Chapter 15
The Policy of Risk Management

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Abstract Agricultural and food production is fundamentally different than other forms of production in the economy, and the differences require alternate methods of risk management. This chapter reviews the primary tools available to producers for the management of price and quantity risk, including insurance, government programs, and market-based instruments. Each of these tools is explained in both historical context and for how it impacts on market function. Current controversies in policy and markets and marketing are then discussed, as are recent research findings and proposed solutions. Some of the controversies addressed are the impact of speculation, packer ownership of cattle, and planting restrictions for decoupled payments.

The peculiarities of agricultural production dictate that risks be managed, and governed, differently from other industries. Risk is randomness in quantity, quality, and price outcomes that makes a difference to those involved. Most individuals and businesses are risk averse, meaning that they prefer certainty over randomness when things are otherwise the same.

The production and distribution of food has often been treated differently than that of other commodities. As food is a necessary ingredient to life, there is an emotional dimension to the different treatment, but there are also economic reasons that production and distribution of food should be treated, if not differently, at least as exceptions to other goods and services. There are many reasons that food and agricultural production can be viewed differently than other products:

- Most foodstuffs degrade with storage
- Output risk is a very real component of the risks faced by agricultural producers

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- Output realizations are often highly correlated across producers, meaning that local production shocks typically imply that regional or national production shocks are more likely
- Demand is inelastic, so shocks have recognizable price impacts
- Production of many agricultural goods is annual, but consumption is continual, and therefore storage is required for year-round availability
- Much of the expenditure for production is spent early in the production cycle, and only weeks or months later does the harvest occur
- Food commodities can be a vector of disease transmission

The risk involved in this set of factors and the price volatility that results create difficulty not only for producers but for all members of the value chain. Processors must worry about pricing as well as inventory risks. Price volatility can affect consumers, especially the poor, as increased prices reduce the budget share available for nonfood purchases. For these reasons, specific mechanisms have evolved in agricultural markets to transfer and mitigate price and production risk.

The risk management options offered to the food system, especially the producers of basic agricultural commodities, are more varied than those of nearly any other industry. In fact, many of the risk management tools currently enjoyed by other commodity and financial industries had their genesis in agricultural production—Aristotle referred to what are now known as option contracts in Book I of *Politics*. Futures markets, as they are now known, originated with the trading of grains in Chicago and rice in Tokyo in the nineteenth century. Only later were such contracts extended to other commodities and financial instruments. Now, a decade into the twenty-first century, the markets for financial derivatives are much larger than the agricultural derivatives markets.

Until the late 1990s, most of the risk management options available to producers were either production based, insurance based upon realized production, or price based, which allowed producers to "lock-in" prices. Beginning in the 1990s, a new class of insurance products became available that insured revenue risk—the total revenue of the operation. These insurance policies were an important advance, as previous "price only" or "yield only" contracts could not account for the "natural hedge"—the fact that when yields were decreased, prices tended to increase, partially offsetting the loss. By insuring only price or yield, the production risk faced by the producer was underinsured. By insuring both price and yield separately instead of revenue, risks were over-insured.

Insurance

Farmers in 2010 have more tools than ever to manage the production and price risk that they face. Farmers today can also manage the risk of production for more crops than ever before. With whole-farm insurance, almost all production and price risk can finally be insured at some level. But the tools available, the cost of coverage,

and the ability to manage risk for specific products still vary dramatically by sector. Broadly the availability of insurance improves farmer outcomes. By pooling risk among producers, insurance permits farmers to spread negative outcomes, and approach production with less need to manage in a highly risk averse, and therefore, less productive, manner. Producers of program row crops, such as corn, soybeans, wheat, and cotton, continue to have the most options and the lowest coverage prices, while livestock and specialty crop producers have significantly less ability to manage their risks. Insurance itself provides an important tool, and increases the technical and allocative efficiency of agricultural markets. By pooling risk, producers can behave in a more risk-neutral manner when it comes to production decisions, and respond to market price signals more quickly. However, the current coverage of the insurance types offered creates some nonmarket inefficiencies, namely, that the products offered for row crop production are much more varied in their structure than those for fruits and vegetable production, and so therefore indirectly promote staple crops at the expense of more nutrient dense fruits and vegetables.

