Analysis Of Agricultural Policy: Effectiveness Of Crop Insurance As A Safety Net For Representative Peanut Farms In The U.S.

A Dissertation submitted
to the Graduate School
Valdosta State University

in partial fulfillment of requirements
for the degree of

DOCTOR OF PUBLIC ADMINISTRATION

in Public Administration

in the Department of Political Science
of the College of Arts and Sciences

June 2018

Audrey Susan Luke-Morgan

M.S., University of Georgia, 1998
B.B.A., University of Georgia, 1996
A.S., Abraham Baldwin Agricultural College, 1994

This dissertation, "Analysis Of Agricultural Policy: Effectiveness Of Crop Insurance As A Safety Net For Representative Peanut Farms In The U.S.," by Audrey Susan Luke-Morgan, is approved by:

Dissertation Committee Chair

Russell Scarborough, D.P.A

Committee Members

Stanley Fletcher, Ph.D.
Professor Emeritus of Agricultural and Applied Economics

Timothy Marshall, Ph.D.
Former Dean and Professor of Animal Science

Dean of the Graduate School

James T. LaPlant, Ph.D.
Professor of Political Science

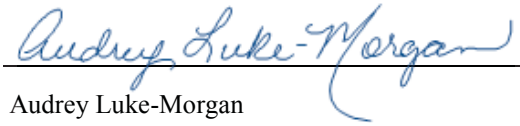
Defense Date

June 13, 2018

FAIR USE

DUPLICATION

I authorize the Head of Interlibrary Loan or the Head of Archives at the Odum Library at Valdosta State University to arrange for duplication of this dissertation for educational or scholarly purposes when so requested by a library user. The duplication shall be at the user's expense.

Signature 

Audrey Luke-Morgan

I refuse permission for this dissertation to be duplicated in whole or in part.

Signature _____

ABSTRACT

Agriculture touches everyone's life. Agriculture, however, is not an industry without risks. Risks prevail for both farm families and consumers. The federal government intervenes through agricultural policy to alleviate these risks. Policymakers typically focus on providing agricultural assistance to minimize price, market or production risk for agricultural producers. A variety of programs devised by Congress and operated by the U.S. Department of Agriculture (USDA) support farm income and help farmers and ranchers manage production or price risks. The foundation of agricultural programs is government intervention intended to provide a farm safety net to agricultural producers. These programs aid in managing the food supply while stabilizing agricultural infrastructure.

The 2014 Farm Act represents a shift in the direction of agricultural policy toward risk management policies, which offer a variety of programs for producers. Through multiple coverage options, these programs aim to raise producers' revenues, on average, and reduce volatility. Specifically, federal crop insurance has expanded over the past two decades and is considered the most extensive component of the safety net provided by the current farm bill given the availability of policies for a considerable portion of U.S. agriculture. With federal crop insurance policies, producers pay a portion of the premium with the remainder subsidized by the federal government. The relative importance of federal crop insurance for a specific commodity or geographic region may be debatable. This study investigates the effectiveness of crop insurance as a safety net for U.S. peanut producers using case study analysis of representative peanut farms. Specifically, the

financial stability of these farms is considered to test for correlations between crop insurance utilization and potential crop insurance indemnity payments.

Crop insurance selection for a peanut enterprise is multi-faceted. Decisions must be made on policy type for a range of coverage levels and pricing options. This study considered a portion of those options. The level of effectiveness varied within each of the variables. In general, the yield protection model generated a greater level of effectiveness than the revenue protection or catastrophic policies but was effective on less than one-third of the total observations. A higher coverage level resulted in higher levels of effectiveness, but even at the maximum level tested, 75 percent coverage, less than three out of five of the observations were deemed effective.

Differences in effectiveness were seen across regions and cultivars, with the maximum effectiveness for any of these only at one-third of the observations. When considering the effectiveness by farm size, farms with peanut acreage in the 750 to 999 range showed 60 percent positive observations. Finally, when looking at individual farms, crop insurance was effective for all crop insurance options analyzed for five percent of the farms. Ten percent of the farms had no positive observations regardless of coverage type or level. These results challenge the effectiveness of crop insurance as a safety net for peanut producers.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

This dissertation reflects a compilation of my professional career path thus far. It allowed me to gain a greater appreciation for the link between my passion, agriculture, and the public administration discipline. The completion of this journey would not have been possible without the support, encouragement, dedication, and mentorship of so many along the way. I would like to acknowledge a few of the people that have helped to make this accomplishment a reality. First, my sincerest gratitude to my committee members:

Dr. Russell Scarborough (Chair), thank you for your willingness to think outside of the box and take on a topic that was beyond the normal scope of public administration topics. I appreciate your guidance along this process.

Dr. Stanley Fletcher, thank you for the opportunity to bring my career full circle. I appreciate your mentorship from being my first boss when I was fresh out of my Master's program to serving as an integral part of my doctoral committee two decades later. I appreciate the opportunity to focus on the issues and opportunities facing the peanut industry.

Dr. Tim Marshall, thank you for your leadership, encouragement, and mentorship over the past 6½ years. Words can't adequately reflect the impact you have had on me. You have seen me through some of the roughest days of my life and never wavered in your faith and trust of my ability to fulfill my duties and responsibilities. I get to share my passion on a daily basis with the next generation of agriculturists because you hired me as an ABAC SANR faculty member. Your passion and compassion for students and agriculture are an inspiration. Thank you for leading by example!

Next, Dr. Gerald Merwin, thank you for your patience and guidance along each step of the way. This journey would not have been possible without the leadership you bring to the Public Administration program.

To my peers, coworkers, and friends, whom there are too many to list, thank you for the words of encouragement and support over the past three years. Your confidence in me is worth more than you will ever know.

To each and every one of my students that offered a word of inspiration or brought me a pick-me-up, whether it was a note, a Bible verse, a flower, candy, or a soft drink, on the days I was feeling overwhelmed, THANK YOU! God sent each one of you just when I needed it.

To our dance family, thank you for the love and support given to Meredith and me. The dance studio is Meredith's home away from home. The love, friendship, and mentorship shared in those four pink walls are immeasurable.

To my mama and daddy, thank you for always believing in me, instilling your work ethic, and sharing your passion for agriculture. Over the past three years, I knew I could always count on you to pick up the pieces of the things I left undone. Thank you for always having my back! Your love and support have helped mold me into the individual I am today. I love and appreciate you both!

Meredith, thank you for being such a wonderful daughter. You have a heart of gold and give me love and support when I need it most. You are my world.

Finally, I give all praise and glory to my Lord and Savior, Jesus Christ. It was He that carried me through each step of this journey. I am beyond grateful and blessed.

DEDICATION

This dissertation is dedicated to my daughter, Meredith Susan Morgan, and my late husband, Craig Allen Morgan.

Meredith, you remind me daily what living life is all about! I thank you for your love, support, and, especially, patience over the past three years. There were far too many times I had to say that we couldn't do something because of my homework, but you always understood and didn't put up a fight. I am so very proud of the young lady you have become. I can't wait to see all that God has in store for you. I love you (and all your "Craigisms") to the moon and back! Always and forever. XOXOXO

Craig, although you will never read this, the love we shared was my strength on so many days during this journey. It was not in my plans for you to leave this place for your heavenly home on August 7, 2013, but it was God's will. I intended for you to be by my side until our old age. Throughout this doctoral journey, one of our last conversations has served as my continual reminder to keep pushing forward. For you, Dear, I am now Dr. Morgan. You will forever be the love of my life.

Chapter I

INTRODUCTION

Agriculture touches everyone's life. Whether as a direct or indirect participant in agricultural production or as a consumer of agricultural goods and services, every individual partakes of something agriculture related. While the importance of agriculture is evident, it is not an industry without risks. Risks prevail for both farm families and consumers. The federal government intervenes through agricultural policy to alleviate these risks. Policymakers typically focus on providing agricultural assistance to minimize price, market or production risk for agricultural producers. Practically all industrialized nations subsidize agriculture to some extent.

Agricultural production is a capital-intensive industry that faces various inherent risks with often high levels of volatility in market prices and a variety of production risk factors. One highly debated topic related to agriculture is agricultural programs or subsidies. "Subsidies" can refer to a range of policy options often targeted at mitigating these risks. A variety of programs, devised by Congress and operated by the USDA, support farm income and help farmers and ranchers manage production or price risks. Although the tools and implementation processes may vary, the foundation of agricultural programs is government intervention intended to provide a farm safety net to agricultural producers.

U.S. Agricultural Production and Agricultural Policy: Current Situation

While farmers and their families comprised almost one-fourth of the U.S. population almost a century ago, today they represent only one percent of the population. This decline in the number of farms, coupled with a relatively flat trend in acres of farmland, has led to an expansion in the size of an average farm operation. The most recent 2012 Census of Agriculture data show the number of farms has stabilized around 2.1 million with an average size of 434 acres. More than half of farm entities are considered small, having less than $10,000 in gross annual sales of farm products, and contribute a relatively small portion to the domestic food supply while more than half of principal operators had a primary occupation other than farming. Many of the remaining agricultural producers have expanded in size to gain efficiencies in operations from economies of scale while also diversifying their operations to help minimize risks associated with agricultural markets and production conditions. Critics of agricultural programs often label large farm operations as corporate or industrial agricultural production and cite cronyism as a challenge within the political arena. Additionally, due to a variety of factors, including cultural practices, commodity choice, regional and climatic impacts, to name a few, there is great variability in the size and diversity of farms across the U.S.

These factors can impact the participation of producers in federal farm programs and the effectiveness, efficiency, and equity of those programs to a farm operation. They also play a role when analyzing the effectiveness of a taxpayer-funded safety net in the form of agricultural programs. The 2014 Farm Act represents a shift in the direction of risk management policies, offering a variety of programs for producers that can be used

in their overall risk management strategy as potential supplements to market-based instruments for addressing farm risk. Meanwhile, the demand for food continues to grow in relation to the expanding world population. Agricultural policy aids in managing the food supply while stabilizing agricultural infrastructure. The current farm bill has not only provided for domestically produced goods but also promotes agricultural trade. These benefits are passed along to the consumer through food availability.

Purpose of Policy Analysis: Planning for 2018 Farm Bill

With an estimated world population of 9 billion people by 2050, agriculture remains a relevant topic worldwide, although, fluctuating economic and political environments have fostered significant changes in the focus of farm bill legislation, agricultural programs, and safety net provisions. Federal crop insurance has expanded over the past two decades and is considered to be the most extensive component of the safety net provided by the current farm bill given the availability of policies for a considerable portion of U.S. agriculture. Currently, federal crop insurance's scope is broad with policies available for more than 130 commodities including grains, fruits and vegetables, pasture, nursery crops, and livestock. Producers pay a portion of the premium with the remainder subsidized by the federal government.

The structural changes to the farm safety net brought about by the 2014 farm bill highlighted the potential for cash flow problems on operations as the timing of program payments shifted. Under the prior farm bill, at least a portion of payments could be received in advance. However, under current legislation payments are delayed until after the crop year. As a result, many operations required additional operating loans or were deemed a higher financial risk for lenders. In turn, lenders may require increased levels

of crop insurance to secure necessary operating loans. Furthermore, as drafting of the 2018 farm bill continues, agricultural producers are facing low commodity prices and thin markets, which may further hinder the economic viability of agricultural production. This market instability can then increase the reliance on the safety net provided by agricultural programs. The increased reliance on federal crop insurance warrants an investigation into the potential financial returns relative to the cost of crop insurance for agricultural producers.

Problem Statement

Current political debate brings forth both proponents and critics of not only the necessity but also the effectiveness of using federal taxpayer dollars to provide a safety net for agricultural producers. Critics point to the current availability of risk management tools in a market economy and the inequity of providing a safety net to agriculture production while other industries do not receive the same benefits (Bakst, 2016). Proponents point to not only the potential instability of agricultural revenue but also the necessity of a secure food and fiber source for our nation and a growing world population. The underlying question of whether enacted farm policies provide an effective safety net to stabilize producer income while ensuring a safe and affordable food source for consumers remains. Moreover, the efficacy of government spending for agricultural programs will continue to receive heightened attention under the current political scrutiny of government spending. Specifically, this study will use case study analysis to explore the relationship between crop insurance for peanuts and the financial stability of peanut farms in the U.S.

Project Selection

This analysis will utilize an unbiased approach to investigate the effectiveness of crop insurance as a component of the safety net for agricultural producers. Specifically, utilizing a case study approach, representative U.S. peanut farms will be analyzed to determine if crop insurance correlates to the financial stability of domestic agricultural peanut producers. Secondary data from the USDA, coupled with the National Center for Peanut Competitiveness (NCPC) representative peanut farm data, will be utilized to analyze the effectiveness of crop insurance as a safety net. Crop insurance premiums, indemnity payments, and net returns will be compared across various farm characteristics to determine the impact on each. Evaluative criteria will include indicators of financial stability and economic viability for each of the representative peanut farms. Additionally, national data for similar criteria will be analyzed to assess the effectiveness over time for various regions and commodities.

