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# WAEA Presidential Address: Moving Agricultural Policy Forward: Or, There and Back Again

**Eric J. Belasco**

This paper discusses the relationship among agriculture, agricultural policy, and economic research. More specifically, this paper evaluates the relevance of current agricultural policy research on crop insurance in meeting the demands of modern agriculture. While forms of disaster assistance created as part of the New Deal persist today, it is argued that there are analytical tools available that allow for policy to be derived by utilizing better data and empirical methods.

*Key words*: crop insurance

> The job of the economist is by no means completed with fact collection. If [they are] to meet the challenge there yet remains interpretation and synthesis and arrival at a basis for action in the dynamic realm of economic life. –M. L. Wilson (1926, p. 9)

Over the last few years, agriculture has experienced an array of perils thrown at it in the form of droughts, floods, trade wars, and a global pandemic. In response to these adversities, policy makers have utilized a combination of policy levers, including crop insurance, direct disaster assistance, and formal disaster programs, among others. Many of these policy levers were developed during the New Deal era in response to declining incomes and reduced employment opportunities as part of the Great Depression and reduced farm productivity from the Great Dust Bowl (Coppess, 2018; Glauber and Collins, 2002).

This paper poses the question as to whether the modern portfolio of agricultural policy research meets the challenges of modern agriculture and agricultural policy. I evaluate the relevance of modern agricultural economics research related to crop insurance and place it within the context of the current agricultural system. What have we learned about crop insurance during the experience of the last 30 years? What research topics remain unanswered? What are some of the ways that agricultural economists can provide value to existing agricultural policy?

While this paper mainly focuses on how agricultural economists can assist in moving agricultural policy forward, there are a couple of caveats. First, there are obvious political constraints that are always a part of the policy equation. This paper is not intended to minimize or second-guess efforts

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Eric J. Belasco (eric.belasco@montana.edu) is an associate professor in the Department of Agricultural Economics and Economics at Montana State University.

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This paper shares its subtitle with the beloved novel by J.R.R. Tolkien, formally titled *The Hobbit: Or, There and Back Again*, which documents an adventure taken by Thorin and company. While they initially set out to reclaim the dwarves' home and gold from a dragon, they return with a sense of victory in having achieved their objective. However, in many ways the story ends where it began, and Lord of the Rings saga documents another battle for future generations. In a way, the battle to advance agricultural policy seems to be one and the same, where forward progress is made in some eras, only to find ourselves fighting similar perils in a different environment.



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in past policy decisions but is focused on the research supporting agricultural policy. Second, I have attempted to document some of what I have found to be the most important agricultural policy research in the recent past and carve a path for future research. I will undoubtedly fail to mention many important research contributions within this space and other important topics in agricultural policy.

## Dynamic Agricultural System and (Mostly) Static Policy

Modern responses to disasters in agriculture owe much of their approach to those developed during the New Deal era. During that period, a new approach to agricultural policy was especially warranted given the lack of federal support for an industry that had been battered by the Great Depression and Dust Bowl in quick succession. One of the most fundamental issues in agriculture, which ultimately led to some of the first major New Deal policies in 1939, includes the disconnect between agricultural production and consumption. To illustrate, Henry Wallace, the first agricultural secretary under the newly developed USDA, stated that

> We got a picture of a gorge, with farm surpluses on one cliff and under-nourished city folks with outstretched hands on the other. We set out to find a practical way to build a bridge across that chasm. (Coppess, 2018, p. 22)

Using this era as a starting point, it is clear that food security and the economic efficiency of the food supply chain were on policy makers' minds. In many ways, the efficient delivery of food from farm to consumer was the primary function of the federal government's provision of monetary support to agriculture. This issue persists, as can be seen in demand and supply disruptions from the global COVID-19 pandemic. While it is reasonable to think that price signals from consumers would provide producers with key insights into the production decisions, there can be a rigidity and a lag between receiving this signal or being able to respond to the signal. This lag arises due to the production cycle but can also persist from structural stickiness in the supply chain. In the past, this resulted in over- or under-production of commodities, since farmers cannot immediately produce items demanded by the consumer. It was this imbalance that introduced what we now see as modern federal farm policy.