Insurance products available to row crop producers were simplified in 2010, as two revenue products, revenue assurance and crop revenue coverage, were combined into a new revenue protection product. As of this writing, there are four different insurance products offered to crop producers.

Actual Production History (APH) coverage is the most traditional form of crop insurance. The producer insures 50–75% of yield at 55–100% of a reference price set by the Risk Management Agency (RMA) of the USDA. APH indemnities are triggered solely by yield shortfalls, and therefore, APH is commonly referred to as "yield insurance." APH insures against yield losses caused by drought, flooding, hail, wind, frost, insects, and disease.

Yield Protection (YP) coverage is a variant of APH in which a "Commodity Exchange Price" is used to calculate indemnities instead of an RMA reference price. This commodity exchange price is calculated with commodity futures prices during the harvest period. This allows the price used in indemnity calculation to better match the price of lost production, in the event of large increases in crop prices throughout the growing year.

APH provides excellent protection against production losses, but it does not provide any protection against large declines in price during the growing season. For example, in a year in which the Western Corn Belt had record production, resulting in lower market prices for the nation, a producer in North Carolina who had average or slightly below average production might incur a significant revenue loss but yet not receive an indemnity under APH or YP.

Revenue Protection (RP) insures the crop revenue against losses from drought, flooding, hail, wind, frost, insects, and disease. Insured revenue per acre is calculated as the product of historical yield and the greater of the harvest futures price during the sign-up period and futures prices during the harvest period. Producers may generally insure up to 75% of their revenue. Because RP is highly tailored to the production risk of the farm, it provides the closest alignment of indemnity and loss. This comes at a cost, however, and, in general, RP plans will have the highest premium-per-dollar insured of crop insurance policies. One way to reduce the cost

of RP is to use whole-farm coverage, in which the revenue target is calculated for all land and crops in a given county, diversifying the risk and lowering the premium for a given level of coverage.

An alternative method of insurance, one that not only potentially offers lower premiums but also eliminates the moral hazard potential of APH and RP plans is the Group Risk Plan (GRP). GRPs are similar to APH plans, but instead of calculating indemnities based on the farm yield shortfall, indemnities are based on the failure of the county average yield to meet its historical average. While this lowers the correlation between the payments and losses to a particular farm or field, it also significantly reduces the premium, even if the coverage level is increased to the maximum 90%. An additional advantage is that since indemnities are paid based on county-level yield, the farmer is no longer required to prove yields annually, or to maintain records at the field or farm level. Group Risk Income Protection (GRIP) is revenue insurance, similar to RP, but whose yield history and realization are based upon county-level averages, like GRP.

Livestock Gross Margin (LGM) policies are available for cattle, dairy, and swine producers. Livestock gross margin insurance provides producers of covered types of livestock with an insurance guarantee on the difference between the value of the output and feed costs—gross margin. The output price and input costs are all based on futures prices. However, LGM does not cover livestock losses, only losses in the value of the livestock due to market fluctuation. The advantage of LGM over the construction of a private-market contract for production is that LGM policies, like other policies offered by the RMA, offer a premium subsidy, which makes purchase through the RMA less expensive than a market-based instrument.

Livestock producers also have livestock risk protection (LRP) policies available. LRP policies are offered for feeder cattle, fed cattle, lamb, and swine. LRP policies indemnify producers against declines in market prices only, not against mortality or other production losses. The feeder cattle prices are based on CME futures prices. For fed cattle, lamb, and swine, prices used to calculate indemnities are based on USDA-AMS regional cash price series, in order to increase the correlation between the prices received by the producer and the prices on which the insurance policies are based.

Finally, Adjusted Gross Revenue (AGR) and AGR-Lite policies provide insurance for a farmer's Schedule F—the Internal Revenue Service form used to report farm earnings—income for commodities not coverable by other insurance programs. These programs provide producers of specialty and nontraditional crops potential protection against a variety of losses. Additionally, because the AGR and AGR-Lite are based on Schedule F revenue, they also cover production risk, not just price risk, for agricultural producers.