Significance of the Study: Effectiveness as a Policy Analysis Criterion

Price and production volatility coupled with the "thin" nature of agricultural markets are examples of market failure characteristics in the agricultural industry. The current level of concentration within the agricultural economy is further exacerbating the market volatility issue. As markets for both inputs and outputs become thinner, both agricultural producers and consumers face imperfect markets. Federal subsidies paid directly to agricultural producers are one example of government intervention to correct market failures. Current government interventions, authorized in the 2014 farm legislation, to correct market failure in the agricultural industry shifted focus to crop insurance in lieu of direct or decoupled payments. Crop insurance is touted as a risk

management tool available to provide one component of a safety net for agricultural producers. This study seeks to objectively analyze the impact of federal crop insurance on U.S. peanut farms. This study may further provide valuable insight into not only the economic health and well-being of one sector of the agricultural industry but also current and future political analysis and debate in drafting agricultural policy. Additionally, future research could encompass additional agricultural commodities, regions, or risk management tools.

Summary

While the need for agriculture remains constant, federal intervention to stabilize the industry over the last eight decades has not as evidenced by changes in agricultural policy and the form and nature of agricultural programs. The agricultural safety net will likely continue to evolve with the drafting of each new farm bill. Proactive policy analysis must remain a primary focus for all stakeholders involved. The following analysis will take a proactive approach to consider the impact of federal crop insurance on providing an effective safety net U.S. peanut farms.

The organization of the remaining chapters is as follows. Chapter 2 provides a review of the literature and discusses in detail the importance of agriculture, the history and evolution of agricultural policy, and the rationale for current policy initiatives. Chapter 3 discusses the methods used to investigate the effectiveness of crop insurance as a safety net for U.S. peanut producers. It details study participants, data sources, study measures, and statistical analyses. Chapter 4 discusses the study results and an analysis of the findings. In conclusion, Chapter 5 provides limitations of the study, study implications, and suggestions for future study.

Chapter II

REVIEW OF LITERATURE

Problem Statement and Overview

The Agricultural Act of 2014 provides authorization for services and programs that impact every American as well as billions around the globe. The legislation expands upon economic gains in rural America while providing program reform and billions in savings for the taxpayer. Among the changes from previous legislation are reforms in the farm safety net provided for agricultural producers. First, the Direct and Counter-Cyclical Program (DCP) and the Average Crop Revenue Election program were repealed. Direct payments, a system that paid producers regardless of whether they incurred losses, were eliminated. Under the 2014 legislation, two new programs, Price Loss Coverage (PLC) and Agricultural Risk Coverage (ARC) were established, cotton was not eligible for inclusion in these new programs, and producers had to choose one of the options. The repeal of these programs shifted focus to federal crop insurance to serve a primary function as the safety net for agricultural producers. Specifically, Titles XI and XII of the 2014 Farm Act covered crop insurance. New and continuing insurance products were authorized to protect agricultural producers against losses resulting from price and yield risks.

The enacted changes coupled with thin markets in the current agricultural economy provide a dynamic environment that may augment producers' reliance on a farm safety net to provide financial stability. Accordingly, the need to investigate

whether the current farm policies provide an effective safety net to stabilize producer income while ensuring a safe and affordable food source for consumers remains. The normative economic prescription for farm policy coupled with the positive political-economic analysis related to agricultural policy warrants discussion (Innes, 2003).

To analyze the effectiveness of agricultural policy as a component of the farm safety net, one must first understand the importance of agriculture, the history and evolution of agricultural policy, the current situation of the agricultural industry, and a review of federal crop insurance past to present. Furthermore, a brief examination of macroeconomic farm financial factors is warranted. This chapter seeks to provide such an overview beginning with a discussion of the relevance of agriculture to not only individuals but also the U.S. economy.

Importance of Agriculture

In 2015 agriculture and related industries contributed 5.5 percent to the U.S. gross domestic product (GDP), while accounting for 11.1 percent of U.S. employment (Kassel et al., 2017). Meanwhile, food purchases ranked third, only to housing and transportation, in U.S. household consumer expenditures in 2015 (Kuhns, 2017). While the importance of agriculture is evident, it is not an industry without risks. Risks prevail for both farm families and consumers. The federal government intervenes through agricultural policy to alleviate these risks.

As a capital-intensive industry, agricultural production faces various inherent risks with often high levels of volatility in market prices and a variety of production risk factors. Agricultural subsidies, which can refer to a range of policy options targeted at mitigating these risks, remain a highly debated topic among not only policymakers,

citizens, and various interest groups but also geographic regions and commodity groups. A variety of programs devised by Congress and operated by the USDA support farm income and help farmers and ranchers manage production or price risks. Although the tools and implementation processes may vary, the foundation of agricultural programs is government intervention intended to provide a farm safety net to agricultural producers. The three main components of the farm safety net under the 2014 farm bill include permanently authorized federal crop insurance, farm commodity price and income support programs for crop years 2014-2018, and permanently authorized agricultural disaster programs with emergency loans and USDA discretionary programs providing additional support (Shields, 2015). Proponents of agricultural subsidized programs point to the various risks faced by agricultural producers, including human and personal risk, institutional risk, financial risk, price or market risk, and production risk, to justify government intervention in agricultural markets. Furthermore, these risks impact not only producers but also consumers who rely on the availability of a safe, affordable, and reliable food source as crop disasters or imperfect market conditions can disrupt food availability and retail prices.

Policymakers typically focus on providing agricultural assistance to minimize price or market risk and production risk for agricultural producers. Practically all industrialized nations subsidize agriculture to some extent. In 2012 agricultural subsidies were estimated at $486 billion in the top 21 food producing countries worldwide with Asian countries spending more than all other countries combined (Potter, 2014). Specifically, in the U.S. agricultural, or farm, subsidies are payments or other support extended by the federal government to certain agricultural producers or agribusinesses.

As shown in Figure 1, federal government direct farm program payments have ranged from a high of more than $24 billion to a low of $9.7 billion when considering the years 2000 to present (USDA ERS Farm Income and Wealth). The most current U.S. farm bill legislation, passed in 2014, was projected to have an average annual cost of $18 billion for mandatory spending including commodity titles, crop insurance, and conservation over the life of the bill based on Congressional Budget Office projections at the time (Congressional Budget Office, 2014). The actual cost of the farm safety net provided to agricultural producers may, in fact, be higher in certain years and lower in others given the volatility in commodity prices since the legislation passed.

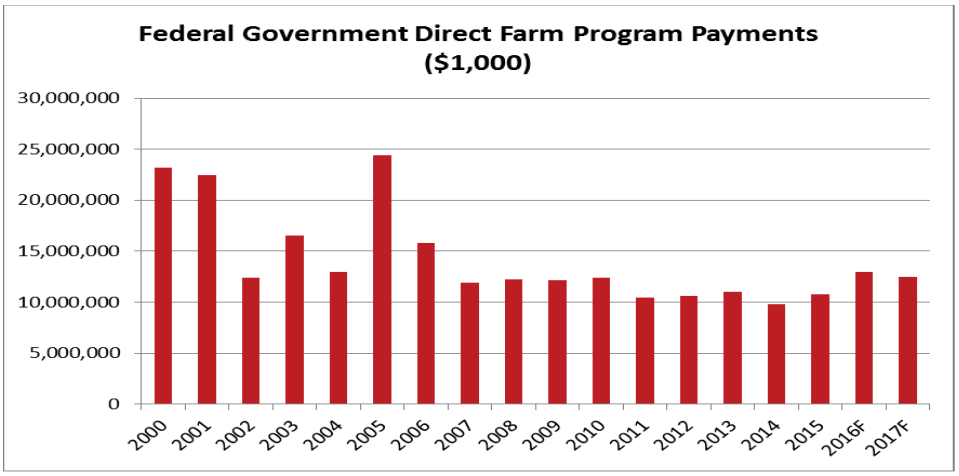


Figure 1. Direct Farm Program Payments
Source: USDA ERS Farm Income and Wealth Statistics

Historical Beginnings of U.S. Farm Programs

Federal support for agriculture in the U.S. can be traced back to the late 1800s with the passage of the Morrill and Hatch Acts which, respectively, established land-grant colleges and funded agricultural research. In 1914 the Smith-Lever Act furthered federal support of agriculture by funding agricultural education. The Federal Farm Loan Act created cooperative land banks in 1916 to provide loans to farmers and to serve as the

foundation for the current Farm Credit System which recently celebrated its 100th birthday. Though federal support for agriculture was strong, it was not until 1929 that direct subsidy support to producers commenced when the Agricultural Marketing Act created the Federal Farm Board. These early efforts at direct producer subsidies, however, were not met with success. As the board raised commodity prices, inventories stockpiled, and in 1933 the program was abolished after a cost of $500 million (Edwards, 2016).

Many farm programs were enacted during the Great Depression to provide economic stability to farmers while ensuring a domestic food supply for Americans at a time in which farmers, along with their families, comprised about one-fourth of the nation's population (White, 2016). The Agricultural Adjustment Act of 1933 and other New Deal programs included various policy tools to mitigate the risk to agriculture including commodity price supports, production controls, and trade protectionism measures such as marketing orders and import barriers, and crop insurance (Edwards, 2016). Over the next several decades, various modifications to farm policy were enacted. As the political pendulum has swung, so too have efforts to reduce and expand the agricultural producer safety net. Shifts have seen a push toward pro-market efforts with the elimination of quotas back to expansions of direct subsidies to stabilize market risks.

More than eight decades after the Agricultural Adjustment Act, agricultural subsidies, although in a different format, still exist with an average cost to the U.S. government under the current legislation projected to be around $20 billion per year, according to the Congressional Budget Office (Charles, 2016). Opponents frequently target farm subsidies as a wasteful use of taxpayer dollars that promotes overproduction

while discouraging innovation (Edwards, 2016). Meanwhile, proponents point to government programs as an aid to keep farms profitable and agriculture infrastructure stable during times of market volatility and production uncertainty to help ensure a safe and affordable food supply (Leadership Report, 2015).

Characteristics of U.S. Agricultural Production: Current Situation

While farmers and their families comprised almost one-fourth of the U.S. population almost a century ago, today they represent only one percent of the population. As shown in Table 1, the number of farms has declined from a peak of 6.8 million in 1935 to around 2 million in recent decades as agricultural productivity has increased and non-farm job opportunities have expanded. This decline in the number of farms, coupled with a relatively flat trend in acres of farmland, has led to an expansion in the size of an average farm operation.

Table 1. Number of U.S. Farms, 1982-2012 (Millions) and Average Farm Size (acres).

Year	Number of Farms (Millions)	Average Farm Size (Acres)
1982	2.48	440
1987	2.34	462
1992	2.18	491
1997	2.22	431
2002	2.13	441
2007	2.02	418
2012	2.11	434

Source: USDA NASS, 2012 Census of Agriculture

The 2012 Census of Agriculture data show the number of farms has stabilized around 2.1 million with an average size of 434 acres. Many of the remaining agricultural producers have expanded in size to gain efficiencies in operations from economies of

scale while also often diversifying their operations to help minimize risks associated with agricultural markets and production conditions. Critics of agricultural programs often label large farm operations as corporate or industrial agricultural production and cite cronyism as a challenge within the political arena. It is appropriate to note that while the average size of farm operations has grown and instances of abuse (as with any program) may exist, farm operations are still primarily family-owned operations. Additionally, due to a variety of factors including cultural practices, commodity choice, regional and climatic impacts, there is great variability in the size and diversity of farms across the U.S. These factors can impact the participation of producers in federal farm programs and the effectiveness, efficiency, and equity of the programs.

Other interesting characteristics of the current U.S. agricultural structure relate to the number of small farms and primary income source of principal operators. Over 56 percent of farms are considered small, with annual sales of less than $10,000, and contribute a relatively small portion to the domestic food supply while more than 52 percent of principal operators had a primary occupation other than farming (USDA NASS). Each of these characteristics can play a role when analyzing the effectiveness of a taxpayer-funded safety net in the form of agricultural programs. Meanwhile, the demand for food continues to grow with the expanding world population. Agricultural programs aid in managing the food supply while stabilizing agricultural infrastructure. The current farm bill has not only provided for domestically produced goods but also promotes agricultural trade. These benefits are passed along to the consumer through food availability.

A USDA report further expounds that the current legislation provides an opportunity for producers to layer programs to mitigate the impacts from downside risks related to market and weather volatility:

> Agricultural producers face significant uncertainties in production and prices that lead to unpredictable swings in farm returns. The 2014 Farm Act represents a shift in the direction of risk management policies, offering a variety of programs for producers. Through multiple coverage options, these programs raise producers' revenues on average and reduce volatility. As such, the programs can be used by producers in their overall risk management strategy as potential supplements to market-based instruments for addressing farm risk. (Hungerford et al., 2017)

Current government interventions, authorized in the 2014 farm legislation, to correct market failure in the agricultural industry shifted focus to crop insurance. Crop insurance is touted as a risk management tool available to provide one component of a safety net for agricultural producers. Crop insurance is available for more than 130 crops and is frequently purchased by U.S. peanut producers as one component of their risk management strategies.

Evolution of Peanut Policy

As the focus narrows from agriculture in general to specifically U.S. peanut farms, a review of recent policy changes as related to the peanut industry and the establishment of representative peanut farms is warranted. Agricultural policy has changed significantly over the past eight decades, especially for the peanut industry. The 2002 farm bill brought about significant change to the peanut industry as historical quota

allotments were “bought-out” and the industry moved more toward a market system. Former quota holders were suddenly faced with a lower price per ton and increased competition while non-quota holders had the opportunity to produce peanuts at a price higher than the historic additional market price. International markets garnered new awareness by U.S. peanut producers. Given the transition in the industry, the University of Georgia National Center for Peanut Competitiveness (NCPC) worked closely with Texas A & M Agricultural and Food Policy Center (AFPC) to establish representative peanut farms across the U.S. to aid in future peanut policy analysis.