Crop insurance was first offered as a pilot project for wheat as part of the 1938 Agricultural Adjustment Act. It can be argued that crop insurance is not comprehensively used to mitigate the influence of disasters in agriculture, as evidenced by the recent disaster programs resulting from Chinese tariffs (Market Facilitation Programs in 2018 and 2019) as well as the impact of COVID-19 (Coronavirus Food Assistant Program under the CARES Act). A notable exception is the 2012 drought, which occurred throughout a large swath of the productive Midwest corn and soybean regions and resulted in no *ad hoc* disaster relief but was paid through higher-than-normal loss ratios from crop insurance.

However, droughts are one peril that modern farm policy is good at compensating without additional disaster assistance. Adverse market conditions that arise from political and human health events are not particularly well suited to coverage under crop insurance. This is partly because crop insurance is designed to guard against adverse marketing or production outcomes that arise between planting and harvest within a single crop year.

Before getting too far into this discussion, a comparison between the New Deal era and today would be instructive. One of the most descriptive indicators of a weak agricultural market during the New Deal era can be shown with net farm cash income (NFCI). Using data from the USDA/ERS Farm Income and Wealth Statistics, Figure 1 shows NFCI and the percentage that came from direct government payments from 1929–2019. Average real NFCI (in 2020 U.S. dollars) averaged $50.8 billion from 1929 to 1941. Following this period, real NFCI remained relatively stable, albeit with periods of ups and downs, with an average NFCI of $104.0 billion since 1942. Given the low level

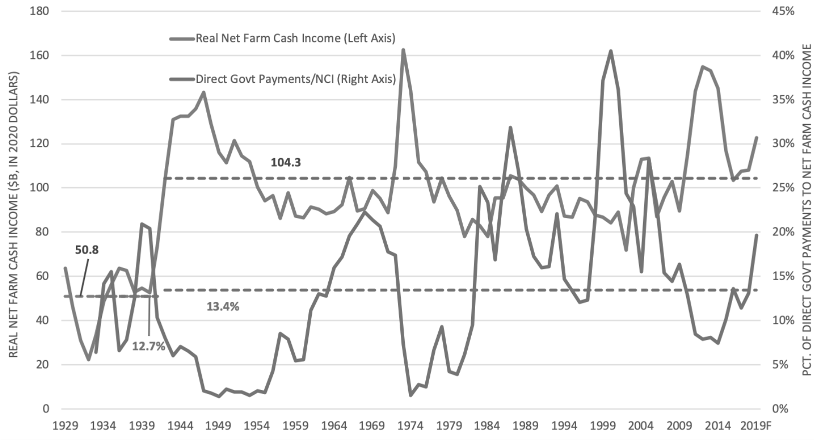


**Figure 1. Plot of Annual Real Net Farm Cash Income and Percent of Direct Government Payments, 1933–2019**

*Source:* Data are from the February 5, 2020, USDA/ERS Farm Income and Wealth Statistics Report.

in agricultural income and the newly developed agricultural support programs, it is worth noting that direct government payments averaged 12.7% (or $7.0 billion) of real NFCI from 1933 to 1941. While it can be argued that the Dust Bowl presented the harshest time in the history of agriculture, the percentage of direct government payments averaged 13.3% since 1942, which is actually higher than during the Dust Bowl era.[1]

Other notable changes since the Dust Bowl era include the consolidation of farms and the use of labor-saving technologies (MacDonald, Hoppe, and Newton, 2018). Given the high fixed costs associated with new technologies, it is easy to see why farm consolidation is a likely result of new technologies. To illustrate, there were 6.8 million farms with an average acreage of 155 acres in 1935, while in 2018 there were 2.0 million farms with an average acreage of 443 acres.

The utilization of labor-saving technologies on farms has lowered the variable cost of production and increased the relative fixed cost of production. This switching has led to substantially higher yields in major commodities and an increased reliance on operating and long-term financing. This increased reliance between banks and farmers has coincided with the switch toward more risk management solutions in agricultural farm policy. In many ways, they also encourage the use of risk management in order to guarantee a minimum level of income so that debts on large investments can be repaid.

