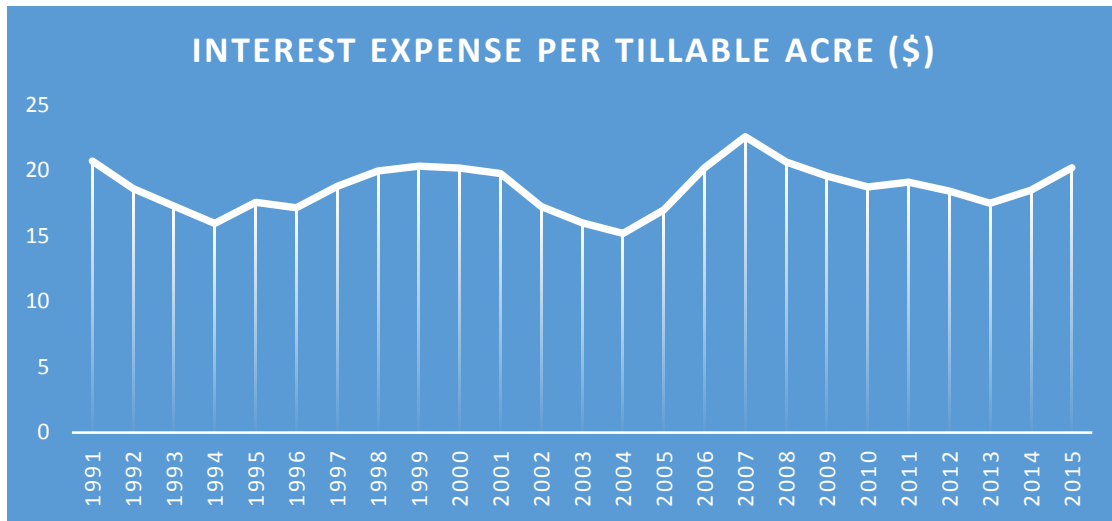


Figure 9: 1991-2015 Interest Expense per tillable acre in Illinois

Source: Illinois FBFM

Additional Figures Represent Marketing Data of Top Commodities Produced in Illinois:
Calendar Year(s) Commodity Price Received in Illinois 1980 – 2016.