An important dimension of understanding crop insurance participation is the realization that many of the premiums are subsidized. The crop insurance programs administered by the RMA are required to be "actuarially sound"—have an expected payout equal to the premiums collected. But this applies to the premiums *after* premium subsidies. Over time, the subsidy rates have varied, to emphasize different priorities in RMA thinking about crop insurance. During the mid-2000s, the Group

plans (GRP and GRIP) had relatively large premium subsidies, to encourage producer enrollment. This emphasis was thought to be the result of the large reduction in moral hazard in these types of plans. As pressures to reduce the US federal deficit have increased, these subsidy levels have come under increased scrutiny. From an efficiency standpoint, such a subsidy program, in which premium subsidies rise with the level of coverage, reduces allocative efficiency, as producers may be encouraged to take out higher-than-optimal levels of insurance, which may result in higher levels of risk being assumed. According to Babcock, a reversion to a pre-2000 premium subsidy scheme, in which farmers received a fixed per-acre premium subsidy, could reduce total cost of the program by up to $2 billion.

Government Programs for Risk Management in Agriculture

Through the passage of legislation, the United States has many programs that affect agricultural producers. In this section, only those programs that directly affect profit risk are discussed, such as Direct Payments (DPs), Loan Deficiency Payments (LDPs), and Milk Income Loss Contracts (MILC). Programs such as Environmental Quality Incentives Program (EQIP) and the Conservation Reserve Program (CRP), which offer payments for the provision of environmental amenities or practices, do not aim to directly affect the profitability of agriculture for its own sake, but instead to offset the cost of agricultural practices desired by the US Government and its agencies.

Row crop producers have five government programs related to profitability, Direct Payments, LDPs, Counter-Cyclical Payments (CCPs), Average Crop Revenue Election (ACRE), and Supplemental Revenue Assistance (SURE). DPs were originally known as Agricultural Market Transition Assistance (AMTA) and were introduced in the 1996 Federal Agricultural Improvement and Reform Act. They were to provide compensation to producers in exchange for ending all government programs over the life of FAIR. However, the FSRIA continued AMTA payments and renamed direct payments, as the low prices of the late 1990s eroded the political will for ending farm support. A further advantage of DPs to the writers of the FSRIA was that because they were based on historical yields and acreage allocations, they were "decoupled" from production decisions and therefore fell into a category of support payments that had no limits under the World Trade Organization, known as "green box." DPs today are fixed per-acre payments based upon the historical production of a given farm, and are paid regardless of the current use of the farm, unless it is used for fruit or vegetable production. If not for the fruit and vegetable proscription, DPs would not affect allocative efficiency, as they don't affect production decisions. However, they do adversely affect allocative efficiency, as payments are made regardless of any other decisions made by the producer.

LDPs are effectively price supports in place to guarantee minimum prices to producers of covered crops. Instead of providing an explicit guarantee to purchase the crop at a price, the LDP program makes payments to producers based on the

difference between the price of the commodity when it is sold or when a loan is taken against its value and the "loan rate" or guaranteed price. One particularly controversial provision of the LDP program is that crops can be put "under loan" which fixes the price on which payments are based, without actually selling the crop. This provision gives producers the ability to set the price on which deficiencies are paid at harvest, when cash prices are lowest, and then actually selling later, when cash prices have risen. Based upon the prevailing crop prices in 2010, the guaranteed price is far below market prices, and therefore the LDP program has played little role in the agricultural policy debate since prices began rising in 2006. LDPs were always seen as highly distorting and inefficient, and have been the target of multiple WTO actions. By effectively setting a price floor, they distort price signals and encourage overproduction during periods of low prices. LDPs reduce technical and dynamic efficiency by blunting the incentive to improve production practices, and are allocatively inefficient as they can, and have, make substantial payments in high revenue years in which prices are very low but output is very high.

CCPs were reintroduced in the 2002 FSRIA to provide additional support to growers in times of low prices, ostensibly in replacement for the disaster payments made to producers in the late 1990s after the Asian currency crisis, which greatly reduced Asian demand for the US crops, and their prices. CCPs used a target price system, in which farmers were paid the difference between the target price, which was set above the cost of production, and the average annual commodity price, as determined by the USDA. The size of the direct payment was subtracted from the CCP, and the resulting per-bushel payment level was paid based on historical acreage and production levels. CCPs were claimed to be decoupled payments at the time of their inception, because they were based on historical acreage allocations and production levels. In this way, they are similar to DPs; their efficiency implications are identical to DPs.