Since the early 1990s, crop insurance has become a more dominant tool in the portfolio of agricultural farm support. This has occurred for a couple of different reasons. First, the context of global trade within the World Trade Organization has made federal farm support programs like crop insurance more consistent with that legislation (Glauber, 2016). Second, the politics behind using crop insurance, where it is claimed that farmers have "skin in the game" is much more politically palatable than other programs that use direct transfers. One recent example of this movement is the elimination of Direct Payments programs, as part of the 2014 Farm Bill, and their replacement with Agricultural Risk Coverage (ARC) and Price Loss Coverage (PLC) programs. These programs are more similar to revenue crop insurance with triggers and payments based on (individual or county) yields and national prices.

While crop insurance programs have improved substantially over the last 30 years, as will be discussed in the next section, the use of direct disaster payments has persisted. (Goodwin, 1993, p. 425) states that the "goal of the act [Federal Crop Insurance Act of 1980] was to create an insurance program that would replace disaster relief measures while operating on an actuarially

[1] This analysis does not include forecasted levels for 2019, which is anticipated to bring the percentage of direct government payments to 19.6% of a real NFCI of $122.7 billion.

sound basis with limited government interference." Despite large efforts to increase participation through education, expansion into new products, and increased rating accuracy, disaster aid persists alongside the program initially developed as its replacement (Glauber, 2004).

The last 3 years provide an example in which crop insurance was not particularly well suited to protect farmers from exogenous adverse events. As a result of the 25% Chinese tariffs placed on U.S. products in retaliation for the steel and aluminum tariffs placed on U.S. imports, the USDA introduced the Market Facilitation Programs (MFP) in 2018 and 2019. Over those 2 years, the program functioned differently, as in 2018 payments were based on units of production, while in 2019 payments were based on county rates that were paid out based on planted acres for a wider range of commodities. While both programs made payments to compensate for losses due to the increased Chinese tariffs, the amount of payments increased from $8.6 billion under the 2018 MFP to $14.5 billion under the 2019 MFP. These payments, totaling $23.1 billion, were made in addition to the $22.3 billion in net payments to farmers through crop insurance from 2018 to 2019.[2]

Disaster assistance continued into 2020 as a result of supply and demand disruptions related to COVID-19. This resulted in the Coronavirus Food Assistance Program (CFAP), which is estimated to provide $9.5 billion in direct payments to farmers in addition to $14 billion in direct payments under the Commodity Credit Corporation (CCC) funding mechanism. The CCC was also used to provide funds for the MFPs and was established in 1935 with the following purpose, documented in the Commodity Credit Corporation Charter Act:

> For the purpose of stabilizing, supporting, and protecting farm income and prices, of assisting in the maintenance of balanced and adequate supplies of agricultural commodities, products thereof, foods, feeds, and fibers, and of facilitating the orderly distribution of agricultural commodities.

While legislation during the New Deal era marked a notable turn in the relationship between agriculture and the federal government, the remnants of those policies persist in the modern environment. (Coppess, 2018, p. 303) explains that new programs face more significant obstacles than maintaining the current programs: The legislative process "creates real challenges for new policies and for changes to existing policies because they must overcome significant hurdles in order to become law." As a result,"...interest groups are generally considered more successful at blocking legislation than at passing it" (Coppess, 2018, p. 303). It is likely for this reason that policy has not evolved as quickly as the agricultural system.

## Revealed Agricultural Policy through Economic Research

While agricultural policy might be sticky in some areas, opportunities for research assessing and informing agricultural policy have expanded with more access to data with a longer series of farmer decisions and agricultural production. In what follows, I discuss some of the areas in which agricultural economists have contributed to research related to important aspects of agricultural policy.