The AFPC has established and maintained representative farms for various agricultural commodities, except peanuts, since the 1980s. These representative farms continue to be the primary vehicle used by the U.S. House Committee on Agriculture and the U.S. Senate Committee on Agriculture, Nutrition, and Forestry to analyze agricultural policy. The NCPC established and maintains the only representative peanut farm database, which includes 20 farms representing each of the major U.S. peanut production areas. The representative peanut farm database has been used for every farm bill since 2002 to analyze the impact of policy options and to provide input to U.S. ag. committees during policy development. This database continues to be maintained by the NCPC. Data collected in recent updates of these farms captured not only current characteristics of each farm but also factors affecting management decisions, production practices, yields, revenues, and expenses. Data specifically relevant to this study include information related to crop insurance coverage type, levels and premiums, production costs, and updated yield information for each representative farm.

Federal Crop Insurance from Past to Present

To thoroughly analyze the effectiveness of federal crop insurance as a safety net for domestic peanut producers, an examination of not only current agricultural policy but also a review of the evolution of that policy is warranted. Federal crop insurance was first authorized by Congress in the 1930s, along with other federal initiatives, to help agriculture recover from the effects of both the Great Depression and the Dust Bowl. The legislation authorizing "the federal crop insurance program states that the purpose of the program is to promote the national welfare by improving the economic stability of agriculture" (Morris 2015, 6). To administer the program, the Federal Crop Insurance Corporation (FCIC) was established in 1938 to oversee the program which began as an experiment and remained as such for almost five decades. Originally, crop insurance was limited with a primary focus on major crops in the main producing areas. The landscape changed with the passage of the Federal Crop Insurance Act of 1980 as the program expanded to include many more crops and regions and also "authorized a subsidy equal to 30 percent of the crop insurance premium limited to the dollar amount at 65-percent coverage" to encourage producer participation (USDA RMA History of the Crop Insurance Program).

This shift in agricultural policy was, at least partially, driven by the desire to shift government intervention in agricultural production to an *ex ante* rather than *ex post* approach. In the two decades preceding the Federal Crop Insurance Act of 1980, the experimental crop insurance program competed with free disaster coverage and producers received compensation for losses resulting from both prevented planting and yield. While the 1980 Act did increase producers' participation in the federal crop insurance

program, it did not reach the participation levels that Congress had anticipated. Adverse weather conditions led to a series of ad hoc disaster bills between 1988 and 1994 with Congress funding agricultural emergency relief measures to help stabilize the farm economy (Dismukes and Coble, 2006). These ad hoc disaster bills were further viewed as lessening the importance of and producers' reliance on the federal crop insurance program. In efforts to curtail the ad hoc *ex ante* aid, lawmakers sought to promote increased producer participation in federal crop insurance programs which led to the enactment of the Federal Crop Insurance Reform Act of 1994 and the Agricultural Risk Protection Act of 2000 (Innes, 2003).

To increase participation and shift a larger portion of the risk management burden to agricultural producers, the 1994 Act mandated producer participation in the crop insurance program to be eligible for other federal agricultural safety net provisions. With this change came the creation of catastrophic (CAT) coverage, which compensated producers for losses exceeding 50 percent of an average yield paid at 60 percent of the price established for the crop for the year. The premiums for CAT coverage were subsidized, and producers only paid a fee of $50 per crop per county to insure their crops. In 1996 the mandatory participation requirement was repealed, and the Risk Management Agency (RMA) was established to administer FCIC programs as well as other risk management and education programs to help support U.S. agriculture. The efforts of lawmakers to entice agricultural producers to participate in the expanded crop insurance program were not without merit. With each successive act, crop insurance participation increased. After the passage of the 1994 Act, participation increased significantly with more than 180 million acres of farmland, roughly two-thirds of the nation's total planted

acres of field crops, insured under the program in 1998 (USDA RMA History of the Crop Insurance Program).

The turn of the century brought additional changes to the federal crop insurance program that remain in effect today. These changes greatly expanded the role of private sector entities while also increasing premium subsidies. The private entities can participate in conducting research and developing new insurance products while also employing expanded contracting and partnering authority. The change brought forth a public-private partnership to administer the federal crop insurance program with the public FCIC's mission being to encourage the sale of crop insurance, through the licensed private agents and brokers, while also providing reinsurance or subsidies to approved commercial insurers of agricultural commodities through FCIC approved plans. For almost two decades, the private sector's role has been to sell and service all Multiple Peril Crop Insurance (MPCI) authorized under the Federal Crop Insurance Act (USDA RMA History of the Crop Insurance Program).

While the tools and program may have changed, the overall mission remains intact as evidenced by RMA's mission statement which poises the agency to "provide risk-management tools, such as crop insurance, to strengthen the economic stability of agricultural producers and rural communities" (Morris 2015, 6). Further, the RMA's strategic plan set forth a goal for 2011 to 2015 for the federal crop insurance program to provide a broad-based financial safety net for producers by continuing to expand participation, ensuring actuarially sound products, and safeguarding the integrity of the program, while being responsible stewards of taxpayer dollars with transparency. The Agricultural Act of 2014 further strengthened this mission by providing more risk

management options for farmers and ranchers by making crop insurance more affordable for beginning farmers. It also provided avenues to expand farm safety net options for organic producers and specialty crop producers.

Participation in Federal Crop Insurance Programs

Producer participation in federal crop insurance has varied over time with individual participation dependent upon a host of factors. Policy debate in the late 1980s pointed to concern about the effectiveness of the Multiple Peril Crop Insurance Program as the primary means of federal agricultural disaster assistance (Vandeveer and Loehman, 1994). As a result, changes were implemented to enhance producer participation while also improving performance. Regardless, concerns over adverse selection, moral hazard, low coverage, and inadequate premium setting methods have received considerable attention in agricultural economics literature. A challenge in the agricultural policy debate of finding a balance between the desire of government officials to reduce costs, the desire of farm state members of Congress to deliver for their constituents, and the desire of producers to maximize protection for the risks inherent to agricultural production transcends the timeline of federal aid to agriculture.

Under current legislation and farm programs, agricultural producers can purchase a policy for an insurable crop at a selected coverage level. As the coverage level increases, so too does the premium. Premium subsidies alter the price of crop insurance and, likely, the demand for the product as a risk management tool. An Economic Research Service (ERS) study explored federal crop insurance usage and how demand shifts with changes in the price of crop insurance. Results suggest that as premium subsidies increased, farmers selected higher levels of coverage while maintaining the

same number of acres enrolled (O'Donoghue, 2014). One concern as subsidy levels increase to encourage participation is the anticipated increase in the cost to the federal government. A small increase in the subsidy rate can lead to relatively large increases in the cost to the government. Dependent upon political will, changing the level of subsidies could be one means of changing the demand for federal crop insurance or altering budget expenditures (O'Donoghue, 2014).

Mitchell et al. (2012) identified factors that significantly influence farmers' intentions to participate in crop insurance after changes brought about by the 2008 Food, Conservation and Energy Act. Specifically, study results suggest that primary crops, risk perceptions, risk aversion, and program complexity were important factors affecting producer participation (Mitchell et al., 2012). To expand upon prior study, which examined the factors associated with the purchase of crop insurance, Sherrick et al. (2004) analyzed Midwestern farmers' choices among crop insurance alternatives and determined how levels of risk, risk management practices, production, and financial factors influenced these choices. The study findings indicated variation among crop insurance participants related to business, personal, and other characteristics across the types of insurance products available. Midwestern producers who were highly leveraged, less wealthy, riskier and operated larger acreages were more likely to extensively use insurance specifically with revenue coverage (Sherrick et al., 2004). As crop insurance continues to serve an increasingly important role in agricultural policy, further review of management practices and risk management tool selection by specific regions and commodities is warranted.

Currently, the federal government subsidizes, on average, 62 percent of the total premium on non-catastrophic policies and 100 percent on catastrophic policies (Shields, 2015). Summary data for the 2014 crop year indicated 294 million acres and 83 percent of the U.S. crop acreage were insured under the federal crop insurance program with four crops, corn, cotton, soybeans, and wheat, typically accounting for more than 70 percent of the total enrolled acres (Shields, 2015). A detailed review of peanut policies can further provide insight in policy planning and the effectiveness of federal crop insurance in providing a safety net for peanut producers while assuring a safe and reliable food source for consumers.

Overview of Farm Economic and Financial Factors

As federal agricultural policy and programs have changed, the day-to-day operation of many farms has been impacted. The ebb and flow of both agricultural production and markets call for times of increased need for a farm safety net for specific regions or commodities followed by the reduced need in others. Agriculture, as a whole, is considered to have had better times in recent years and, as a result, is considered at lower risk of bankruptcy as contrasted to the historic levels in the 1980s. However, the trend in the leveraging of operations with land, coupled with increased land values, does raise the concern about a possible land price bubble (Marzen, 2016). Thus, obtaining an accurate assessment of the financial well-being of the farm sector proves a challenge given the diversity of the 2.1 million farms that comprise the sector. As previously discussed, the agricultural industry is subject to wide fluctuations in both yields and prices. An analysis of trends in farm income will point to its highly variable nature. The variability in income further impacts the decision-making process of farm managers and

owners related to a variety of topics ranging from resource allocation, risk management options, investment opportunities, and even household welfare (Key et al., 2017). The far-reaching impact of the instability of income has long been championed as justification for agricultural policy and, specifically, the farm safety net. Information at the national level is frequently reported while similar data evaluating the income variability of individual farm households have been scarce.

One measure of farm sector financial well-being is farm sector net cash income. The total of all farm and farm-related revenue minus any cash expenses paid during the year represents farm sector net cash income. This measure of financial well-being remained relatively stable through the early 2000s but grew in volatility beginning in 2009. Since 2009, growth led to record highs in 2012 and 2013 followed by sharp declines brought about by factors including declining global demand, the strengthening dollar, large inventories, and depressed commodity prices through 2016. In both absolute and percentage terms, the decline in net cash income from 2013 to the forecast for 2016 is the largest decline since the 1980s with farm prices for major commodities down 30 percent or more (Prager et al., 2017). This decline in commodity price and net farm income impacts revenue-based risk management tools.

Consideration of farm sector assets, debt, and wealth indicates an increase of 4.4 percent in farm sector debt while the market value of farm sector assets is expected to increase 4 percent. Non-real estate assets are expected to continue a downward trend as lower crop prices coupled with increased costs and restrictive loan terms make obtaining operating and non-real estate loans more challenging (USDA ERS Farm Income and Wealth Statistics). These restrictive terms are, in part, a contributing factor in the historic

level of farm real estate debt forecast for 2017. While federal crop insurance carries the potential to influence the behavior of participants, a 2015 study found that although participation in the federal crop insurance program is associated with an increase in the use of short-term farm debt, it is not associated with an increase in long-term debt (Ifft, Kuethe, Morehart, 2015). However, agricultural producers are faced with placing real estate as collateral to secure the needed operating liquidity. Utilization of real estate as operating collateral erodes farm equity. An analysis is warranted to determine whether an erosion of equity is observed on U.S. peanut farms.

One concern with the aggregation of data to report a national value is that the single value often masks the volatility experienced by individual farms. A 2017 USDA ERS study conducted by Key et al. considered farm household income volatility based on panel data from a national survey. The study focused on larger scale operations similar to those responsible for about 80 percent of U.S. agricultural output. The findings point to higher levels of income volatility for these farm households relative to typical nonfarm households with the median change in total income between years about eight times larger than for nonfarm households (Key et al., 2017). The study further considers the impact of crop insurance on the panel of individual farms, which include a variety of crops.

The findings indicate that net crop insurance payments (indemnity payments minus premiums) are not large at an average of $6,628 per farm while the certainty equivalent (the amount each dollar received from crop insurance is worth on average to the farmer) per dollar of crop insurance payment is 1.38 (Key et al., 2017). Key et al. further expound on the value of products with risk-reducing potential. However, the

authors go a step further and consider the average value received relative to median income fluctuations. The average total payments for a farmer are around $24,000 while the median change in farm income between periods is $86,000 with a mean change of $261,000. The significance of this relationship is to point out that the extent to which government programs can effectively smooth income is limited. An analysis considering the income variability of commodities, specifically peanuts, is warranted. The premise utilized in the Key et al. study will be employed for representative peanut farms to investigate the income variability and effectiveness of crop insurance measures.

Concerns Surrounding Federal Crop Insurance Use

As evidenced by the preceding discussion of recent trends and literature considering federal crop insurance, producer participation has increased as federal crop insurance has become a pillar of the current agricultural safety net. This transition has not been without costs. The federal government subsidizes premiums and covers all costs related to selling and servicing the policy to encourage participation. The increased demand for federal crop insurance policies, which provide greater coverage, has resulted in increased government spending and has drawn attention to the future of the federal crop insurance program as critics call for reform. While literature considering various commodities and geographic regions is available, analysis specifically focused on the impact on peanut producers is lacking and thus justifies this study.

