

# Are Our Agricultural Risk Management Tools Adequate for a New Era?

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*JEL Classifications: D80, G11, Q18*

This *Choices* theme is premised on an assumption that agriculture has entered a new era of increased instability. Among the causes posited for this increased instability are the recent integration of the agriculture and energy sectors through bioenergy markets and the macroeconomic consequences of the current recession and credit crisis. While increased volatility in some agricultural commodity prices has been observed recently, whether agriculture has actually entered a new era of long-run increased instability is, we believe, open to some question. History is replete with “new eras” in American agriculture—most of which were amazingly short-lived (Paarlberg, 1964).

Regardless of what has changed, much remains unchanged. Agricultural production is still quite concentrated with less than 6% of the farms in the United States producing 75% of the value of production (Census of Agriculture, 2007). Most U.S. farms still produce undifferentiated commodities for markets where production is characterized by relative ease of entry and exit. And farming is still a risky business.

When examining the risk in agriculture, a common pitfall is to focus strictly on the variability of annual farm net income or even the variability of net income from a specific commodity. While variability in annual net income can threaten the short-run survival of a farm business, it is also important to look more broadly to the variability of both annual net income and asset values from a portfolio perspective. An unreasonably narrow perception has contributed to misunderstandings regarding the risk exposure in agriculture and federal policies that are redundant, too focused on single-year income streams, too commodity-specific, and too likely to create significant resource misallocation.

## Portfolios and Risk

Farm households manage a portfolio of assets. Those assets are used in crop and/or livestock production and frequently also in enterprises that are related to farm production such as custom harvesting or initial processing of agricultural commodities. However, not all farm household assets are utilized in agricultural production or enterprises related to agricultural production. Like other U.S. households, farm households invest in financial or real assets that may be completely unrelated to agriculture.

Farms classified by ERS as large-scale family farms account for more than 60% of the value of agricultural production in the United States. On approximately 50% of these farms the farm operator and/or the spouse work off the farm (Hoppe, Korb, O’Donoghue, and Banker, 2007). Table 1 indicates that, for large-scale family farms, both earned and unearned sources of off-farm income account for a significant share of total farm household income.

Table 1.

Off-Farm Income Sources for Large-Scale Family Farms	Large-scale family farms	
	Large	Very large
Mean household income	\$125,120	\$272,527
Farm earnings	\$80,250	\$225,094
Off-farm income	\$44,870	\$47,434
Earned	\$33,238	\$29,320
Unearned	\$11,633	\$18,114
Share of income from off-farm	35.90%	17.40%

Source: (Hoppe, Korb, O’Donoghue, and Banker, 2007).

Farm households manage their portfolios by making decisions that weigh expected returns (either annual net income or capital gains) against risk exposure (often measured as the variability in returns). Like other investors, farm households desire higher expected returns but dislike risk. However, expected return and risk are usually positively correlated.

Farm portfolios may include only one crop or livestock commodity or may be diversified across several commodities. Specialization often creates economic efficiencies that may increase net returns, but it also typically exposes the farm household to more risk.

Farmers have always been faced with variability in output prices, yields, and input costs. For a single commodity, this variability, along with the correlations among these random variables, has important implications for variability in annual net income. Similarly, the variability in whole farm net income is affected by cross-commodity correlations in these random variables. So an argument that agriculture is entering an era of increased instability in annual net income is implicitly an argument that the variability of the underlying random variables has increased and/or that the correlations have changed.

But the risk exposure of a farm household portfolio is not limited to just variability in annual net income. Like any other investment portfolio, a major risk (and perhaps the most important risk) is variability in the value of the underlying assets—capital gains and losses. For large-scale family farms, 88% of net worth is tied to farm assets and approximately 68% of farm net worth is in real estate (Hoppe, Korb, O'Donoghue, and Banker, 2007). Thus, from a portfolio perspective, variability in land values may be far more significant than variability in annual net income caused by random output prices, yields, and input costs. For example, a 10% de-

crease in the value of cropland from a base value of \$2,500 per acre reduces net worth by an amount that is equivalent to a \$1.25 per bushel decrease in the price of a 200 bushel per acre corn crop. It is worth remembering that between 1981 and 1987 the value of farm assets in the United States decreased by 30%. In the Midwest, land values fell by approximately 50% (Barnett, 2000).

## Commodities

Despite the emphasis in recent decades on “value-added” agriculture and farmers “moving down the supply chain,” much of U.S. agriculture is still based on producing undifferentiated commodities. Further, in some regions of the United States, farmers can quickly enter and exit specific commodity markets. The ease of entry and exit from markets for undifferentiated commodities suggests that while price variability may create short-run economic profits or losses, these profits or losses are not likely to be sustained over the long run. Short-run economic profits will attract new entrants. This increases the cost of limiting resources (typically land) and drives out the short-run economic profit.