### *Continued Improvements in Crop Insurance Rating*

The notable departure of crop insurance relative to other farm policy instruments is its reliance on actuarial fairness. To be more specific, the USDA Risk Management Agency (RMA) is mandated to rate insurance policies such that "the amount of the premium shall be sufficient to cover anticipated

[2] Net payments to farmers are calculated by summing total subsidies ($12.7 billion) and indemnity payments ($17.1 billion), then subtracting farmer-paid premiums ($7.5 billion). These payments are made in addition to the payments made to insurance companies through administrative and operating (A&O) payments ($3.1 billion) and underwriting gains ($3.0 billion).

losses and a reasonable reserve" (Coble et al., 2010, p. 11, quoting the Federal Crop Insurance Act, Sec. 508(d)(2)). This mandate has resulted in an explosion of research related to the efficiency of crop insurance rates through a multitude of channels.

Much of this research is related to estimating the distribution of detrended yields. To characterize the distribution of farmer and county yields, various distributions have been considered, including the normal distribution (Just and Weninger, 1999; Atwood, Shaik, and Watts, 2003), while others have considered incorporating skewness and kurtosis (Ramirez, Misra, and Field, 2003; Sherrick et al., 2004; Coble et al., 1996). The presence of heteroskedasticity has also been identified (Harri et al., 2011; Ker and Tolhurst, 2019) and has become more important as yields have changed over time due to new technologies in both seed and machine technology. Additional research has evaluated the relative merits of more flexible distributional forms to include nonparametric and semiparametric distributional forms of yields (Ker and Coble, 2003).

Motivated by the movement toward revenue-based insurance, which includes the product of yield and prices, has led to an increase in methods evaluating the bivariate nature of yields and prices (Goodwin, 2015; Goodwin and Hungerford, 2015). Additional papers have focused on efficiently estimating rates under small samples (Rejesus et al., 2015), which is a persistent problem in estimating crop insurance rates in areas or among individuals with limited production histories.

It is notable that much of this research has persisted in spite of widespread usage of data at the policy or individual level. Much of the research detailed above has been conducted using publicly available county-level information, some of which make adjustments to estimate individual-level information based on the processes detailed in Coble and Dismukes (2008).

### *Demand for Crop Insurance Is Mostly Inelastic*

With the constant growth of crop insurance—both in terms of liability and acres enrolled, as shown in Figure 2—a solid body of research has focused on demand for crop insurance and the impact of changes in prices, either through subsidies or premiums, on participation. One consistent finding is that the demand for crop insurance appears to be fairly inelastic (Goodwin, Vandeveer, and Deal, 2004; Goodwin and Smith, 2013; Young, Vandeveer, and Schnepf, 2001). Additionally, farmers in riskier areas tend to have more inelastic demand for insurance (Goodwin, 1993). These findings partially explain the need to increase subsidies to the relatively high average subsidy rate of over 60% in order to sufficiently increase participation in the program to avoid issues associated with adverse selection. There has been a lot of concern over the impact of adverse selection in insurance markets, going back to Rothschild and Stiglitz (1976), who found that asymmetric information between high- and low-risk participants leads to rates that are more inviting to a higher-risk pool and lead to poor program performance by leaving out many low-risk participants.

A related challenge in this area of research is the endogeneity associated with participation and rates, since crop insurance rates can be influenced by the risk profiles of those who participate in the program. To better understand the demand for crop insurance, the identification of participation responses from exogenous shocks becomes an important empirical consideration. There have been two recent efforts to avoid these endogeneity issues. First, Woodard and Yi (2020) account for the endogeneity between premium rate calculations and participation and find that demand is relatively more elastic than had previously been thought. Second, DelCurto (2020) estimates the demand for crop insurance using rates derived under the Pasture, Rangeland, Forage program. The advantage to this strategy is that rates are derived independently of participation and based on historical rainfall. Because of this, the estimation can be conducted without concern of adverse selection, since the rates are not influenced by participation in the program.