Source: Farm Doc

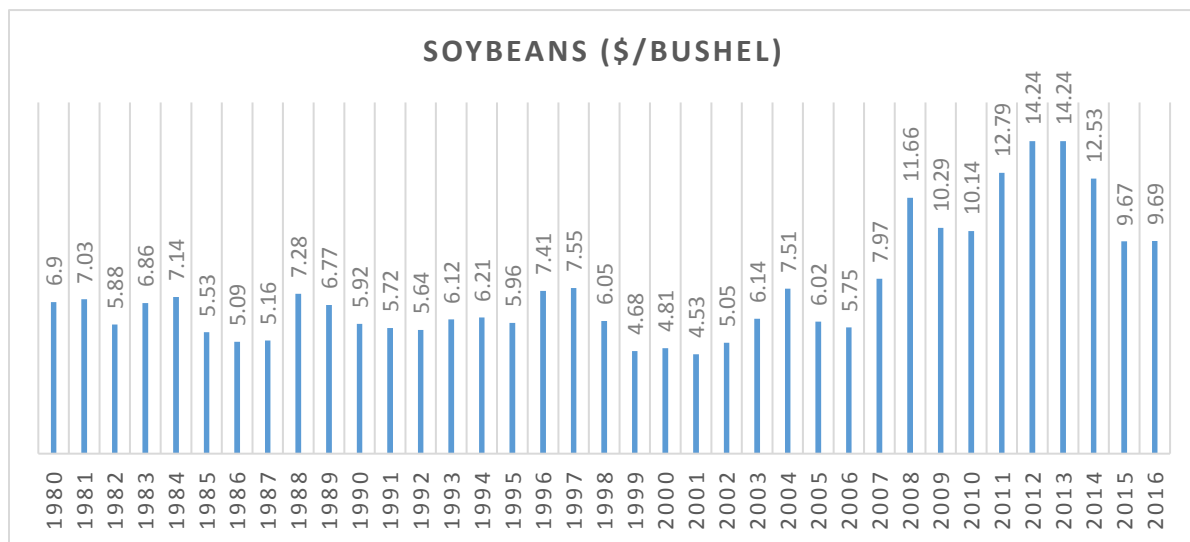


Figure 10: 1980-2016 Soybean price received per bushel in Illinois

Source: Farm Doc

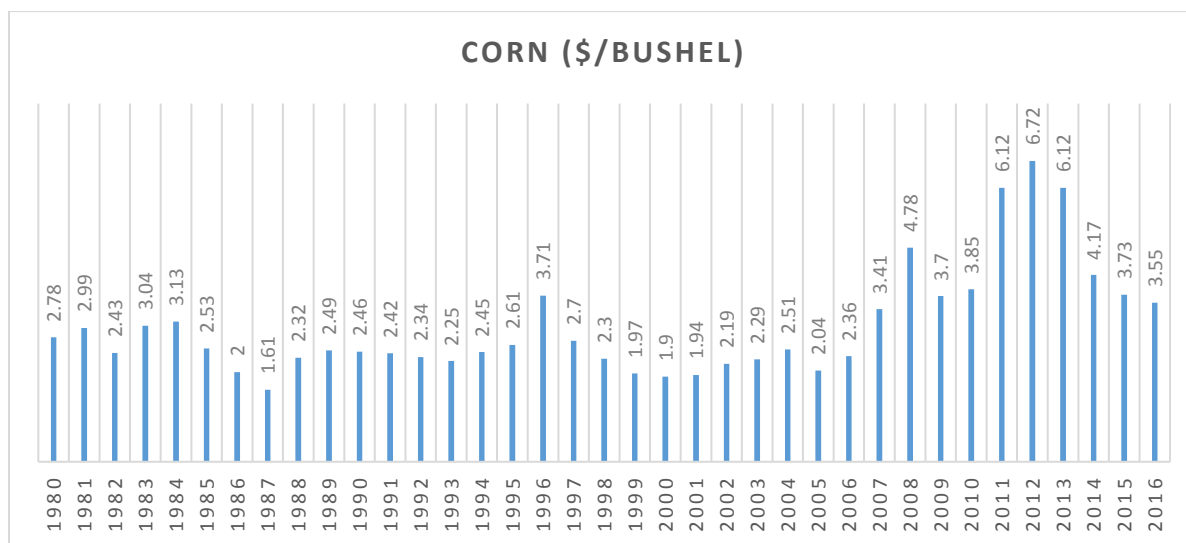


Figure 11: 1980 – 2015 Corn price received per bushel in Illinois

Source: Farm Doc

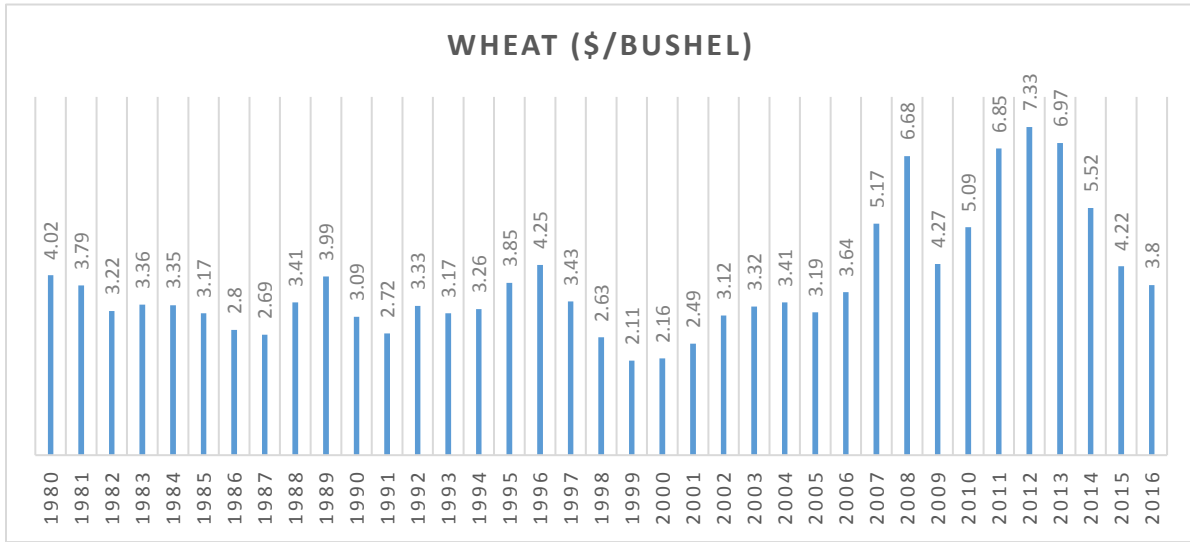


Figure 12: 1980-2016 Wheat price received per bushel in Illinois

Source: Farm Doc