The ACRE payment system was introduced in the 2008 Food, Conservation and Energy Act. The ACRE program is designed to assume the risk of systematic, multiyear declines in commodity demand that result in lower prices while continuously updating price levels. One criticism of previous support mechanisms, such as CCP and DP, is that the support levels are set in statute, therefore requiring action by Congress to alter them in response to changing market conditions. After the increase in commodity prices that began in 2006, CCP target prices and loan rates used to compute LDPs were far below market prices, and therefore offered little support. For each crop year, ACRE calculates a target revenue, based on state yields, and the 5-year Olympic average of prices. Payments are made to farmers if they suffer an actual yield loss and if the product of national price and state yield is below the ACRE revenue target. The use of the 5-year Olympic mean of prices prevents the prices being guaranteed by ACRE from ever becoming irrelevant if prices move upward over a number of years. This also presents the very real danger, from a producer's perspective, that prices may fall well below the cost of production over a number of years, and ACRE will not necessarily provide them long-term support. From this perspective, ACRE payments are more dynamically and allocatively efficient than LDPs, as the payment levels do not fully insulate growers from market

price signals. However, they are still less allocatively and dynamically efficient than an undistorted market, as they spread large price changes over a matter of years. The fact that ACRE benefits are provided freely (even though producers must give up LDPs, CCPs, and a portion of their DPs, the producers do not bear any cost for those programs) reduces the overall allocative efficiency of the marketing system, as it underprices the risk protection that ACRE provides.

The final major Federal program to help producers manage risk is the MILC, which was introduced in the Farm Security and Rural Investment Act of 2002 and reauthorized with changes in the 2008 FCEA. After the 2008 reauthorization, MILC provides payments to milk producers based on the difference between milk prices and the price of a reference feed ration, thereby making the MILC contract a true "profit" insurance contract. Because it partially insulates producers from periods of low profitability—reducing incentives to modify methods, shrink, or expand in response to changing market conditions—MILC reduces technical and allocative efficiency.

Market-Based Instruments

Futures contracts are the oldest forms of risk management available to producers. All of the major row crops have futures contracts, in which the majority of price discovery and risk transfer occur at low transaction costs. While direct futures contract usage by farmers has typically been low, futures contracts are used by elevators to manage the risk arising from forward and hedge-to-arrive contracts. Elevators similarly use options contracts to manage the risk of "minimum price" cash contracts, which in many cases are simply repackaged options contracts whose premium is offset by the basis differential offered by the elevator.

Futures are one area in which livestock producers are on a roughly equal footing with row crop producers. There are futures markets for both live and feeder cattle, as well as lean hogs. Dairy producers and processors also have a number of futures contracts that can be used for risk management, although the contracts vary drastically in their trading volume, and, therefore, usefulness in risk management. Futures, options, and other exchange-traded instruments increase allocative efficiency by providing price signals to producers and consumers not only for nearby prices but also for prices in the future, in some cases two or three harvest cycles in the future.

While futures contracts have successfully served as a mechanism for price risk transfer, repeated attempts for contracts to transfer other risks faced by agricultural producers have not fared as well. Most notably, futures contracts on state-level yields were offered in the 1990s, but they never achieved significant trading volume and were eventually discontinued. Futures contracts on fertilizer were also introduced, but suffered a similar fate. There have been attempts to use weather derivatives to manage production risk, and although Turvey (2001), Vedenov and Barnett (2004), and Chen et al. (2006) found that weather derivatives can be used to offset production risk, there is little evidence that agricultural producers have begun to use them in any volume.

Cash Contracts

Cash contracts, agreements in which physical delivery of the commodity is a fundamental component, are the primary private method of agricultural risk management. The contracts take many forms, depending on the commodity involved. Grain contracts are often simple contracts to deliver at a future date, with a price fixed at the time the contract is initiated. Contracts in the poultry industry, however, often require the buyer to supply the chicks, feed, and other inputs to production, and compensate the grower based on the weight gained and condition of the birds when they are delivered back to the buyer.