Federal Crop Insurance: An Agricultural Example of Public Administration

Considering the possible theoretical framework of federal crop insurance as not only a risk management tool for agricultural producers but also the surrounding prefaces related to public administration unveils many levels. First, the intervention of the federal

government to rectify the market failure is in the interest of not only the producer but also the public. Options for situating policy questions include market, production, conformity, and evolutionary models. While agricultural policy questions lend credence to a variety of these models, the question of the effectiveness of farm programs as a means to stabilize producer income and ensure availability of an affordable food source for consumers can best be framed from a market failure approach. Market failure theory is a popular paradigm for identifying specific problems that relate to the disequilibrium between supply and demand in a market which warrants government intervention through policy options to establish equilibration through exchange. The price and production volatility coupled with the "thin" nature of agricultural markets are examples of market failure characteristics in the agricultural industry.

Political will deems the necessity of stabilizing the agricultural sector to assure the availability of a safe and affordable food supply. Given the inherent risks and capital-intense nature of agricultural production, the use of public policy tools is warranted to provide risk management options. Risk balancing theory predicts that an increase in financial risk or debt use will result in response to the income and risk reduction aspects of federal crop insurance. However, the effectiveness of federal crop insurance as a tool to reduce the risk in the aggregate farm sector is not conclusive. While Lee and Djogo (1984) found that crop insurance could potentially improve the financial health of agricultural lenders and farm operations by reducing loan losses to agricultural lenders and Pfleuger and Barry (1986) surmised that crop insurance participation could improve liquidity and survival for a highly leveraged farm, Skees and Nutt (1988) found that purchasing crop insurance could be detrimental to highly leveraged farms considering

lower levels of loss ratios. The success of federal crop insurance at lowering total risk in the farm sector is significantly less than the decline in risk provided by federal crop insurance to individual operations (Ifft et al., 2015). The impact of the federal crop insurance program on farm financial decisions is relevant as policymakers continue to debate future U.S. farm policy.

Another consideration is the administration of the federal crop insurance program. The federal crop insurance program is currently a public-private partnership. Public entities are involved in the administration and oversight of the program while private entities are responsible for delivery of the product to producers. As transitions in the role of individuals and technology continue, it is important to consider not only the need but also the budgetary constraints of providing an efficient and effective deliverable that is deemed to have high value. Specifically, as related to this project, peanut producers demand an effective safety net that provides an efficient risk management tool. Meanwhile, taxpayers demand the prudent use of limited budgetary dollars. With any policy debate, there are multiple vantage points that must be considered.

Summary

Effective analysis of federal crop insurance as a safety net for domestic peanut producers requires not only an assessment of the current situation but also a retrospective and prospective lens. Recent literature on federal crop insurance points to increased producer participation, in general, as the role of federal crop insurance expands in the provision of an agricultural safety net for U.S. producers and consumers. However, it is important to note that this transition has not been without costs. Specifically, the federal government subsidizes premiums as well as covering all costs related to selling and

servicing the policy to encourage producer participation. The increased demand for federal crop insurance policies has, thus, resulted in increased government spending. Increased government spending, in turn, may draw attention to the future of the federal crop insurance program as critics call for reform. Commodity specific analysis is important to determine the impact to peanut producers from both a cost and benefit perspective and affords support for the study at hand.

Chapter III

METHODOLOGY

Overview

In this chapter, the types of data to be collected, their sources, research procedures, and statistical analyses utilized to measure the results are discussed. Utilizing secondary data, the study examines farm sector economic and financial data from USDA ERS, crop insurance statistics from USDA RMA, and enterprise farm data from The University of Georgia National Center for Peanut Competitiveness (NCPC) representative peanut farm database. The NCPC database details the structure, management decisions, production yields, costs, and returns for peanut farms representing twenty different locations throughout the U.S. in the primary peanut producing regions. Furthermore, the database has been utilized for almost two decades to analyze policy options related to peanut production.

The study is framed from the underlying question of whether the current enacted farm policies provide an effective safety net to stabilize producer income while ensuring a safe and affordable food source for consumers. Given the current and anticipated future political scrutiny of government spending, the efficacy of government spending for agricultural programs will continue to receive heightened attention. Precisely, this study will use a case study analysis to explore the relationship between crop insurance for peanuts and the financial stability of peanut farms in the U.S. To explore this relationship, the study has two primary objectives.

Research Objectives

1. Objective one—To determine the relationship, if any, of crop insurance for peanuts and the financial stability, as evidenced by crop insurance selection and the net return above variable input cost for the peanut enterprise, for representative U.S. peanut farms.
2. Objective two—To compare crop insurance utilization and financial stability measures among the representative peanut farms by geographic regions, cultural practices, and farm size.

These objectives will address by the following research questions utilizing representative farm data collected.

Research Questions

The specific research questions are as follows:

1. Does federal crop insurance utilization positively impact the net farm income of U.S. peanut farms?
2. Does the impact of crop insurance on the financial stability of U.S. peanut farms differ by geographic region, cultural practice, or farm size?

Hypotheses

Under the precept of the following hypotheses, the effectiveness of federal crop insurance in providing a safety net to U.S. peanut producers will be investigated:

Hypothesis$_1$: A positive relationship exists between crop insurance utilization (CIU) and the financial stability (FS) of a representative U.S. peanut farm.

- Null Hypothesis$_1$*:* There is no relationship between crop insurance utilization (CIU) and financial stability (FS) on a representative U.S. peanut farm.

Hypothesis$_2$: A relationship exists between the effectiveness of crop insurance on the financial stability of a representative U.S. peanut farm and the geographic region, cultural practice, and farm size.

- Null Hypothesis$_2$*:* There is no relationship between the effectiveness of crop insurance on the financial stability of a representative U.S. peanut farm and the geographic region, cultural practice, and farm size.

Should these hypotheses fail to be rejected, recommendations for changes to crop insurance policies can be made regarding its effectiveness as a safety net for U.S. peanut producers.

Study Approach

This analysis will utilize an unbiased approach to investigate the effectiveness of crop insurance as a primary component of the safety net for agricultural producers. Specifically, utilizing a case study approach, representative U.S. peanut farms will be analyzed to determine the effectiveness of crop insurance as a safety net for peanut producers. Secondary data from the USDA, coupled with the NCPC representative peanut farm data, will be analyzed to determine the effectiveness of crop insurance as a safety net. Using a quantitative approach, crop insurance premiums, indemnity payments, and net returns above variable operating costs (RAVIC) will be determined for each representative peanut farm. The results will then be evaluated. Evaluative criteria will include indicators of financial stability and economic viability for each of the

representative peanut farms. Specifically, crop insurance will be deemed effective as a safety net if the resulting RAVIC is positive. Additionally, national data for similar criteria will be analyzed to assess the effectiveness for various regions. Comparative analysis will be utilized to determine the effectiveness of crop insurance as a safety net for representative peanut farms relative to national statistics.

Data Source

This study will utilize quantitative secondary data obtained from the USDA and the University of Georgia NCPC. Data from the USDA ERS include farm economy data considering the farm sector income and finances. Specifically, crop insurance premium and indemnity payments, net farm income, and financial ratios will be considered at the national, state, and county levels when available. Data from the USDA RMA include national and regional statistics related to crop insurance usage, premiums, and indemnity payments. The NCPC maintains a database with current and historical whole farm information that captures the characteristics and decision-making process for 20 representative peanut farms. The database includes detailed historical production and economic data for each commodity represented on that farm. Each representative peanut farm is established by a focus group of four to six producers in a region who develop and update the farm to represent the peanut farms in that region. Thus, at a minimum, the representative peanut farms represent more than 100 individual farms throughout the major peanut growing regions in the U.S. These representative peanut farms have been used since 2002 to analyze federal policy alternatives. Data to be analyzed includes management decisions related to crop insurance, risk management, and the resulting farm

finances. Given the utilization of secondary data sources, IRB approval is not required for this study.

Data Estimation Model

To reflect the potential impact of crop insurance on a peanut farm, both cost and production data from the representative peanut farm database will be used to determine crop insurance premiums and indemnity payments. To foster an understanding of the model, a discussion of MPCI options available for peanuts is warranted.

Multiple Peril Crop Insurance

When considering crop insurance options for peanuts, current legislation provides that producers may purchase three plans at a premium cost based on the plan and coverage level chosen. These plans include Yield Protection (YP), Revenue Protection (RP), and Revenue Protection with Harvest Price Exclusion (RHPE). Yield protection protects against a production loss while revenue protection protects against revenue loss, which can be due to a production loss, price decline or increase, or a combination of both. The revenue protection with harvest price exclusion protects against revenue loss due to production loss, price decline, or a combination of both; however, the harvest price is excluded for determining the value of production in loss determination.

Within each of these plan options, a producer also chooses a coverage level between 50 to 85 percent of the approved yield. Selection of higher coverage levels provides a higher level of protection. However, that higher level of protection comes at a greater cost to the producer.

Cost to Producer

Producers are responsible for premiums related to their coverage level and plan chosen. However, those premiums are subsidized at varying rates as shown in Table 2. As the level of coverage increases, the percent of premium subsidy declines, thus increasing the cost to the producer. The higher level of coverage chosen can be likened to reducing the deductible on an insurance policy. If a producer chooses only 50 percent coverage, 67 percent of the premium cost is subsidized. However, if the producer chooses coverage at 85 percent, only 38 percent of the premium cost is subsidized.

Table 2. Crop Insurance Premium Subsidy and Producer Premium by Coverage Level

Item	Percent							
Coverage Level	50	55	60	65	70	75	80	85
Premium Subsidy	67	64	64	59	59	55	48	38
Producer Premium Share	33	36	36	41	41	45	52	62

Source: USDA RMA Summary of Business Report

An additional cost to the producer includes an administrative fee of $30 per crop per county regardless of acreage covered. In addition to coverage at a premium cost, producers may also choose Catastrophic Risk Protection (CAT) coverage, which is fixed at 50 percent of the approved yield and 55 percent of the projected price. CAT is 100 percent federally subsidized with no premium cost to the producer. For producers

choosing CAT coverage, there is not a cost for premiums, but there is an administrative fee of $300 per crop per county.

Loss Examples

To evaluate the impact of crop insurance on the financial stability of peanut farms, an understanding of what constitutes a loss is necessary. Specifically, what triggers an indemnity payment from an insurance plan? A yield protection loss occurs when peanut production for an insurance unit falls below the production guarantee due to damage from a covered cause of loss. For example, if the pounds per acre guarantee is 2,500 under a yield protection policy, should production per acre fall below 2,500 pounds because of a covered cause of loss, an indemnity payment will be warranted for the difference between actual production and the production guarantee. Similarly, a revenue protection loss occurs when the value of production-to-count (pounds produced multiplied by the projected or harvest cost) is less than the revenue protection guarantee due to a production loss and/or revenue loss. For revenue protection policies, the insurance guarantee is equal to the production guarantee multiplied by the greater of the projected price or harvest price unless the harvest price exclusions election is made. For RHPE plans, the production guarantee per acre and projected price are utilized to determine the revenue protection guarantee. An indemnity payment is rendered when the per acre production-to-count value is below the insurance guarantee per acre.

Representative Peanut Farm Determined Data

Utilizing the representative peanut farm production and cost data, the projected revenue, insurance guarantee, and projected return above variable input cost will be determined on a per acre and total enterprise basis for each farm and crop insurance

coverage option. From this determined data, comparisons can be made to analyze the effectiveness of crop insurance as a safety net for U.S. peanut producers. Crop insurance will be deemed effective if the projected return above variable input cost is positive.

Study Variables

The first step in determining the effectiveness of crop insurance as a safety net for peanut producers was to determine the expected gross revenue of the peanut enterprise for each representative farm based on expected yields and prices by building an economic model to determine the economic returns. This value represents a producer's expectations that are used to make management decisions when planning for the current crop year since it reflects historical production information and current market and economic trends. The expected gross revenue for each farm, then, serves as a baseline for the comparison for each of the crop insurance options. The expected gross revenue was used to determine the expected returns above variable input costs for each representative farm.