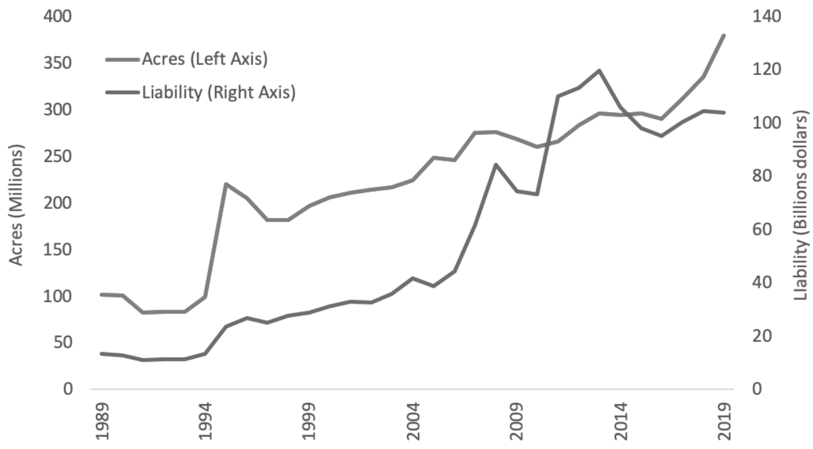


**Figure 2. Plot of Annual Federal Crop Insurance Participation, 1989–2019**

*Source:* Data are from the USDA Risk Management Agency, Summary of Business.

### *Moral Hazard and the Unintended Consequences of Crop Insurance*

Moral hazard, which occurs when farmers respond to participating in crop insurance by adjusting behavior in other areas, is a major concern in agricultural crop insurance policy for two reasons: First, if producers change their behavior, the rates they are presented with may no longer be consistent with their risk profile. For example, if a farmer takes on riskier farm management practices upon being insured, then their rates do not reflect this change in practice. For example, Smith and Goodwin (1996) account for this endogenous relationship by using a system of simultaneous equations approach and find that those who participate in crop insurance tend to use fewer chemical inputs, thereby increasing risk. Conversely, farmers who participate in crop insurance may avoid costly investments in better farming practices that may assist in adapting to longer-run climate concerns (Annan and Schlenker, 2015). Again, the issue of endogeneity is important to consider here since farm management decisions tend to be correlated across a range of decisions. Identification has always been a challenge in this domain of research.

Second, moral hazard can have impacts on other areas of agriculture. In addition to environmental impacts (Smith and Goodwin, 1996), crop insurance participation has been found to increase debt holdings among farmers (Ifft, Kuethe, and Morehart, 2015) and influence crop selection decisions (Yu and Sumner, 2018).

### *The Cost of Basis Risk*

Given the notable issues around adverse selection and moral hazard on crop insurance rating and the viability of the crop insurance program, many efforts have been made to develop area- and weather-based insurance programs that can avoid many of the associated issues. While there has been a good amount of research in this space, there is also plenty of room for additional research to mitigate the impact of basis risk and improve area- and weather-based insurance policies.

Miranda (1991) first defined basis risk as the difference between systemic and idiosyncratic risk components. While systemic risks include perils that influence producers across a region (e.g., drought, flooding, or low prices), idiosyncratic risks are localized to a single farm or small area (e.g., hail or pest damage). The vast majority of crop insurance liability and acreage is devoted to individual plans that insure both idiosyncratic and systemic risks, such as Revenue Protection ($76.5

billion in 2018) and Yield Protection ($6.7 billion in 2018), relative to Area Revenue Protection ($1.1 billion in 2018) and Area Yield Protection ($0.2 billion in 2018).[3]

This lack of participation occurs, in spite of the relative merits suggested in Miranda (1991), including lower cost of delivery and rating that occurs with limited impacts from adverse selection and moral hazard. Further, Paulson and Babcock (2008) demonstrate how a free area insurance program can increase direct benefits to producers. More recently, Belasco, Cooper, and Smith (2020) show that a weather-based disaster program that covers only systemic risk could save approximately 30% of all crop insurance expenditures.

While the savings of such programs, along with the consistency of a program that covers only systemic risks, is likely to be appealing, producers have been reluctant to purchase area products due to the presence of basis risk, where payments are not made when losses are experienced (Smith and Watts, 2009). However, with better access to weather and production data, along with improved modeling techniques, there has been significant efforts aimed at minimizing basis risk through estimating the relationship between weather and yields.

Initially, much of this research was motivated by identifying the potential impact from climate change on agriculture by taking future climate projections and using historical weather-production relationships (Deschenes and Greenstone, 2007; Schlenker and Roberts, 2009; Tack, Barkley, and Nalley, 2015; Ortiz-Bobea, 2020). Other studies have attempted to isolate the impact of technology on yields by conditioning on the impact of weather (Yu and Babcock, 2010; Goodwin and Piggott, 2020).