## Available Risk Management Tools

Farm households use various methods to manage their risk exposure. They commonly diversify across commodities or geographic locations. Farm households also manage risk by producing crops that generate multiple harvests over a single growing season, securing off-farm employment, or investing in off-farm assets. Other risk management strategies include using risk-reducing inputs such as irrigation, forward pricing, savings, and maintaining credit reserves.

The federal government also directly provides, or subsidizes the provision of, a host of programs that provide income enhancement and risk management benefits to agricultural

producers. Some of these are standing federal programs while others have been authorized on an *ad hoc* basis. Access to these programs is generally limited to producers of selected crops. For example, standing federal commodity programs (see table 2) are available only to producers of the major program crops (barley, corn, cotton, grain sorghum, oats, peanuts, rice, soybeans, wheat). Federally-subsidized yield and/or revenue insurance are available for more than 100 crops produced in the United States. However, with the exception of pilot price insurance programs for swine, cattle, and lambs, livestock producers do not have access to federally-subsidized insurance.

Through the years, various types of federal emergency assistance have been provided to both crop and livestock producers on an *ad hoc* basis to compensate for production losses, low output prices, or high input costs. However, the availability of such *ad hoc* assistance is, by definition,

**Figure 1.** Commodity Programs Under the 2008 Farm Bill

Program crop producers must choose between the following two commodity program options.

**Option 1:**

Direct payments.  
Marketing loan.  
Price counter-cyclical program.

**Option 2:**

Direct payments reduced by 20% relative to option 1.  
Marketing loan rates reduced by 30% relative to option 1.  
Average Crop Revenue Election (ACRE) revenue counter-cyclical program.

For more information see <http://www.ers.usda.gov/FarmBill/2008/Titles/Title-commodities.htm>

uncertain and often comes many months after the loss has occurred. This makes it effectively impossible for farm households to include *ad hoc* assistance in risk management planning.

The 2008 Farm Bill created, for the first time since 1980, a standing federal disaster payment program. Payments from the Supplemental Revenue Assistance Program (SURE) are triggered by shortfalls in realized whole-farm (not commodity-specific) revenue.

### The Adequacy of Current Federal Policies

Any assessment of the adequacy of current federal risk management (or income enhancement) policies begs the question of “adequacy” for whom—for program crop producers, the broader agricultural sector, or society as a whole? For example, bio-fuels policies adopted in recent years have benefitted some program crop producers but have negatively impacted livestock producers who often do not produce feed crops.

Policymakers are generally averse to radical changes. Thus, federal agricultural policies have changed only incrementally over time. Today’s hodgepodge of government commodity programs and subsidized insurance programs are, in part, a response to the current political climate and, in part, a historical artifact. It is hard to imagine that anyone working from a clean slate would conceive of such a mix of overlapping, and sometimes conflicting, programs.

As an example of federal program redundancy, consider that the marketing loan provides program crop producers with protection against output price risk. Additional price or revenue risk protection is provided through the producer’s choice of participating in either the price counter-cyclical payment program (assuming the producer actually produces the crop on

which the counter-cyclical payment will be made) or the Average Crop Revenue Election (ACRE) program. The SURE program provides further protection against revenue shortfalls, and federally-subsidized revenue insurance is also available. So program crop producers can potentially receive compensation triggered by low prices from up to four different federally provided or subsidized programs. Coble and Barnett (2008) show that greater risk reduction per federal dollar spent could be obtained from simpler nonredundant programs.

In contrast, to the many federal programs that protect program crop producers against output price risk, the SURE program and subsidized yield or revenue insurance are the only standing federal programs from which producers can potentially receive compensation triggered by production shortfalls. There are no standing federal programs that protect crop producers against rapidly escalating input costs.

It is also important to note that neither the private sector nor the public sector provide protection against fluctuations in land values. Among the reasons for this are spatial differences in land attributes, the likelihood that the owner has access to proprietary information about the attributes of any particular parcel, and the fact that land value risk is an example of what Skees and Barnett (1999) call an “in-between” risk—neither highly systemic (so that it might be appropriate for futures markets) nor highly idiosyncratic (so that it might be appropriate for insurance markets).

### Long Run versus Short Run

Agricultural production requires long-run commitments (e.g., investments in land or equipment) but markets typically offer only limited opportunities for obtaining risk protection that extends beyond a single production season. While many

farmers can forward price their outputs and at least some of their inputs within a production season, most output handlers or input suppliers will not offer forward contracts beyond the current production season. For some major crops, futures contracts are available for at least one growing season into the future, but the markets for these contracts tend to be very thin and highly volatile.