Next, for each representative farm, the insurance guarantee on a dollar per acre basis was determined for the varying coverage levels considered for the peanut enterprise. The insurance guarantee represents the maximum amount per acre that a producer could receive if a claim was filed for a covered loss. Both yield protection and revenue protection plans at 50, 60, 65, 70, and 75 percent coverage levels were considered for each farm. For yield protection plans, three different pricing options were considered—producer expected price, USDA RMA projected price, and USDA RMA maximum contract price—to provide an expected, worst-case, and best-case scenario. The RP plan considered USDA RMA reported 2017 projected and harvest prices for the

county and cultivar relevant for each representative peanut farm. Catastrophic coverage was also considered for all farms. Therefore, for each of the 20 farms, the following options or scenarios were considered:

1) Expected Returns with no cause for insurable claim (Baseline)
2) Catastrophic Coverage (CAT)
3) Yield Protection at 50 percent coverage level using expected price (YPE50)
4) Yield Protection at 60 percent coverage level using expected price (YPE60)
5) Yield Protection at 65 percent coverage level using expected price (YPE65)
6) Yield Protection at 70 percent coverage level using expected price (YPE70)
7) Yield Protection at 75 percent coverage level using expected price (YPE75)
8) Yield Protection at 50 percent coverage level using projected price (YPP50)
9) Yield Protection at 60 percent coverage level using projected price (YPP60)
10) Yield Protection at 65 percent coverage level using projected price (YPP65)
11) Yield Protection at 70 percent coverage level using projected price (YPP70)
12) Yield Protection at 75 percent coverage level using projected price (YPP75)
13) Yield Protection at 50 percent coverage level using maximum contract price (YPM50)
14) Yield Protection at 60 percent coverage level using maximum contract price (YPM60)
15) Yield Protection at 65 percent coverage level using maximum contract price (YPM65)
16) Yield Protection at 70 percent coverage level using maximum contract price (YPM70)

17) Yield Protection at 75 percent coverage level using maximum contract price (YPM75)
18) Revenue Protection at 50 percent coverage level (RP50)
19) Revenue Protection at 60 percent coverage level (RP60)
20) Revenue Protection at 65 percent coverage level (RP65)
21) Revenue Protection at 70 percent coverage level (RP70)
22) Revenue Protection at 75 percent coverage level (RP75)

Utilizing the calculated insurance revenue guarantee and the reported variable input costs, the returns above variable input costs were calculated on a per acre basis for the peanut enterprise for each representative. Given the crop insurance scenarios, the financial performance of the peanut enterprise was determined for each of the farms by calculating the return above variable input cost (RAVIC) on a per acre and per enterprise basis under each scenario. Each resulting RAVIC represents an observation to determine the effectiveness of crop insurance for peanut farms. RAVIC represents the short-term economic viability, or financial stability (FS), of the peanut enterprise since economic theory posits that an operation should continue to operate in the short run as long as the price equals or exceeds the variable operating costs. When an operation can no longer cover the variable operating costs, the operation has reached the "shut down" point and can minimize losses by ceasing operation. While the operation will still face fixed or overhead cost, it is not adding additional costs through the loss generated with the price being below the variable operating costs. Thus, for each crop insurance scenario, the insurance guarantee (potential maximum price under insurance claim) can be compared to the total variable input cost to determine if the operation should operate or shut down

at that level. If the RAVIC is greater than or equal to zero, the crop insurance scenario is considered to provide financial stability to the farm and deemed effective as a safety net. If the value is negative, the crop insurance scenario fails to provide financial stability to the farm and is deemed not effective as a safety net.

Additionally, this study will define, examine, and quantify the following variables for the representative U.S. peanut farms:

Crop Insurance Utilization (CIU)

Crop Insurance Premium Payment (CIP)

Crop Insurance Premium Subsidy (CIS)

Geographic Location (LOC)

Cultural Practice (CP)

Enterprise Size (SZE)

Summary statistics will be provided for each variable. Further, data will be analyzed to test for correlations between variables. First, it will be determined if management practices elect to utilize crop insurance. If crop insurance was utilized, then data will be analyzed to determine what type of plan was selected, and, finally, the level of coverage for each specific farm. The following coding will be used to denote CIU:

0 = No crop insurance selected

CAT = Catastrophic Coverage

YP = Yield Protection

RP = Revenue Protection

Coverage Level = 50%, 60%, 65%, 70%, or 75%

Next, the crop insurance premium payment (CIP) for each representative farm will be determined and analyzed. As discussed earlier, CIP depends on the type of coverage chosen, the level of coverage selected, and the geographic location (LOC) of the farm. The total premium includes a portion paid by the agricultural producer and a portion subsidized by the government. To determine the estimated cost per acre for each farm, the USDA RMA cost estimator will be utilized. The net premium payment for producers, CIP, will consider both the total premium and the subsidized portion, CIS. Furthermore, the estimated crop insurance premium provided by each representative farm panel will be analyzed. The CIP and CIS will be coded in a dollar per acre format.

The next three variables are used to denote characteristics of the farm. The LOC will be coded to represent the growing region where the farm is located. The southeast states of Georgia, Florida, Alabama, and Mississippi will be represented by SE. The southwest states of Texas, Oklahoma, and New Mexico will be noted by SW. Farms located in Virginia or the Carolinas will be labeled VC. The cultural practice, CP, will represent the cultivar planted by the farm. The options include runners (RU), Virginias (VI), Spanish (SP), or Valencia (VL). Finally, the enterprise size (SZE) will be coded based on the number of acres of peanuts on the farm. The following categories will be used for SZE:

1 = 1 to 249 acres

2 = 250 to 499 acres

3 = 500 to 749 acres

4 = 750 to 999 acres

5 = 1,000 or more acres

Analytic Procedures

Various statistical analyses will be conducted. Descriptive summary statistics will be analyzed to describe trends on a national level as well as for the representative peanut farms. Specifically, to test H_1, descriptive statistics and simple linear regression analyses in Excel comparing relationships between the independent variable CIU and the dependent variable FS, represented by the average RAVIC, for each insurance option based on the model, $FS = \beta CIU + \alpha$ will be utilized. The crop insurance utilization analyzed will be limited to the type and coverage level selected. Trends in enrollment type and coverage levels will be reviewed for each representative peanut farm. National trends in crop insurance utilization, coverage type, and the coverage level will be considered as well. Analysis of Variance, or ANOVA., a parametric procedure which allows the researcher to compare group means to determine whether the sample averages are significantly different from each other or were due to chance probability will also be utilized.

To test H_2, the RAVIC will be considered for each insurance policy option observation. The observations will be analyzed to determine the effectiveness of crop insurance in providing a safety net for the peanut farm. An observation will be deemed effective if the resulting RAVIC observation is positive. Results will be reported on a percentage basis based on the number of observations relative to the total observations. Summary data will also be reported within and across the independent variables of LOC, CP, and SZE. Results for each representative farm will also be discussed. Summary statistics will present an overview of trends.

Summary

The results of this quantitative study will test the research hypotheses considering the relationship between federally subsidized crop insurance as a safety net for U.S. peanut producers to aid in providing financial stability to the farm sector. The effectiveness of crop insurance as a safety net will be considered for each of the peanut producing regions, differing cultural practices, and varying farm sizes in consideration of the financial stability of one sector of the agricultural industry. The financial stability of U.S. peanut farms is a critical variable for the future of the agricultural industry.

Chapter IV

RESULTS

Multiple factors have led to an increase in the utilization of crop insurance by agricultural producers. Current farm policy places significance upon crop insurance to provide a safety net for agricultural producers. However, its effectiveness in providing a safety net for peanut producers warrants study. The results and observations herein are intended to be descriptive of the current situation of U.S. peanut farms, the utilization of crop insurance, and the effectiveness of crop insurance in providing a safety net for representative peanut producers, thereby informing stakeholders as each face management decisions in the short and long run. Furthermore, these results and observations can also be utilized to shape agricultural policy at, primarily, the federal agency level to ensure an effective safety net is in place to aid in managing risks faced in agricultural production and to assure a safe and reliable food source for consumers.

Crop Insurance in Peanuts at the National Level

To provide an overview of crop insurance for peanuts at a national level, NASS and RMA data were analyzed. Table 3 provides a summary of crop insurance utilization in peanuts at the national level. This table illustrates the prevalence of crop insurance utilization with the percent of planted acres insured by some form of crop insurance ranging from 85 to 93 percent between 2012 and 2017 with an average of 90 percent for this time frame. The last two years show a lower relative percent insured; however, it should be noted that these years also reflect an increase in planted acreage. Analysis of

this national level data supports the importance of crop insurance in peanut production and the need for further study in consideration of its effectiveness as a safety net for peanut farms.

Table 3. National Peanut Acreage Planted and Insured

Year	Acres Planted	Acres Insured	% of Total Acres Insured
2012	1,638,000	1,513,649	92%
2013	1,067,000	974,061	91%
2014	1,353,500	1,259,369	93%
2015	1,625,000	1,502,361	92%
2016	1,671,000	1,412,287	85%
2017	1,870,600	1,643,564	88%

Source: USDA NASS and USDA RMA Summary of Business Report

Next, the varying coverage levels utilized in peanuts was considered at the national level as shown in Table 4. From 2012 to 2017, a 70 percent coverage level was chosen most frequently with an average of 31 percent of the insured acres covered at this level. A coverage level of 75 percent was the next most frequent level chosen with an average of 21 percent of the acreage covered at this level, followed by a tie at 18 percent for both the 65 and 50 percent coverage level. With roughly 70 percent of peanut acreage covered at a level between 65 and 75 percent, the levels chosen for analysis of representative peanut farm data appear relevant. On average, only 5 percent of the acreage is covered at 80 percent or more and 7 percent at a 55 to 60 percent coverage level. It should be noted that while the six-year average for coverage at 80 percent is

only 4 percent, there has been an increase in the percent of acres covered at this higher level of coverage in most recent years relative to early years in this analysis.

Table 4. National Coverage Level Selected by Percent of Acreage by Year for Peanuts

	Coverage Level Chosen							
	0.5	0.55	0.6	0.65	0.7	0.75	0.8	0.85
2012	21%	1%	7%	22%	31%	16%	2%	0%
2013	22%	1%	7%	22%	30%	16%	2%	0%
2014	21%	1%	7%	21%	29%	18%	3%	1%
2015	14%	1%	4%	15%	32%	25%	7%	2%
2016	15%	0%	5%	14%	32%	26%	6%	1%
2017	14%	0%	5%	13%	32%	27%	7%	1%
AVERAGE	18%	1%	6%	18%	31%	21%	4%	1%

Source: USDA RMA Summary of Business Report

Next, the types of crop insurance utilized were analyzed, and the results are summarized in Table 5. For this analysis, data for 2015 to 2018 were considered. As discussed in Chapter 3, the 2014 Farm Bill brought about changes to the types of policies available. Some insurance policies available before 2015 are no longer an option for peanut producers while new ones were introduced. The types of insurance available and analyzed include Catastrophic (CAT), Revenue Protection (RP), Revenue Protection with Harvest Price Exclusions (RPHPE), and Yield Protection (YP). Nationally across the four-year average, yield protection was chosen in 48 percent of the covered acres followed by revenue protection at 40 percent and catastrophic at 12 percent. Revenue protection with harvest price exclusion represents less than one percent. Two

observations are made regarding the yield and revenue protection. After the change in available policy types, RP garnered significant support in 2015 and 2016 with over 60 percent of the acreage covered by this type of policy. For the 2017 and 2018 crop years, YP was the choice for more than 70 percent of the planted peanut acreage.

Table 5. Crop Insurance Selection by Policy, Percent of Peanut Acreage by Year

	CAT	RP	RPHPE	YP
2015	10%	68%	0%	22%
2016	10%	65%	1%	24%
2017	10%	19%	0%	71%
2018	17%	9%	0%	74%
AVG	12%	40%	0%	48%

Source: USDA RMA Summary of Business Report

Representative Farm Characteristics

Next, the characteristics of the representative farms were considered. The choices analyzed represent management decisions for the 2017 crop year. The representative farm characteristics are summarized in Table 6. Of the 20 representative farms, 10 percent indicated CAT, 65 percent indicated YP, 15 percent indicated RP, and 10 percent were undetermined when considering what type of crop insurance coverage to purchase for peanuts. These management choices align with the national averages discussed previously. The undetermined farms can be considered representative of the percentage of acreage not covered by crop insurance while no farms chose the RPHE. The percent of farms utilizing CAT coverage matched the national percentage of acreage with this coverage. Relative to national choices, the representative farms had a slightly lower level

choosing YP and slightly higher choosing RP for 2017. However, it is important to note the representative farm values discussed consider the number of representative farms and not the total number of acres in the representative farms.

Table 6. Type of Crop Insurance Chosen by Representative Peanut Farms

Coverage Type	Number of Farms	Percent of Farms
CAT	2	10%
YP	13	65%
RP	3	15%
Undetermined	2	10%
Total	20	100%

Source: UGA NCPC

Beyond the type of insurance coverage chosen, it is also relevant to review the levels of coverage chosen by the representative peanut farms. Forty-four percent of the farms choosing coverage other than CAT chose a 65 percent coverage level. An equal number of farms chose 50 percent and 70 percent coverage level. No farms chose a coverage level above 75 percent as shown in Table 7. While the crop insurance chosen by two representative farms was undetermined, those two farms chose coverage at 50 and 60 percent under the previous crop insurance provisions. Neither had chosen catastrophic with both opting for the actual production history (APH). For 2017, 60 percent of all representative farms, three-fourths of those with coverage other than CAT, chose a level between 65 to 75 percent.

Table 7. Level of Coverage of Crop Insurance Chosen by Representative Peanut Farms

Coverage Type	Number of Farms*	Percent of Farms
50	3	19%
60	1	6%
65	7	44%
70	3	19%
75	2	13%
Total	16	100%

*Excludes farms choosing catastrophic (2) or undetermined (2)

Source: UGA NCPC

Peanuts are produced primarily in three distinct geographic growing regions in the U.S. These include the Southeast, encompassing the states of Georgia, Florida, Alabama, and Mississippi; the Southwest, which includes Texas, Oklahoma, and New Mexico; and the Virginia-Carolina region, which includes Virginia, North Carolina, and South Carolina. The National Peanut Board reports that for 2014, production in the Southeast region accounted for more than 70 percent of the quantity produced in the U.S. Meanwhile, the Virginia-Carolina region accounted for 17 percent while the Southwest accounted for the remaining 11 percent. The representative peanut farms are distributed throughout the peanut growing region with 65 percent of the farms located in the Southeast, 25 percent in the Southwest, and 10 percent in the Virginia-Carolina region as shown in Table 8. When the acreage reflected in the representative peanut farms is considered, 69 percent of the total acreage is in the Southeast, with 22 percent in the Southwest, and 9 percent in the Virginia-Carolina.