Livestock producers have the fewest options for cash contracts. Because of potential asymmetry of information regarding animal quality, packers are reluctant to agree to purchase livestock far in advance. Instead, purchases are made for immediate delivery. Producers of pork and poultry face similar information asymmetries, but the lower capital requirement for entry has made contract production very common in both industries. As discussed below, contract production is a contentious issue, but from a risk management standpoint, the producer assumes very little market risk—the integrator purchases the feed, supplies the young animals, and markets the grown animals. The actual grower is left only with operational risk—the risk of conditions that result in suboptimal growth of the supplied animals, such as disease, climate, or fire.

Grain producers have a multitude of options for cash contracts. Along with the simple cash forward contract, in which prices are set in advance for deferred delivery of the commodity, there are hedge-to-arrive contracts, in which the futures price is fixed, but basis remains unset until delivery. Alternatively, there is the basis contract, in which a future delivery of grain is contracted, but only the basis portion is fixed, and the futures price portion is left until later. There are also minimum-price contracts, which combine a forward contract with a put option, guaranteeing growers a floor price for their grain. Forward, hedge-to-arrive, and minimum price contracts, even though they are largely repackaged futures or options contracts, are much more common because the elevator typically assumes much of the management required of the exchange-traded security, including the variation margin. Like market-based contracts, cash contracts increase allocative efficiency. They also provide price signals to producers about the value of current and future production and consumption, but because they can be customized to particular locations and grades that are not covered by futures markets, they have the potential to provide even more accurate price signals.

Current Controversies

There are a number of unsettled controversies involving risk management options for producers and marketing firms.

Price Impact of Speculative Activity

Beginning in 2006, a broad swath of commodity prices began climbing. In everything from crude oil to rice, markets rallied almost incessantly from 2006 to 2008, and began climbing again in late 2010. These high prices, especially during 2008, drew attention from all quarters of society. Food riots erupted sporadically in developing nations. Some governments enacted export bans, as policy-makers sought to understand the causes of the higher prices. Others attempted to fix blame for problems on various individual causes, or apportion impact attributable to the various potential sources.

Many blamed speculation for the increases in prices. While blaming speculation for price increases has a long history, the run-ups since 2006 had a new potential villain: the commodity index trader (CIT). Gorton and Rouwenhorst (2006) showed that investing a portion of a diversified investment portfolio into a broad index of commodities can significantly reduce the risk of the overall portfolio. Pension funds and insurance companies were the first to incorporate these findings in their portfolio. However, such investments would still be subject to the position limits that apply to speculators in the futures markets. In 2002, the CFTC granted an exemption to swap dealers, which allowed them to treat hedging of swaps with futures as bona fide hedges—releasing them from speculative limits. This permitted CITs to skirt speculative position limits by purchasing swaps on commodity prices, which the dealers could then hedge, free of speculative position limits. By 2006, billions of dollars had flowed into the commodity markets because of CITs, and many commentators were very blunt in blaming these flows for rising prices. Masters and White (2011) typify this sentiment, "Congress should take the additional step of prohibiting or severely restricting the practice of commodity index replication. This practice represents a new threat to the markets because it inflates commodities futures prices, consumes liquidity and damages the price discovery function." Others have joined in laying blame on CITs, including Robles et al. (2009). Academic studies, however, have found no link between CITs and prices. Sanders et al. (2010) found "that long-only index funds may be beneficial in markets traditionally dominated by short hedging." Irwin et al. (2009a) state "a number of facts about the situation in commodity markets are inconsistent with the existence of a substantial bubble in commodity prices," and "available statistical evidence does not indicate that positions for any group in commodity futures markets, including long-only index funds, consistently lead futures price changes."

Energy/Agricultural Price Correlation

Energy price increases, transmitted through biofuels production, have also been blamed for the rise in commodity prices. Many studies have pointed out the increase in the correlation of agricultural and energy prices. Given the size differential of the two markets, it is therefore implied that increases in oil prices pulled grain prices higher, which, through competition for land and other resources, pulled other

commodity prices higher, as well. Numerous studies have documented the increased correlation of energy and various agricultural prices, including Hertel and Beckman (2010) and Tyner and Taheripour (2008). As energy prices have historically been much more volatile than agricultural prices, the increased linkage means increased volatility in agricultural prices.