However, a developing area of research to characterize basis risk is through the implementation of the Pasture, Rangeland, Forage insurance program. Because this program is weather based, it provides a natural laboratory that demands more attention to specify the relationship between weather and production. Maples, Brorsen, and Biermacher (2016) note that rainfall does not tend to be a good predictor of forage production in Oklahoma. Yu et al. (2019) estimate basis risk, measured as the correlation between estimated production from weather and the actual production, to be around 26% in Kansas and Nebraska.[4]

Methods that account for the complexity of impacts that weather can have on agricultural production—including the intensity, timing, and interactions among weather indicators—can minimize basis risk. Two recent efforts that I've worked on have used weather data to directly regress agricultural yields for livestock (Belasco, Cheng, and Schroeder, 2015) and crops (Belasco, Cooper, and Smith, 2020). Further refinement of those relationships may provide a more cost-effective way to insure agricultural operations from large risks while significantly mitigating the cost to taxpayers.

In summary, some persistent themes run through the major innovations in agricultural policy research. First, the availability of data is critical: Better availability has allows for more timely and precise analysis. Farm-level data provide a superior framework from which to evaluate the impact of policy and come from state farm management organizations and USDA-ERS initiatives. Additionally, the availability of weather data, albeit increasingly complex, provides opportunities to evaluate one of the biggest historical risk factors in agricultural production. Second, data-driven techniques have assisted in pushing research forward in areas where data analytics are used as the framework. This type of research can be found in improving crop insurance rates, estimating the degree of basis risk, and the estimating moral hazard. Third, requirements for data integrity and continued assessments, as is the case for crop insurance, help provide policy makers and researchers with compatible research incentives. As agricultural policy research moves forward, it is important to carry these concepts forward to improve the efficiency and effectiveness of agricultural policy.

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[3] These figures are from the USDA-RMA Summary of Business Report, which can be found at https://www3.rma.usda.gov/apps/sob/current_week/insplan2018.pdf.

[4] Smith and Watts (2009) estimate the correlation between weather station results and farm-level yields to be around 0.35 when approximating by using the product of the correlation between weather and yields at the same location to be 0.70 and the correlation of yields between farms to be 0.50.

## Remaining Empirical Questions

Despite a long history of evaluating economic issues around agricultural policy going back to nearly 100 years, a number of questions have arisen from past research or remain unanswered by that research.

### *Crop Insurance Purchasing Decisions*

Major row crops in the United States—including corn, soybeans, wheat, and cotton—experience high levels of participation in federal crop insurance programs. However, there is still much to learn about the decisions farmers make regarding their crop insurance policy after the participation decision is made. One important decision is that of coverage level selection. This question is notable because we would expect farmers to select the highest coverage level possible whether the underlying behavioral assumptions include classical expected utility theory or a prospect theory probability weighting approach. This is because of the subsidized nature of crop insurance. However, coverage levels tend to vary by region (Bekkerman, Belasco, and Smith, 2019, Appendix B) and are commonly not at the highest possible coverage level, violating basic economic theory. Boyd (2019) finds that coverage levels tend to be negatively related to premium costs and that financial liquidity constraints may play an important role in coverage level selections. Since participation rates are very high in most major row crops, decisions around coverage level and unit designation may provide the marginal responses from farmers resulting from changes in the price of insurance. For example, a change in the subsidy rate is likely to influence coverage level and unit designation decisions rather than participation decisions. A better understanding of this relationship could guide current debates regarding the optimal subsidy rate and what impact that change would have on the risk portfolio held by farmers and the government.