Table 8. Representative Peanut Farm Location

Region	Number of Farms	Percent of Farms
Southeast	13	65%
Southwest	5	25%
Virginia-Carolina	2	10%

Source: UGA NCPC

Along with the different growing regions also come differences in the cultural practices and cultivars planted. The different cultivars considered include runner, Virginia, Valencia, and Spanish. Table 9 provides a summary of the number of farms producing each cultivar. Runner peanuts, which tend to be uniform in kernel size and are most commonly used in peanut butter production, account for 80 percent of the peanuts produced in the U.S. Virginia peanuts are the largest of the cultivars produced in the U.S. and account for 15 percent of the U.S. production. Valencia peanuts, which have three or more kernels per shell, account for less than one percent of the total U.S. production. The Spanish cultivars, with their red skins and smaller kernels, account for four percent of the U.S. production. The distribution of cultivars on the representative peanut farms closely resembles the U.S. production distribution except for VI being slightly underrepresented and VL slightly overrepresented.

Table 9. Cultural Practice as Cultivar Type for Representative Peanut Farms

Cultivar	Number of Farms	Percent of Farms
Runner	16	80%
Virginia	2	10%
Valencia	1	5%
Spanish	1	5%

Source: UGA NCPC

The last representative peanut farm characteristic that will be further analyzed when considering the effectiveness of crop insurance as a safety net is the farm size. For each farm, the number of acres of peanuts was used to classify the farm into one of five categories. The breakdown of sizes is detailed in Chapter 3 and shown in Table 10. It is important to note that while there are boundaries used to categorize these farms, the farms' total acreage will likely be much higher given the need for good rotational practices in peanut production. Many farms will follow a two- to three-year rotation between peanut plantings to maintain yield and quality standards. Therefore, the crop acreage for a given farm would typically be three to four times greater than the peanut acreage. For example, a farm with 1,000 acres of peanuts would need a total of 3,000 cultivatable acres to maintain a two-year rotation between peanuts or 4,000 cultivatable acres to maintain a three-year rotation between peanuts. Operation size, management production practices, and operation diversity can each impact management decisions and eventual production output. For the representative peanut farms, 70 percent fell between the second and third sizes, which ranged from 250 to 749 acres of peanuts. Data from the 2012 Census of Agriculture indicates over 79 percent of peanut farms in the U.S. are farms with more than 260 acres and over two-thirds of the peanut farms are 500 acres or more. The average number of peanut acres across all farms was 559 acres with an estimated yield of 2.19 tons per acre. This average size would imply a total farm size between 1,677 to 2,236 acres following sound rotational management practices discussed previously.

Table 10. Farm Size by Peanut Acreage for Representative Peanut Farms

Acres of Peanuts	Number of Farms	Percent of Farms
1 - 249	2	10%
250 - 499	7	35%
500 - 749	7	35%
750 - 999	2	10%
1,000 or more	2	10%

Source: UGA NCPC

Representative Farm Model

To reflect the potential impact of crop insurance on a peanut farm, both cost and production data from the representative peanut farm database were used to estimate crop insurance premiums, indemnity payments, and net returns. The first step in determining the effectiveness of crop insurance as a safety net for peanut producers was to determine the expected gross revenue of the peanut enterprise for each representative farm based on expected yields and prices. Next, the reported variable input cost for each representative farm was considered. Utilizing an economic model, the expected economic returns above variable input cost, RAVIC were determined for each farm. This value represents a producer's expectations that are used to make management decisions when planning for the current crop year since it reflects historical production information and current market and economic trends. It serves as a guide for management to determine if the enterprise should shut down or continue to operate in the short run. Furthermore, the RAVIC calculated for each farm serves as a baseline for comparison for each of the various crop insurance policy options.

Table 11. Expected Returns above Variable Input Cost for Peanuts

Farm	Baseline	Total RAVIC	CIURAVIC
	$/Acre	*Peanut Enterprise*	*$/Acre*
A	$325.37	$357,907.25	$(180.01)
B	$357.56	$259,229.45	$(336.05)
C	$247.56	$82,188.64	$165.98
D	$276.42	$138,209.22	$(28.88)
F	$251.89	$100,754.00	$37.08
G	$192.65	$81,876.25	$76.68
H	$193.01	$77,203.00	$(60.71)
I	$181.85	$127,295.00	$52.75
J	$150.17	$99,860.39	$(33.76)
K	$60.38	$30,190.00	$(8.97)
N	$297.81	$119,124.00	$(13.65)
O	$20.88	$12,529.20	$64.80
P	$298.26	$238,608.00	$(447.39)
Q	$61.01	$14,642.40	$(501.33)
R	$159.56	$159,560.00	$(186.68)
S	$151.69	$27,303.60	$(187.24)
T	$232.75	$58,187.50	$(121.61)
U	$521.13	$442,959.00	$224.25
V	$(16.67)	$(12,001.40)	$(34.42)
W	$397.34	$158,936.00	$2.10

Source: UGA NCPC

The baseline expected net income for the 20 representative peanut farms ranges from a loss of almost $17 per acre to a return of more than $520 per acre with an average return across all farms of $218 per acre. Nineteen of the farms, 95 percent, expect positive returns above variable input costs. Total expected peanut enterprise returns range from a loss of $12,000 to positive returns of almost $443,000. Analysis of the variance shows great variability in both the return per acre and enterprise returns for peanuts across the representative farms with R-squared values of 0.0127 and 0.0251, respectively. From a management perspective based on economic theory, farm V should shut down and not operate in the short run since it cannot cover the variable input cost of operating.

The next step in analyzing the effectiveness of crop insurance as a safety net was to estimate the insurance guarantee on a dollar per acre basis for each representative peanut farm for the varying coverage types and levels considered. The insurance guarantee represents the maximum amount per acre that a producer could receive if a claim was filed for a covered loss. Both yield protection and revenue protection plans were considered for each farm. For the yield protection plans expected, worst and best-case scenarios were considered. The expected scenario, YPE, utilized the expected price supplied by the representative farm panel and also used in calculating the baseline net income unless that price exceeded the maximum allowed contract peanut price. The worst-case scenario, YPP, utilized the RMA projected price for the cultivar and region while the best-case scenario, YPM, utilized the RMA maximum contract price allowed. The revenue protection model, RP, utilized the USDA RMA projected and harvested prices. The price used to determine net returns was the higher of the two. Since no farms

chose the revenue protection with harvest price exclusion, the study excluded that policy. Each of the YP and RP models considered coverage levels at 50, 60, 65, 70, and 75 percent. Therefore, for each of the 20 farms, there were twenty different possible premium insurance policy elections. Catastrophic coverage was also considered for each of the farms.

Once the potential returns per acre under the given insurance election were calculated for each farm and insurance policy election, the variable input costs were subtracted to derive the expected returns above variable input costs for each farm. Also included in the costs were any adjustments needed to correct for over or understatement of producer premium for the corresponding level of insurance coverage. During the most recent representative farm panel update meetings, producers indicated the coverage type and level for the peanut enterprise. Table 11 includes the expected returns above variable input costs given the crop insurance type and coverage level indicated by each representative farm. The maximum potential payout was calculated. Then, the variable input costs were subtracted from that value to arrive at the crop insurance return above variable input cost (CIURAVIC).

Considering the crop insurance type and levels chosen by management, only 7 of the 20 farms, 35 percent, would have positive returns above variable input costs should a peril take place that resulted in an insurance claim. The average return after insurance indemnity payments would be a loss of almost $76 per acre, with maximum and minimum returns of $224 and ($501), respectively, per acre. The majority of the representative peanut farms are considerably worse off on a dollar per acre basis relative to the baseline expected returns. Of interest is the fact that one farm showed a higher

return per acre for crop insurance guarantee relative to the baseline. For this farm, the reported expected price is less than the USDA RMA projected price for peanuts. Further study is warranted to determine the cause of the lower reported expected price.

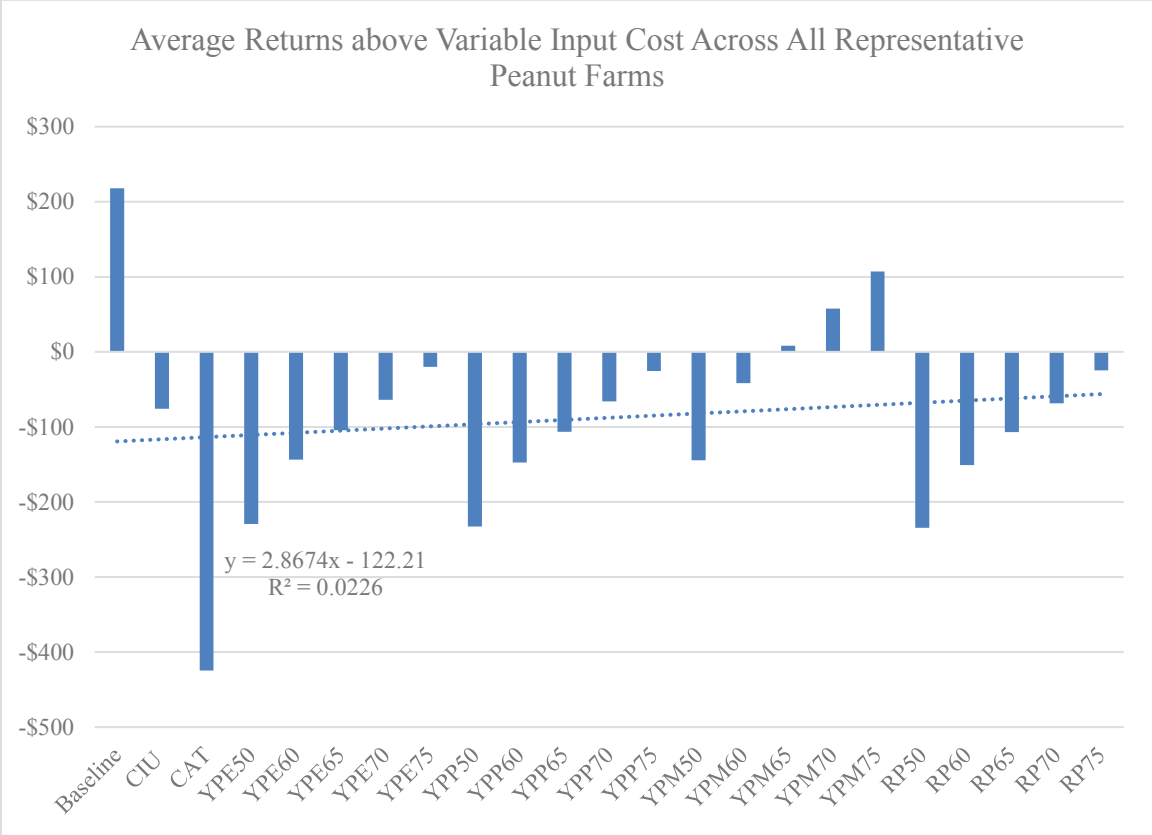
Determining how to measure or quantify the effectiveness of a policy option can be difficult. Different management styles, risk propensities, or levels of profitability expectations could impact how effectiveness is gauged. To further exacerbate the topic of interest in this study, defining what a safety net entails can be just as challenging. For this study, a crop insurance policy option was deemed effective as a safety net if the RAVIC for that policy option observation was positive. A positive RAVIC means the variable input expenses are covered, and funds are available to help cover the fixed and opportunity costs that remain. Given that 65 percent of the farms showed negative returns after insurance indemnity payments for the chosen coverage, CIURAVIC, the effectiveness of crop insurance as a safety net warrants further study. To further analyze the effectiveness, expected, best, and worst-case scenarios at a range of coverage levels for yield protection and revenue protection were analyzed.

Testing Hypothesis$_1$: Relationship between CIU and FS

To determine if a positive relationship exists between crop insurance utilization and the financial stability of a representative U.S. peanut farm, the average returns above variable input costs across all representative peanut farms were analyzed for each insurance policy option. Figure 2 shows the results for each option. Linear regression indicates there is a positive relationship within an insurance policy type of protection as the coverage level increases. The results, however, indicate that out of the 21 different insurance policy options considered, only three provided positive returns above variable

input costs when averaged across all farms, thus challenging the effectiveness of crop insurance as a safety net.