Convergence Problems

In 2006, users of the Chicago wheat market began to notice wider and wider *basis* levels—differences between futures prices and cash prices. At the expiration of the futures contract, cash prices at the Toledo, OH, delivery point were $0.50 or more below the futures price, far greater than the historical difference at expiration of about $0.05 or $0.10. The process of cash and futures prices convergence had seemed to break down. Without convergence, there is no guarantee that futures prices are reflective of the cash market, which calls into question the utility of the futures market for either price discovery or risk transfer. During 2007 and 2008, as all commodity prices increased more rapidly, convergence in Chicago wheat deteriorated further, and CBOT corn and soybean futures also began to demonstrate convergence problems. While the CBOT corn and soybean futures convergence improved in late 2008 and thereafter, the CBOT introduced changes to the wheat contract in 2009 to improve convergence performance. Irwin et al. (2009b) and Garcia et al. (2011) document the convergence performance of futures contracts during this time period and suggest potential solutions.

Contract Pork and Poultry Production

The rise of contract production in pork and poultry has been very contentious. While studies have shown that contracting does reduce the risk to producers, the relatively low number of integrators operating in some areas has prompted charges of monopsonistic market power abuses. The integrators assert that this production method reduces variability in animal quality, and results in a more favorable financial situation for producers, as they have a very transparent income stream resulting from the production contracts. Growers counter that the integrators have a wide latitude to set facility requirements, and require costly upgrades, that can be used to punish growers, or cancel contracts early (see Chap. 4 for further discussion).

Packer Ownership of Cattle

In a similar vein, the issue of packer ownership of cattle prior to slaughter has also caused controversy. In order to smooth the flow of animals through packing plants,

and to reduce price risk, some firms began to purchase feeder cattle, and contract their feeding, instead of buying fed cattle from feedlots. Some producers have vociferously complained that this practice allows packers to exercise market power by strategically timing purchases, and better managing their purchases. Packers have pointed out that there is no evidence that such behavior has any adverse impact on the market, and it is simply a way of managing their input price risk. Lawrence et al. (2001) and Koontz and Lawrence (2010) both examine these issues and identify the price impacts and effects on price risk and market power.

Government Program Eligibility and Planting Restrictions

In response to the creation of the World Trade Organization, and its limits on agricultural subsidies, the 1996 and 2002 Farm Bills both increased the amount of *decoupled* support—payments that were not directly tied to production decisions or prevailing prices, and so therefore should not distort allocations of land or other resources. One example of a fully decoupled payment is the Direct Payment, discussed above. However, in these acts, as well as the 2008 Act, one restriction remained on decoupled payments such as the DP and CCP, namely, that these payments would not be made for land on which fruits or vegetables were grown. There is no requirement that the land be in production, it may lie fallow and still be eligible, but fruit or vegetable production results in the land being ineligible for such payments for the duration of the policy contract (Johnson et al. 2006).

Farm Program Overlap

The farm programs that exist today, such as ACRE, SURE, and crop insurance premium subsidies, were often created to meet the needs of producers of specific crops, or to ameliorate the risk of very specific events. As they were not designed as a whole, there may be areas in which the various policies overlap. O'Donoghue et al. (2011) point out the ways in which the current slate of systems make multiple payments to farmers for the same loss, which they term Type I overlaps. These overlaps not only reduce the efficiency of farm support payments, but they may also incentivize inefficient behaviors and make the entire suite of programs more politically vulnerable during periods of budget pressure.

Policy Options and Their Consequences

It is possible to identify some potential policies to address some of the controversies cited above. This section briefly explores those options and their likely consequences.