However, many commodities still have relatively low participation rates, where the determinants of participation may be critical and fundamentally different from major crops. With the expansion of crop insurance to more crops and livestock operations, as part of the 2000 Agricultural Risk Protection Act, many of those products suffer from low participation. For example, in spite of the huge growth in organic crop insurance offerings since 2007, many organic programs still suffer from low participation rates (Morris, Belasco, and Schahczenski, 2019). While most crop insurance products have been developed with large-scale row crops in mind, other operations that produce a diversified range of products or market direct to consumers still mostly do not participate in crop insurance. Morris, Belasco, and Schahczenski (2019) find that many producers refuse to participate in crop insurance due to the complexity of reporting across many products or that they have found alternative ways of managing risk. They also find that the largest determinant of whether organic operations will utilize crop insurance is the existence of an operating loan on the farm.

The introduction of the Whole Farm Revenue Protection (WFRP) insurance program, a step toward insuring producers who are not actively participating in federal crop insurance programs, raises one of the major issues with crop insurance as the dominant federal safety net program. Those who don't participate in crop insurance forgo the main federal benefit program given to farmers, resulting of a tilting of the playing field toward more conventional producers. Further, Morris, Belasco, and Schahczenski (2019) find that many of the farms served by the WFRP are not the diversified operations originally intended but farms that purchase traditional insurance (revenue or yield protection) along with WFRP to be used as an umbrella policy.

The Pasture, Rangeland, Forage (PRF) insurance program, which is fundamentally different from other crop insurance offerings, also has relatively low participation rates (Goodrich, Yu, and Vandeveer, 2020). However, in addition to the participation decision, the PRF program also requires choices regarding coverage levels, interval selection, and productivity factors. Given the large recent changes to the county base values and the resulting changes to premiums (DelCurto, 2020), the evaluation of modification within the policy provides an interesting area of new research. Many ranch operations, which would be good candidates to participate in the PRF program, do not have the same experience with crop insurance that farmers have.

Creating new programs or adjustments to existing programs that provide producers and ranchers who are not currently served by the crop insurance program would provide much value to the agricultural landscape. One potential avenue to provide insurance to low-participation groups is through the use of formalized disaster programs. A recent example includes the implementation of the standing livestock disaster programs. Major uninsurable risks in ranching include drought, extreme weather events (e.g., heavy off-season snow), flooding, and fires. The programs—which include the Livestock Forage Program (LFP), Livestock Indemnity Program (LIP), and Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish (ELAP)—are automatically triggered by these events and avoid the political dynamics required for other, *ad hoc* disaster programs. These programs also realize significant savings, relative to crop insurance, since they are administered by the Farm Service Agency (FSA) and not through a public–private partnership, saving costs through underwriting gains and some operational costs. The LFP, in particular, is based on weather information and is triggered without the need for insurance agents or adjusters and can be administered at a low cost. The extensive use of weather stations across the United States, along with good research relating weather to agricultural production, provides a fruitful opportunity to develop more weather-based insurance programs that can save significant costs.

### *The Impact of Market Consolidation*

One of the primary changes in agriculture over the last 50 years is that of market consolidation, as fewer farms have expanded into larger operations across all commodities. Consolidation is also observed further down the supply chain in the form of increased market concentration in the processing, marketing, logistics, and retail sectors. The largest contributor to this consolidation is likely the result of increased segmentation and economies of scale. MacDonald, Hoppe, and Newton (2018) argues that technology plays a large role in consolidation, which may be assisted by federal programs, such as crop insurance, that mainly focused on major row crops from 1987 to 2012.

While the potential economic benefits of consolidation in the form of lower prices to consumers are clear, indirect negative effects may also be introduced into the agricultural market. First, interruptions of major producers may make the agricultural supply chain less resilient in the case of extreme stress, as has been experienced during the COVID-19 outbreak. Second, regional economies may suffer when a few large farms in rural economies support fewer workers. It is also likely that these workers may be displaced into downstream parts of the supply chain, including retail, processing, logistics, and marketing.

Third, policies developed in the New Deal era may no longer be effective if they do not account for consolidation. Bekkerman, Belasco, and Smith (2019) found that crop insurance subsidy benefits increase, on a per acre basis, for larger farms and are extremely concentrated for the largest 10% of farms, in terms of crop sales. Further, policy proposals to limit the concentration in benefits were largely struck down as part of the 2018 Farm Bill discussions, in spite of their limited impact on a very few very large farms. More specifically, legislation aimed at capping insurance benefits at $40,000 has been introduced multiple times under the AFFIRM Act and has failed to be implemented. While the intention of the act is to limit farm concentration, critics argue that under current laws these caps would be difficult to effectively enforce and lead to the creation of "paper farms" (Barnaby and Russell, 2016).