From a producer’s perspective, a primary advantage of federally provided or subsidized risk management programs is that they provide longer-run protection than is available from markets. The federal marketing loan program and price counter-cyclical payment program trigger payments whenever realized prices are less than targets that are prespecified throughout the life of the farm bill. The revenue targets for ACRE—and to some degree for SURE—are based on moving averages of historical revenues. For ACRE the revenue targets cannot increase or decrease by more than 10% per year. The federally-subsidized yield and revenue insurance programs also establish targets based on historical moving averages of yield.

While the longer-run protection available from federally provided or subsidized risk management programs is an advantage to producers, it likely imposes significant social costs. Long-run price or revenue guarantees can distort market price signals and lead to the misallocation of resources.

The benefits of federal commodity programs are also bid into land values. Since land is a primary store of wealth for many farm households, the potential for changes in federal policies is likely one of the most important risks currently facing many U.S. farm households. In this period of record budget deficits, any effort to reduce federal outlays for agricultural commodity programs or corn/soybean based bioenergy programs is likely to cause tremendous capital losses for

many farm households. Further, as the economy recovers from the current recession, the Federal Reserve is likely to raise interest rates to forestall inflationary pressures. This will also create downward pressure on land values.

### A New Era of Instability?

Has U.S. agriculture entered a new era of instability? Perhaps. It is too early to tell if the long-run variability of output prices or input costs has increased. For some commodities, it seems likely that the integration of agricultural and energy markets has changed correlations among random variables (e.g., output prices and input costs) that affect the variability of annual net income, though the magnitude of those changes is not yet clear. For other commodities, there is likely little or no impact.

Regardless, much is likely to remain unchanged in this “new era.” For the foreseeable future, most U.S. agricultural producers will still produce undifferentiated commodities (that are also produced in many other countries around the world) for markets that are characterized by relative ease of entry and exit. This implies that any period of unusually high profit for producers of agricultural commodities is likely to be short-lived.

Markets will continue to offer an array of mechanisms that producers can use to forward price their commodities within a production season. Due to the potential for supply or demand shocks that cause unforeseen but systemic changes in price, markets are unlikely to provide risk management tools for output prices or input costs that extend much beyond a production season. Any longer-run price or revenue protection will have to be

provided by the federal government. However, efforts to provide longer-run agricultural risk management (or income enhancement) programs will conflict with concerns about resource misallocation (and the potential for associated environmental impacts) as well as U.S. trade obligations that extend well beyond the agricultural sector.

Due to efficiencies from specialization, farms are unlikely to revert to the highly diversified multicommodity enterprises of yesteryear. But farm households will continue to diversify their portfolios through off-farm employment and off-farm investments. In many rural areas the opportunities for off-farm employment have never been greater (the current recession aside) while modern financial markets make it possible for agricultural producers to hold a well-diversified portfolio of investments that are largely uncorrelated with the net returns from producing farm commodities. As with any other household, accumulating savings and maintaining credit reserves will also be an important risk management strategy.

The federal measures that enhance farm incomes and reduce the variability in single-year income streams may actually increase the risk inherent in many farm household portfolios. The benefits of these programs are bid into land values. Thus, the accumulated wealth of many farm households is highly vulnerable to reductions in federal transfers—as might be required to meet future federal budget cuts or trade agreement commitments. Further, farmland values are also vulnerable to higher interest rates, and that seems quite likely following on the heels of the current fiscal stimulus.

### For More Information

- Barnett, B.J. (2000). The U.S. farm financial crisis of the 1980s. *Agricultural History*, 74, 366–380.
- Census of Agriculture (2007). Available online: <http://www.agcensus.usda.gov/>
- Coble, K.H. and B.J. Barnett (2008). Implications of integrated commodity programs and crop insurance. *Journal of Agricultural and Applied Economics*, 40, 431–442.
- Economic Research Service (2009). 2008 farm bill side-by-side. United States Department of Agriculture. Available online: <http://www.ers.usda.gov/Farm-Bill/2008/Titles/Titlelcommodities.htm>
- Hoppe, R.A., Korb, P., O’Donoghue, E.J., and Banker, D.E. (2007). Structure and finances of U.S. farms: Family farm report, 2007 edition. United States Department of Agriculture, Economic Research Service Economic Information Bulletin No. 24. Available online: <http://www.ers.usda.gov/Publications/EIB24/>
- Paarlberg, D. (1964). *American Farm Policy: A Case Study of Centralized Decision-Making*. New York: John Wiley & Sons.
- Skees, J.R. and B.J. Barnett (1999). Conceptual and practical considerations for sharing catastrophic/systemic risks. *Review of Agricultural Economics*, 21, 424–441.
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- The authors thank John D. Anderson, Jerry R. Skees, John E. Lee, Jr. and two anonymous referees for their helpful comments.*