Speculation

While these issues were certainly not off the radar previously, in 2009, the new administration made them a greater priority. The combination of higher commodity prices from 2006 to 2008 and the ensuing recession—events that have been hypothesized to be related (Hamilton 2009)—led to the Wall Street Reform and Consumer Protection Act of 2010 (commonly known as Dodd–Frank). While the central aim of the Act was to reform the financial institutions to reduce the probability of a 2007–2008-style financial crisis, the Act touched nearly all aspects of domestic financial markets, including commodity markets. In particular, the Act brought nearly all over-the-counter derivatives trading under the jurisdiction of the Commodity Futures Trading Commission, and required the CFTC to place position limits on speculators in these commodities under the assumption that excessive speculation creates systemic risk and impedes price discovery. In response to its legal responsibility, the CFTC has proposed a number of rules to limit the size of speculative positions. While position limits would almost certainly reduce the impact of speculation, it is not clear that any such changes would be for the better. Futures markets have long relied on speculators to absorb the risk that commercial participants seek to shed. There is some question, however, on whether CITs actually do participate in this risk transfer, as they simply purchase futures and hold them, mechanically moving from nearby to deferred contracts as expiration approaches. Further, there is concern that, if position limits are too restrictive, they may incentivize CITs and others seeking exposure to commodity markets to take positions in the physical commodities instead—purchasing grain stored in elevators, for example. Such cash market participation may impede commodity flows, especially in times of relative scarcity, therefore resulting in the exact opposite effect of what was intended—limiting the impact of speculation on cash prices. If, as has been demonstrated in the literature, "excess" speculation does not ultimately affect price discovery, then position limits that are too small may reduce allocative efficiency by reducing the speed at which information about prices is incorporated in the market.

Biofuels Policy

The primary vector of price volatility transmission from energy markets to agricultural markets is the biofuels market, especially the US ethanol market. In 2010, the USDA estimated that approximately 35% of the US corn production was used to make ethanol, which is both a complement and substitute for gasoline. However, because of the large difference in size between the two markets—the USA consumed approximately 140 billion gallons of gasoline in 2009, and 13.5 billion gallons of ethanol—increases in gasoline prices increased the price of ethanol. Two policies contributed to both the growth of the ethanol industry and, therefore, its role in price linkage. Ethanol consumption is mandated through the renewable fuels

standard portion of the Energy Independence and Security Act of 2007, rising from 9 billion gallons in 2008 to 15 billion gallons in 2015. The Volumetric Ethanol Excise Tax Credit (VEETC) provides a $0.46/gallon of ethanol credit against federal excise taxes for firms that blend ethanol with gasoline for sale as transportation fuel. The combination of these two policies has created a large derived demand for corn that is sensitive to the relative prices of gasoline and corn. Outside of repealing either the RFS or VEETC, the only other proposal that has been suggested is repeal of the tariff on imported ethanol, which is currently $0.54/gallon. Changes to any of these policies will obviously reduce the demand for the US-produced ethanol, and therefore, corn, resulting in lower grain prices and reduced economic activity in areas with significant amounts of ethanol production. On December 31, 2011, the VEETC and the import tariff on ethanol were both allowed to expire, and in the following months, ethanol production margins and, therefore corn demand, have weakened. This simultaneously reduced feed costs to animal producers, which would offset some of the losses in economic activity. Reductions in VEETC, the RFS, or import tariffs will also affect gasoline consumption in the United States, potentially changing domestic demand for imported energy sources. As has been shown by DeGorter and Just (2009), among others, the current raft of biofuels policies is highly inefficient. The mix of subsidies and mandates reduces allocative and dynamic efficiency. The effect on nonmarket outcomes is unclear, as there remains considerable debate on the environmental effects of biofuel production and consumption.

Convergence

Lack of convergence has repeatedly drawn the attention of legislators, though there has been little actual legislative activity on the topic. The CFTC has had multiple hearings on convergence in agricultural futures, and has instructed exchanges to remedy the problem. In late 2009, the CME Group proposed changes to the Chicago wheat futures contract. Instead of using a fixed daily storage charge for grain that is being stored while registered for delivery to the exchange, the CME Group proposed a new "Variable Storage Rate" system. Under VSR, the rate changes when the price of the first deferred futures contract remains above 80% of "full-carry"—the theoretical cost of carrying wheat from the maturity of the nearest contract to the next nearest contract, comprising the storage cost and the opportunity cost of money. When the spread is wide, the storage charge allowed by the exchange will increase in $0.035/month increments. It is thought that the higher storage charge will disincentivize the holding of inventories in deliverable position, which should permit more arbitrage to occur between spot and nearby futures contracts, thus improving convergence performance. More recently, the Kansas City Board of Trade, in response to poor convergence performance in 2009 and 2010, introduced a system of "seasonal storage rates" in which the storage charge is $0.06/month from December through June, and $0.09/month from July through November. The seasonal nature of the changes is meant to reflect the higher storage demand during