Similar concentration of benefits has been found in the 2018 and 2019 Market Facilitation Programs, although to varying degrees (Belasco and Smith, n.d.). The difference in the concentration of payments between the 2018 and 2019 iterations of the MFP program demonstrates the ways in which these policies lead to very different levels of concentration in payments. In general, the 2018 program is much more concentrated in payment structure because it was tied to total production, resulting in higher per acre payments to more productive farms. Another reason for this relative concentration is the exclusive nature of the program, that was extended to only nine commodities; over three-fourths of the benefits were expected to flow to soybean producers. In contrast, the 2019 program included a wider net of commodities and used a per acre rate throughout the county. As a result, payments under the 2019 program were substantially less concentrated.

This final point presents some researchable questions that economists should focus future attention toward. Should federal farm programs account for or limit market concentration? How can this be done effectively? Do current farm programs reinforce or encourage market concentration?

### *Measurement of Policy Outcomes*

When thinking about the previous questions, it is reasonable to then consider the role of economists in policy matters. While economics has long existed as a positive science, much as described in Friedman (1966), it also relies on the maximization subject to constraints. In this way, it is important to consider the objective function when evaluating farm policy. While it seems to be appropriate to include the expected profits from the farm, that is not a sufficient objective function for a comprehensive federal policy evaluation, since it would simply result in maximizing government payments to the farmer. Then the question becomes: What else belongs in that objective function?

First, if the efficiency of farm programs is being evaluated, then consideration of the cost of the program should also be included in the objective function. If two programs are to deliver identical benefits benefits with differing costs, then the lower-cost policy design reasonably seems preferred. Second, since farm families increasingly rely on off-farm labor and off-farm investments, it seems that household income that includes both on-farm and off-farm income should be considered. Many farm programs, particularly disaster programs, currently only consider the damage done to the agricultural side of the household and ignore the off-farm aspects. Third, I previously discussed aspects of moral hazard and the secondary impacts from farm policy that should also be included into an objective function. If private decisions have negative externalities, then accounting for those seems reasonable in a policy assessment.

While the inclusion of these factors may present significant empirical difficulties, there are even more fundamental questions that should be considered. What is the objective of farm policy? Many past studies use farmer welfare or farmer profits as the primary indicator of policy success. This seems insufficient. Thus, is the objective to reduce farm bankruptcies, increase food security, or increase market efficiency?

## Concluding Remarks

The main rationale behind pushing crop insurance to become the dominant source of federal farm support was that disaster programs had been shown to be remarkably political and inefficient, while other forms of federal farm support had been shown to be incompatible with WTO trade regulations or public perceptions (Goodwin and Smith, 1995). Crop insurance, in many ways, avoids the political whims of elected officials because the parameters of the program are defined prior to a potential event occurs. A second reason is that the program is mandated to be actuarially fair, meaning that it places a priority on constant improvement of rating through empirical research, much of which has come from economists. However, Glauber (2004, p. 1180) notes that "despite large gains in [crop insurance] participation, Congress continues to pass *ad hoc* disaster legislation."

However, the last few years have illustrated the limitations of crop insurance in comprehensively protecting farm incomes from geopolitical and major health events. The political incentives to utilize direct disaster aid relief have been fairly obvious over this time. The creation of innovative and formalized disaster programs may provide a more effective way to protect farm incomes while maintaining a market-based agricultural system that avoids the influence of political pressures.

While agricultural policy research has come a long way since the inception of modern farm policy in the 1930s, there remain many areas for agricultural economists to provide value to the agricultural system. In this article, I've attempted to describe some research pathways that could be used to improve agricultural policy for future generations. Never before have empirical researchers had more access to data and the methods to solve the complex policy issues of our time. Agricultural economists need to utilize these tools to provide more effective policy instruments that can be used to support a market-based agricultural system that continues to evolve.

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