Figure 2. Returns above Variable Input Cost for Insurance Policy Options ($/Acre)



Effectiveness of Crop Insurance Summary Analysis

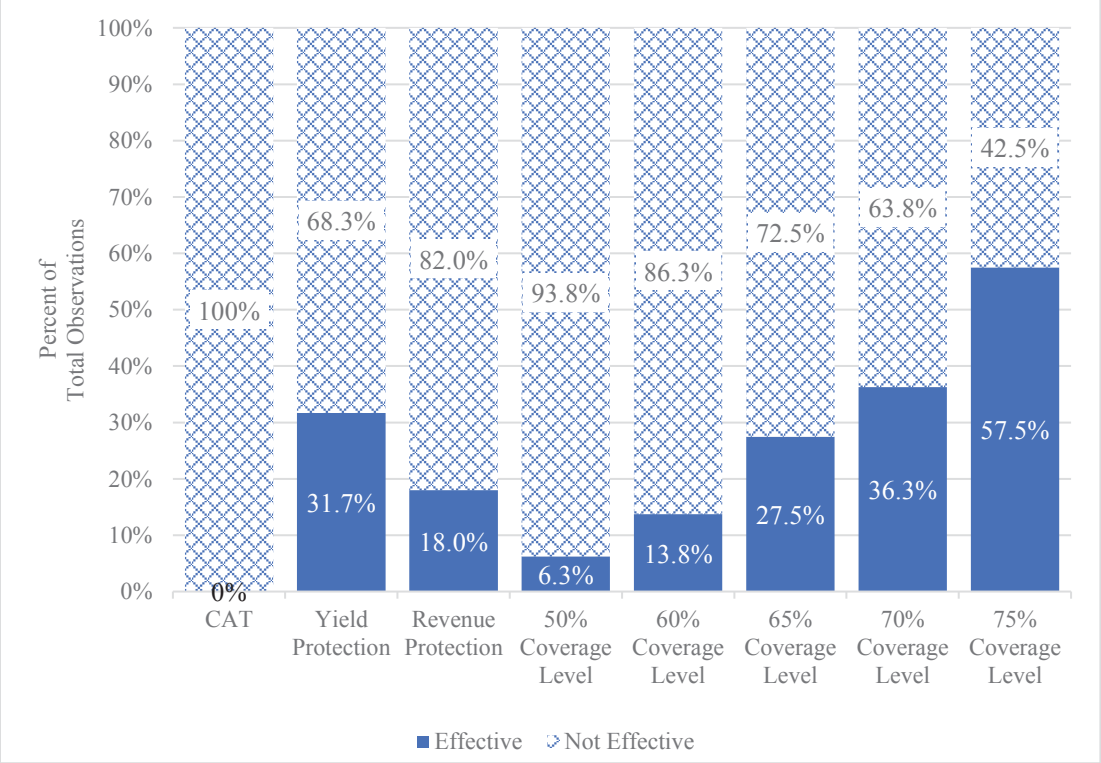
Figure 3 provides a visual representation of crop insurance effectiveness for representative peanut farms across different independent variables considered in this study. For CAT insurance coverage, there were no observations of positive net returns above variable input costs; therefore, it would not be deemed an effective safety net for peanut producers given the measurement guidelines established for this study. When considering yield protection policies across all levels of coverage and projected price options, 32 percent of the observations resulted in positive net returns. Meanwhile, revenue protection policies resulted in 18 percent of the observations showing a positive

return above variable input costs. For those positive observations, crop insurance can be considered an effective risk management tool. The average RAVIC across all farms and coverage levels for yield protection policies was ($77) per acre while the average for revenue protection across all farms and coverage levels was ($117) per acre. Analysis of variance (ANOVA) indicates the statistical significance of this difference with a resulting p-value of 0.037. Yield protection policies can be considered statistically more effective as a safety net than revenue protection policies. However, given that the average returns for each are negative neither would meet the criteria outlined in this study to be deemed effective as a safety net for peanut producers.

Considering the coverage level across all protection types and pricing options, as would be expected, an increase in positive observations was seen as the coverage level increases. The percent of positive observations was only six at a 50 percent coverage level. With a 10-percentage point increase in the coverage level, the positive observations more than double to 14 percent. As the coverage level increased to 65 percent, a 100 percent increase in positive observations resulted with 28 percent of all occurrences having a positive return above variable input costs. Given a 75 percent coverage level across both yield and revenue protection as well as the different pricing options, almost 58 percent of the observations resulted in a positive return above variable input costs. For each of the positive observations, crop insurance can be considered an effective tool in providing a safety net for peanut producers. However, it is pertinent to point out that at the upper end of the available coverage levels, which come at a higher cost to the peanut producer, more than 40 percent of the observations did not cover variable input costs. Therefore, as shown in Figure 3, for more than 42 percent of the

observations at a 75 percent coverage level, crop insurance was not effective as a safety net based on the criteria set forth in this study. The average return above variable costs across all farms and coverage types was calculated for each coverage level. This average for all levels of coverage determined was negative except for the 75 percent coverage level. The average returns range from a loss of $200 per acre for 50 percent coverage level to positive returns of $9 per acre for 75 percent coverage level. Considering the average for each coverage level, only the 75 percent coverage would be considered to meet the criteria to provide an effective safety net for peanut producers. Furthermore, ANOVA indicates the difference between groups is statistically significant for the varying levels of coverage.

Figure 3. Effectiveness of Crop Insurance (Percentage of total observations)



Next, the three peanut producing regions, Southeast, Southwest, and Virginia-Carolina, were considered. The RAVIC across all coverage types, coverage levels, and

all farms in a region were analyzed and are summarized in Table 12. For the Southeast, 33 percent of the observations were deemed effective, followed by the Virginia-Carolina region with 26 percent, and the Southwest with 10 percent. Given that the cultivar planted is heavily influenced by the geographic production region, the RAVIC across cultivars resulted in similar findings as LOC. Runner type peanuts saw a 30 percent effectiveness, followed by Virginia type peanuts at 26 percent. The two cultivars primarily grown in the Southwest, Spanish and Valencia, showed five and zero percent effectiveness, respectively, of crop insurance as evidenced by positive returns above variable input costs. ANOVA indicated statistically significant differences between the groups for both regions and cultivars.

Table 12. Regional and Cultivar Summary Observations for Effective Observations (Percent of Total) and Average RAVIC $/acre

Region	*Percent Effective*	*RAVIC*
SE	33%	($62.66)
SW	10%	($215.65)
VC	26%	($82.96)
Cultivar	*Percent Effective*	*RAVIC*
Runner	30%	($71.43)
Virginia	26%	($82.96)
Spanish	5%	($179.61)
Valencia	0%	($570.31)

Source: UGA NCPC

The next independent variable considered was operation size. Each representative farm was categorized into one of five options based on peanut acreage to test for differences in effectiveness of crop insurance based on the operation size. The categories did not overlap and each farm could only be put in one category. Table 13 shows that categories 1, 4, and 5 each included 10 percent of the representative peanut farms while categories three and four each included 35 percent, or seven farms. Again, the returns above variable input costs were considered to determine the effectiveness of crop insurance as a safety net.

For farms with less than 250 acres of peanuts, only two percent of the observations were effective, and the RAVIC across all policy types, coverage levels, and pricing options was a loss of almost $375 per acre. Operations with more than 1,000 acres of peanuts only had 14 percent observations effective with the average RAVIC a loss of more than $130 per acre. Farms with 250 to 499 acres of peanuts and those with peanut acreage between 500 to 749 saw similar rates of effective observations with 29 and 26 percent respectively. The larger farms, 500 to 749 acres, saw a larger net loss at almost $105 per acre compared to a net loss of $54 per acre for farms between 250 to 499 acres.

The size four category, which included 750 to 999 acres of peanuts, showed 60 percent of the observations as positive. This category was also the only operation size that resulted in a positive return above variable input costs. Therefore, crop insurance can be considered effective for peanut operations with more than 750 acres but less than 1,000 acres. ANOVA indicated statistical significance between the groups.

Table 13. Operation Size Summary, Effective Observations and Average RAVIC $/acre

Operation Size	*Percent Effective*	RAVIC $/acre
SZ1	2%	($374.96)
SZ2	29%	($53.743)
SZ3	26%	($104.70)
SZ4	60%	$30.98
SZ5	14%	($130.81)

Source: UGA NCPC

Given the statistical differences observed between the independent variables discussed, each insurance policy protection model was analyzed for the varying coverage levels across all representative farms. Considering five different coverage levels and 20 representative farms, a total of one hundred observations resulted for each insurance model. For each policy type and coverage level, Table 14 shows the number of farms with a positive net return along with the maximum, minimum, and average RAVIC on a per acre basis. The model with the greatest likelihood of positive net returns is the yield protection at the maximum contract price. Of the 100 observations across all farms and coverage levels, 58 resulted in positive net returns or 58 percent effective observations. Utilizing the producers' expected price, 21 observations were positive, while the RMA projected price resulted in only 16 out of 100 observations being positive. The revenue protection plan resulted in 18 positive observations given USDA RMA projected and harvest prices. The USDA RMA prices did not show great variability for 2017. However, should the market become more volatile at harvest time, the revenue protection model could see an increase in effectiveness.

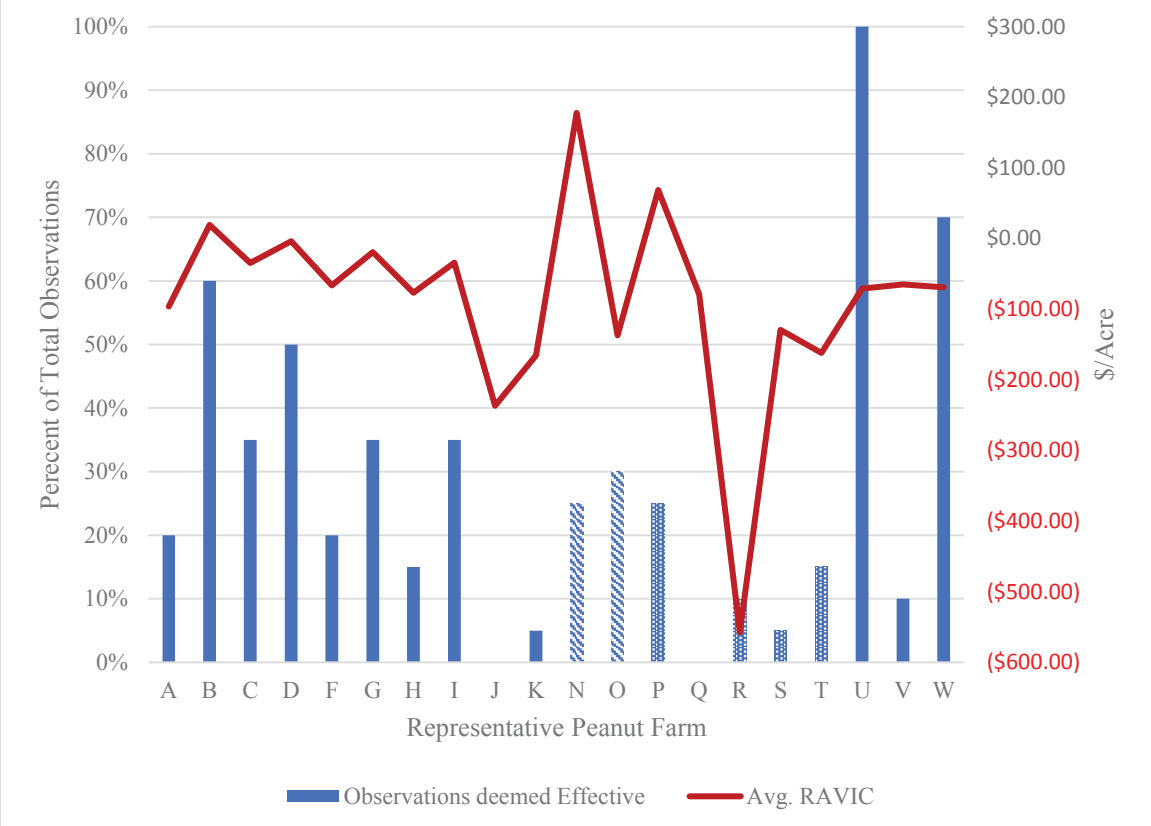
Table 14. Summary of Determined Returns above Variable Input Cost for Yield Protection Crop Insurance Plans and Coverage levels, Quantity of Farms, $/acre

Model	*YPE50*	*YPE60*	*YPE65*	*YPE70*	*YPE75*
No. Positive	1	1	3	5	11
Max	$9.42	$112.36	$163.83	$211.62	$266.78
Min	($614.29)	($541.15)	($501.33)	($468.77)	($417.19)
Average	($229.30)	($143.46)	($104.29)	($63.74)	($20.07)
Model	*YPP50*	*YPP60*	*YPP65*	*YPP70*	*YPP75*
No. Positive	1	1	2	4	8
Max	$0.50	$102.26	$153.14	$203.33	$254.90
Min	($697.99)	($619.99)	($586.74)	($560.75)	($533.74)
Average	($232.72)	($147.58)	($106.46)	($65.92)	($25.46)
Model	*YPM50*	*YPM60*	*YPM65*	*YPM70*	*YPM75*
No. Positive	2	8	14	16	18
Max	$102.16	$224.25	$285.29	$345.65	$407.38
Min	($632.29)	($541.15)	($501.33)	($468.77)	($435.19)
Average	($144.40)	($41.59)	$8.35	$57.73	$107.02
Model	*RP 50*	*RP 60*	*RP 65*	*RP 70*	*RP 75*
No. Positive	1	1	3	4	9
Max	$0.50	$102.26	$153.14	$204.02	$254.90
Min	($697.69)	($631.93)	($599.05)	($566.17)	($533.29)
Average	($234.29)	($150.96)	($106.79)	($68.45)	($24.84)

Source: UGA NCPC

The final data analysis to be considered in this study is to look at each representative farm, individually, to determine the effectiveness of crop insurance across all observations for a farm. Figure 4 shows the percent of observations deemed effective for each farm, which ranged from a low of zero percent for two of the farms to a high of 100 percent for one farm. The range of 5 to 15 percent effective included 6 farms; five were in the range of 20 to 30 percent effective, and three had 35 percent of the observations considered effective. The three remaining farms experienced 50, 60, and 70 percent of observations deemed effective.