those months while providing certainty to physical users of the markets—they need not worry about unforeseen changes occurring over the life of a hedge, as can potentially occur with VSR. However, if the SSR rates are not high enough, they may not force convergence, whereas the VSR can continue to increase until convergence occurs. Other suggested changes to improve convergence are to change the contracts to cash settlement—where instead of the physical commodity being exchanged at futures expiration, payments would be made between parties based on the final price of a specified index, such as the average cash price of corn in the USA. While cash settlement provides convergence by design, it is not without its flaws. Indices must be very carefully designed to prevent manipulation, and to provide price discovery and risk transfer. A lack of convergence reduces allocative welfare in an economy, as the market is no longer providing accurate price signals to participants. It also potentially reduces productive efficiency by increasing the cost of shifting risk among market participants.

Integrator Ownership

Contract production of pork and poultry and packer ownership of cattle are frequently discussed together, under the broader topic of market power in agriculture. In late 2010, the Grain Inspection, Packers, and Stockyards Administration issued proposed rules on contract production and packer ownership based on Title XI of the Food, Conservation and Energy Act. The rules "provide further definition to practices that are unfair, unjustly discriminatory or deceptive … [and] establish new protections for producers required to provide expensive capital upgrades to their growing facilities." The proposed rules also "prohibit packers from purchasing, acquiring or receiving livestock from other packers, and communicate prices to competitors;" and "require that companies paying growers under a tournament system provide the same base pay to growers that raise the same type and kind of poultry, including ensuring that the growers pay cannot go below the base pay amount" (USDA 2010). Such rules would increase transaction costs in the meat processing industry. One provision requires packers to be able to justify why different prices are paid for different animals, which would reduce technical efficiency, and may have nonmarket efficiency impacts, as well, as it could blunt incentives for payment of quality premiums by packers, homogenizing the quality of meat available. The provision banning the sale of animals between packers means that for producers who own packing facilities, a middleman would need to be introduced to legitimize the sale, reducing technical efficiency. Finally, some practices of tournament pricing for growers would be outlawed, increasing the costs to integrators (Informa Economics 2010).

Elimination of Planting Restrictions on Decoupled Payments

Eligibility for CCPs and DPs is rescinded if the land is used for fruit or vegetable production. This subsidy affects the allocation of land between crops and fruit and vegetable production, which creates both allocative efficiency and nonmarket welfare losses, as it contributes to the underproduction of more nutrient-rich fruits and vegetables. In the 2008 Farm Act, the Planting Transferability Pilot Project was introduced, which permits small amounts of acreage to be exempt from these restrictions in order to better understand the actual effects.

Opportunities for Improved Industry–Government Collaboration

Four areas that would benefit from industry–government partnerships are apparent from the above discussion: improving crop insurance, shifting risk to markets, better understanding of success/failure of futures, and better understanding of futures delivery mechanisms. Since 2000, crop insurance has become the primary method of risk mitigation for row crop producers, especially for risk that arises from changes in weather. However, the options for other agricultural producers remain much more limited. Whole farm revenue insurance does offer at least some protection to all producers. With increased variability in inputs stemming from generally increased commodity prices, and specifically increased energy prices, revenue insurance that is based on historical revenue levels may provide substantially less financial protection than expected or desired if input costs rapidly increase in a short period of time. However, creating insurance on profit margins can induce moral hazard—the situation where insurance changes the incentives of the insured to "game the system."

A better route to provide increased protection from volatile input prices is to better understand factors that cause futures markets to succeed or fail, and encourage the creation of more complete futures markets for inputs, such as diesel fuel and fertilizers, or their chemical components—such as nitrogen, potassium, and phosphorus. The commodity exchanges themselves have strong incentives to support the creation of new contracts, as does the agricultural community. A related opportunity is the exploration of mechanisms to shift the risk from crop insurance into markets. To the extent it is possible for crop insurance risk to be repackaged and sold through markets, there is less need for the federal government to be the insurer of last resort to the crop insurance industry.

Finally, understanding the way in which farm programs overlap for growers of various crops and in different regions and seeking to reduce or eliminate that overlap in future programs can reduce not only costs of the farm program for both the government and/or farmers but also production-distorting incentives.

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