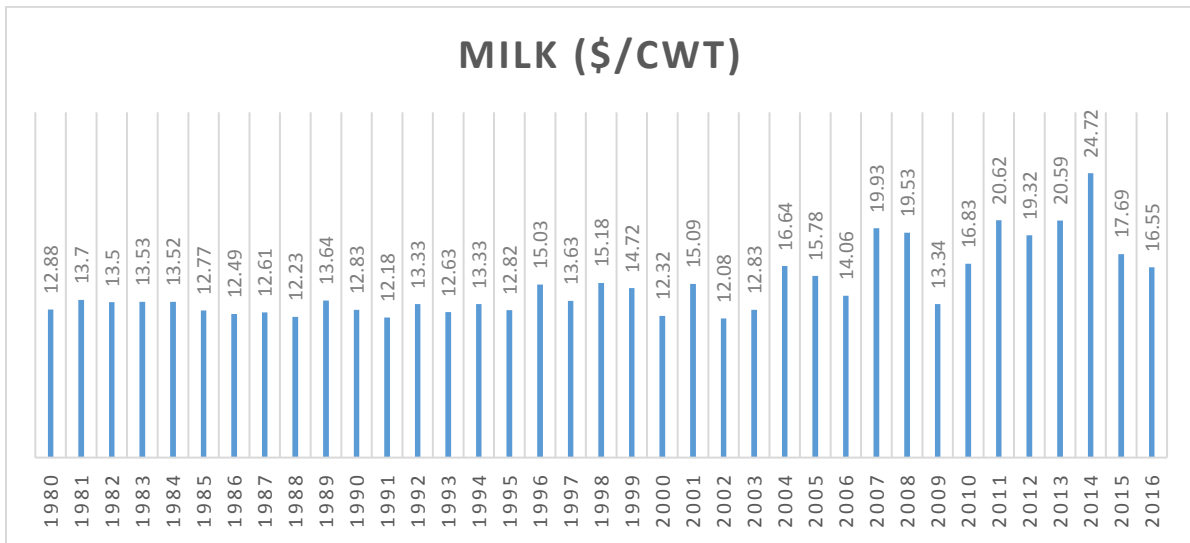


Figure 13: 1980-2016 Milk price received per hundredweight in Illinois

Source: Farm Doc

VITA

Graduate School
Southern Illinois University

Ryan A. Bailey

BaileyRyan100@gmail.com

Southern Illinois University Carbondale
Bachelor of Science Agribusiness Economics, May 2016

Research Paper Title:
Evaluating farm financial performance measures in Illinois

Major Professor: Dr. Jebaraj Asirvatham