Figure 4. Percent of observations deemed effective and average RAVIC for each farm $/acre



Source: UGA NCPC

The average return above variable input cost across all protection options and coverage levels was also determined for each representative farm and is shown in Figure

4. Three farms had a positive RAVIC, ranging from $19 to $178 per acre, while the other 17 farms showed a negative RAVIC across all options. When considering the farms independently, crop insurance is considered effective for 15 percent of the representative peanut farms based on the assumptions set forth. The individual rate of effectiveness for a farm varied depending on the specific factors considered in this analysis.

Summary

Crop insurance selection for a peanut enterprise is multi-faceted. Decisions must be made on policy type, including catastrophic, yield protection, revenue protection, or revenue protection with harvest price exclusion, for a range of coverage levels and pricing options. This study only considered a portion of those options, but the magnitude of data quickly grew. In consideration of the first objective of this study, which was to determine the effectiveness of crop insurance as a safety net for peanut producers, data were analyzed at several levels ranging from an individual response for a specific farm for a certain coverage type and level to average responses across multiple variables. The level of effectiveness varies within each of the variables. In general, the yield protection model generated a greater level of effectiveness than the revenue protection or catastrophic policies but was effective on less than one-third of the total observations. A higher coverage level resulted in higher levels of effectiveness, but even at the maximum level tested, 75 percent coverage, less than 3 out of 5 of the observations were deemed effective. Differences in effectiveness were seen across regions and cultivars, with the maximum effectiveness for any of these only at one-third of the observations. When considering the effectiveness by farm size, farms with peanut acreage in the 750 to 999 range showed 60 percent positive observations. Finally, when looking at individual

farms, all observations were positive for one farm while two other farms also reflected a positive average return above variable input cost. There were also two farms that had no positive observations regardless of coverage type or level.

Chapter V

CONCLUSION

Study Overview

This study presents an objective analysis of agricultural policy by considering the impact of federal crop insurance on U.S. peanut farms. The study analyzes the effectiveness of crop insurance as a safety net using a case study approach. Employing a proactive approach, it provides valuable insight into the utilization of crop insurance by peanut farms, the potential impact to the peanut industry, and the economic health and well-being of one sector of the agricultural industry that can augment current and future political analysis and debate in drafting agricultural policy related to peanut production. Findings from the study point out differences in the effectiveness of crop insurance as a safety net among insurance options, geographic regions, cultural practices, and farm size.

Additionally, it highlights future research needs which could encompass analysis of the effectiveness of crop insurance on additional agricultural commodities and regions or even the consideration of other risk management tools. The study further emphasizes that while the need for agriculture remains a constant, federal intervention to stabilize the industry over the last eight decades has not, as evidenced by changes in agricultural policy and the form and nature of agricultural programs. Furthermore, the agricultural safety net will continue to evolve with the drafting of each new farm bill and proactive policy analysis must remain a primary focus for all stakeholders involved.

Limitations of the Study

There are obvious limitations to this study that should be acknowledged. First, the management practices and resource availability and utilization on a U.S. peanut farm are as unique and varied as an individual. To capture the specific management decisions related to federal crop insurance, risk management tools, and the current financial position of each peanut farm is not feasible. However, the NCPC representative peanut farm database, which includes current and historical whole farm information, is viewed as a reliable source that captures the characteristics and decision-making process of peanut farms. As indicated, each representative peanut farm was established by a focus group of four to six producers in a region who develop and update the farm to represent the peanut farms in that region. Thus, at a minimum, the representative peanut farms represent more than 100 individual farms throughout the major peanut growing regions in the U.S. These representative peanut farms have been used since 2002 to analyze federal policy alternatives.

An additional limitation of the study may be the varying levels of risk propensity for individual decision makers, which may result in differing views on what is deemed an "effective safety net." The parameters and definitions utilized in this study to determine the effectiveness of crop insurance as a safety net are clearly identified. However, consideration of a broader set of parameters could supply additional insight.

Finally, the nature of the study and time limits set thereupon limit the scope of a study that would be deemed reasonable to complete. Analysis of public policy and public administrative concerns must be conducted promptly such that the issue at hand remains relevant.

Study Implications

The analysis presented in this study provides insight into the impact of agricultural policy on one commodity within a larger industry. It points to differences in the effectiveness of crop insurance as a safety net for peanut producers which warrant further study into effective policy options for government intervention intended to provide a farm safety net to agricultural producers. It also provides data to better inform stakeholders and decision-makers as future policy is shaped.

The study points out wide variations in the stability of agricultural revenue for peanut farms. The underlying question of whether the current enacted farm policies regarding crop insurance provide an effective safety net to stabilize producer income while ensuring a safe and affordable food source for consumers was examined. How that question is answered depends upon the level at which it is analyzed. From a broad, general perspective across all farms, regions, and insurance options, crop insurance does not appear to be effective as a safety net to stabilize farm income based on the criteria set forth within this study. However, when additional parameters are included, observations pointing to the effectiveness exist at the farm level. The study confirms that higher levels of coverage provide a more effective safety net. It indicates that for some farms none of the crop insurance options available will provide an effective safety net.

This study also reveals what appears to be deeper concern regarding the financial stability of agricultural production. The analysis in this study only considered the variable input cost of peanut production. Additional costs for the farm entity include fixed or overhead costs and the opportunity cost of the resources employed. These additional costs range from $290 to almost $860 per acre. Considering the baseline

values for individual farms, many would not be able to cover these additional costs of production. Evaluation of farm financial indicators, including the current ratio and debt-to-asset (DTA) ratio, indicates a decline in the overall financial health of representative peanut farms from 2012 to 2016 as the current assets relative to current liabilities have declined while the amount of debt relative to assets has increased. While general financial analysis may indicate that the "normal" range for DTA ratio is from 30 to 60 percent, the USDA reported average farm sector debt-to-asset value is 12 percent. The 2016 average DTA across all representative peanut farms was 51 percent with only three farms with a value less than 30 percent and categorized as financially strong. Nine of the 13 farms categorized as normal have a value closer to the upper boundary, 60 percent, than the lower boundary of 30 percent. These shifts prompt concern for the economic viability of the peanut industry.

Recommendations for Future Research

While this study provided a sound, but cursory, exploration of the effectiveness of crop insurance utilization in peanut production through case study analysis of the representative peanut farm database, this investigation further uncovers challenges and opportunities to explore within the industry. Since peanut farms typically produce other commodities, a first step would be to analyze the effectiveness of crop insurance for the other crops produced on the farm and consider the effectiveness of crop insurance on a whole farm level.

Another area worthy of additional research relates to quality issues. Specifically, do crop insurance policies provide an effective safety net when quality issues arise? What levels of coverage are required, and what is the cost to producers and taxpayers?

The analysis included in this study assumed no quality degradation for peanuts produced or sold. However, in situations where an insurable loss occurs, the quality often declines. What is the impact of peanuts that are a lower quality grade or even classified as segregation 2 or 3, which results in a lower price paid to a producer?

Supplementary study is also warranted to capture changes in peanut prices between regions or across years for both projected and harvest prices given the limited availability of data for these price variations since the changes to crop insurance policies are a result of the 2014 Farm Bill and considering the lack of a futures commodity exchange for peanuts. A sensitivity price analysis model to simulate a variety of price changes and estimate the impact on management decisions should be considered.

Finally, given the recent and continued decline in the financial environment of the farm economy, further study into the financial health of peanut farms and the impact of crop insurance premium and indemnity payments is warranted. Each of these areas of study can provide relevant and vital information to stakeholders and key decision makers to help assure knowledgeable assessments and options as public administration challenges facing the agricultural industry, well beyond the 2018 Farm Bill, are addressed.

Reference List

Bakst, D. (Ed). (2016). Farms and free enterprise: A blueprint for agricultural policy. The Heritage Foundation. www.heritage.org.

Congressional Budget Office. (2014). H.R. 2642, Agricultural Act of 2014. Released January 28, 2014. https://www.cbo.gov/publication/45049 .

Charles, D. (2016). Farm subsidies persist and grow, despite talk of reform. NPR. http://www.npr.org/sections/thesalt/2016/02/01/465132866/farm-subsidies-persist-and-grow-despite-talk-of-reform.

Dismukes, R. & Coble, K. H. (2006). Managing risk with revenue insurance. Amber Waves, 4(5), 22-27.

Edwards, C. (2016). Agricultural subsidies. Downsizing the federal government. Cato Institution. https://www.downsizinggovernment.org/agriculture/subsidies.

Hungerford, A., Motamed, M., & Cessna, J. (2017). Managing agricultural risk under different scenarios: Selected 2014 farm act programs. Amber Waves. 06 February 2017. https://www.ers.usda.gov/amber-waves/2017/januaryfebruary/managing-agricultural-risk-under-different-scenarios-selected-2014-farm-act-programs/.

Ifft, J. E., Kuethe, T., & Morehart, M. (2015). Does federal crop insurance lead to higher farm debt use? Evidence from the Agricultural Resource Management Survey (ARMS). *Agricultural Finance Review*, 75(3), 349-367.

Innes, R. (2003). Crop insurance in a political economy: An alternative perspective on agricultural policy. *American Journal of Agricultural Economics*, 85(2), 318–335. https://doi.org/10.1111/1467-8276.00122.

Kassel, K., Melton, A., & Morrison, R. (2017). Selected charts from ag and food statistics: Charting the essentials. October 2017, AP-078, U.S. Department of Agriculture, Economic Research Service.

Key, N., Prager, D. and Burns, C. (2017). Farm household income volatility: An analysis using panel data from a national survey. ERR-226, U.S. Department of Agriculture, Economic Research Service.

Kuhns, A. (2017). USDA ERS. Food accounts for 12.6 percent of American households' expenditures. Food prices, expenditures and costs. U.S. Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=58276.

Leadership Report. (2015). Should Washington end agriculture subsidies? The Wall Street Journal. https://www.wsj.com/articles/should-washington-end-agriculture-subsidies-1436757020.

Lee, W.F., & Djogo, A. (1984). The role of federal crop insurance in farm risk management. *Agricultural Finance Review*, 44,15–24.

Marzen, C.G. (2016). Bankruptcy and federal crop insurance. *Virginia Environmental Law Journal*, 34(3), 328-346.

Mitchell, P.D., Rejesus, R.M., Coble, K.H., & Knight, T.O. (2012). Analyzing farmer participation intentions and county enrollment rates for the Average Crop Revenue Election Program. *Applied Economic Perspectives & Policy*, 34(4), 615.

Morris, S.D. (2015). Crop insurance: In areas with higher crop production risks, costs are greater, and premiums may not cover expected premiums. GAO Reports GAO-15-215, Washington, D.C.

O'Donoghue, E. (2014). The importance of federal crop insurance premium subsidies. Amber Waves. 20 October 2014.

Pflueger B. W., & Barry, P. J. (1986). Crop insurance and credit: A farm level simulation analysis. *Agricultural Finance Review*, 46,1–14.

Potter, G. (2014). Agricultural subsidies remain a staple in the industrial world. Vital Signs Worldwatch Institute. 28 February 2014.

Prager, D., Burns, C., & Key, N. (2017). Examining farm sector and farm household income. Amber Waves, 1-11. Retrieved from http://proxygsu-abr1.galileo.usg.edu/login?url=https://search.proquest.com/docview/1930759939?accountid=8167.

Sherrick, B.J., Barry, P.J., Ellinger, P.N., & Schnitkey, G.D. (2004). Factors influencing farmers' crop insurance decisions. *American Journal of Agricultural Economics*, 86(1), 103-114.

Shields, D. A. (2015). Federal crop insurance: Background. CRS Report R40532.Congressional Research Service.

Skees, J.R., & Nutt, P.J. (1988). The cost of purchasing crop insurance: Examining the sensitivity of farm financial risk. *Agricultural Finance Review*, 48(1), 37-48.

UGA NCPC. (2018). [Representative Peanut Farm Database: 2012-2018]. The University of Georgia National Center for Peanut Competitiveness. Unpublished raw data.

USDA ERS. Farm income and wealth statistics. U.S. Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics.aspx.

USDA NASS. 2012 Census of Agriculture. U.S. Department of Agriculture, National Agricultural Statistics Service. https://www.agcensus.usda.gov/Publications/2012.

USDA RMA. History of the crop insurance program. U.S. Department of Agriculture, Risk Management Agency. https://www.rma.usda.gov.

USDA RMA. Summary of business reports and data. U.S. Department of Agriculture, Risk Management Agency. https://www.rma.usda.gov/data/sob.html.

Vandeveer, M. L, & Loehman, E. T. (1994). Farmer response to modified crop insurance: A case study of corn in Indiana. *American Journal of Agricultural Economics*, 76(1), 128.

White, D. (2016). What are U.S. farm subsidies? ThoughtCo. https://www.thoughtco.com/us-farm-subsidies-3325162.

APPENDIX A: Institutional Review Board (IRB) Protocol Exemption Report