A Study of the Impact of a Reserve Program Had One Been in Effect in the Period, 1998 to 2010

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Introduction

It is widely acknowledged that the next farm bill, which is the omnibus, multi-year legislation that guides most federal farm and food policies, will be written with less money than previous farm bills. In the current economic climate and growing budget deficits, agriculture will be called upon to cut its budget in order to help get the U.S. fiscal house in order. Given these constraints on federal spending, the 2012 Farm Bill budget faces significant reductions. The goal of the next farm bill, therefore, should be to provide an effective safety net for family farmers, improve the efficiency of existing programs and reduce overall costs.

Price volatility in commodity markets is costly for the agricultural economy as well as the federal government. Price and income problems have plagued American farmers for centuries. Over time, the causes of extreme price volatility have been identified. In recent decades and even prior centuries, policymakers have tried a variety of solutions to address the lack of timely market self-correction when crop prices plummet. Some of these solutions have treated the causes of this dynamic while others have treated the symptoms. The current set of federal policies tends to treat the symptoms of agriculture's chronic price and income problems. After trying both approaches over the last half century, addressing the causes is generally less expensive and less destabilizing to the agricultural sector than ignoring the problem or treating the symptoms.

This study presents an alternative policy approach that will reduce farm payments. The policy works with market forces but also reins in prices when they are most extreme and disruptive to producers and users of agricultural commodities.

If this alternative approach had been in effect over the 1998 to 2010 period, government outlays to farmers would have been cut in half while providing farmers with the same level of total income they received over the period—income received through cash sales and often massive government checks primarily in the form of emergency payments, direct payments, and the marketing loan program. At the same time, the alternative policy would have buffered extremes in crop prices.

The next section describes the policy features analyzed in this study. Several sections follow that present POLYSYS simulation results for key economic indicators of major commodities and aggregate agriculture. This is followed by discussions of major policy impacts on agricultural producers, consumers, and other stakeholders. The next sections give a brief history of reserves and discuss and evaluate the criticisms of previous policy sets similar to the one analyzed. The last section, prior to the study summary, discusses the unique characteristics of crop agriculture and an interpretation of the corresponding policy implications.

Policy Description

So how would one put together a set of commodity programs that could reduce government agricultural payments while maintaining the same level of farm income using 1998 to 2010 as the study period, with times of extreme low and high crop prices? That is the focal question of this study.

The policy approach analyzed is designed so that farmers receive the bulk of their revenue from market receipts. It includes a combination of farmer-owned reserves, increased loan rates, set-asides, the elimination of direct payments, and reduced reliance on other

government payment instruments. The policy will be referred to in this report as the farmer-owned reserves.

The analysis of the policy began by setting the 1998 loan rate for corn at the midpoint between the variable cost of production and full cost of production for the 1998 crop, as calculated by the U.S. Department of Agriculture (USDA). All other crop loan rates were pegged to the corn loan rate based on the ratio between corn and the other crops, as found in the 1996 Farm Bill. The two exceptions are grain sorghum, which was increased to the same price as corn and soybeans raised from where the loan rate was to $6.32. Thereafter, all loan rates were raised or lowered based on the change in the rolling three-year average of the chemical input index of prices paid by farmers. For corn, that calculation resulted in a loan rate of $2.27 in 1998, increasing to $2.60 by 2010. These loan rates approximate the historical ratio between the price of corn and the other crops, facilitating the arbitrage of crops to the most profitable mix for each farm, with minimal influence from the loan rate.

When the market price falls below the loan rate, farmers would have the opportunity to place their grain into a farmer-owned reserve. The farmer would be paid $0.40 a bushel/year as a storage payment. The release price was set at 160 percent of the loan rate to allow for a sufficiently wide band within which the market could efficiently allocate resources. Once the price exceeds 160 percent of the loan rate, the crop would be released into the market until the price falls back below the release price. Reserves were held in corn (3 billion bushels), wheat (800 million bushels) and soybeans (400 million bushels). With the right balance in the loan rates, reserves of these three crops would maintain the prices of other crops within their price bands.

In the model, all of the crop allocation decisions were made at the county level as a proxy for farm-level decisions. When the reserve is full (comparable to 3 billion bushels corn, 800 million bushels of wheat, and 400 million bushels of soybeans), a set-aside is triggered if prices drop below the loan rate. The farm-level set-aside is based on whole-farm acreage and not allocated crop-by-crop as in the past. Set-asides would be allocated at the county level and farmers would have the opportunity to bid acreage into the set-aside. Participation in the set-aside by any given farmer would not be mandatory, but all farmers would have the opportunity to offer a bid on acreage they would be willing to put in the set-aside. As in the past, farmers would be required to maintain an appropriate cover crop on the land. Farmers would be free to allocate the mix of crops based on the profitability of the crops.

Direct payments would be eliminated, and with the use of a farmer-owned-reserve, the marketing loan and countercyclical programs would also be eliminated. Commodity payments would only be paid for quantities actually placed in the reserve and not for every bushel produced, as in the case of the marketing loan program or a large proportion of the bushels produced for other payment programs. As a result, the level of government payments would be significantly reduced.

Government Payments and Farm Income, 1998-2010

Throughout the 13-year period from 1998 to 2010, government payments for crops totaled $152.2 billion, or $11.7 billion per year. If farmer-owned reserves had been used during those years, government payments would have been $56.4 billion over the same period (an average of $4.3 billion annually), less than 40 percent of what the U.S. government actually spent on crop programs in those years. A look at a year-by-year comparison of government payments under the two policy regimens (fig.1) shows large savings in six of the eight years in the period from 1998-2005. Even when prices were high, especially during 2006-2010, the savings are significant—government payments are nearly 50 percent lower under a system of farmer-owned reserves than under the policies that were in effect at that time.

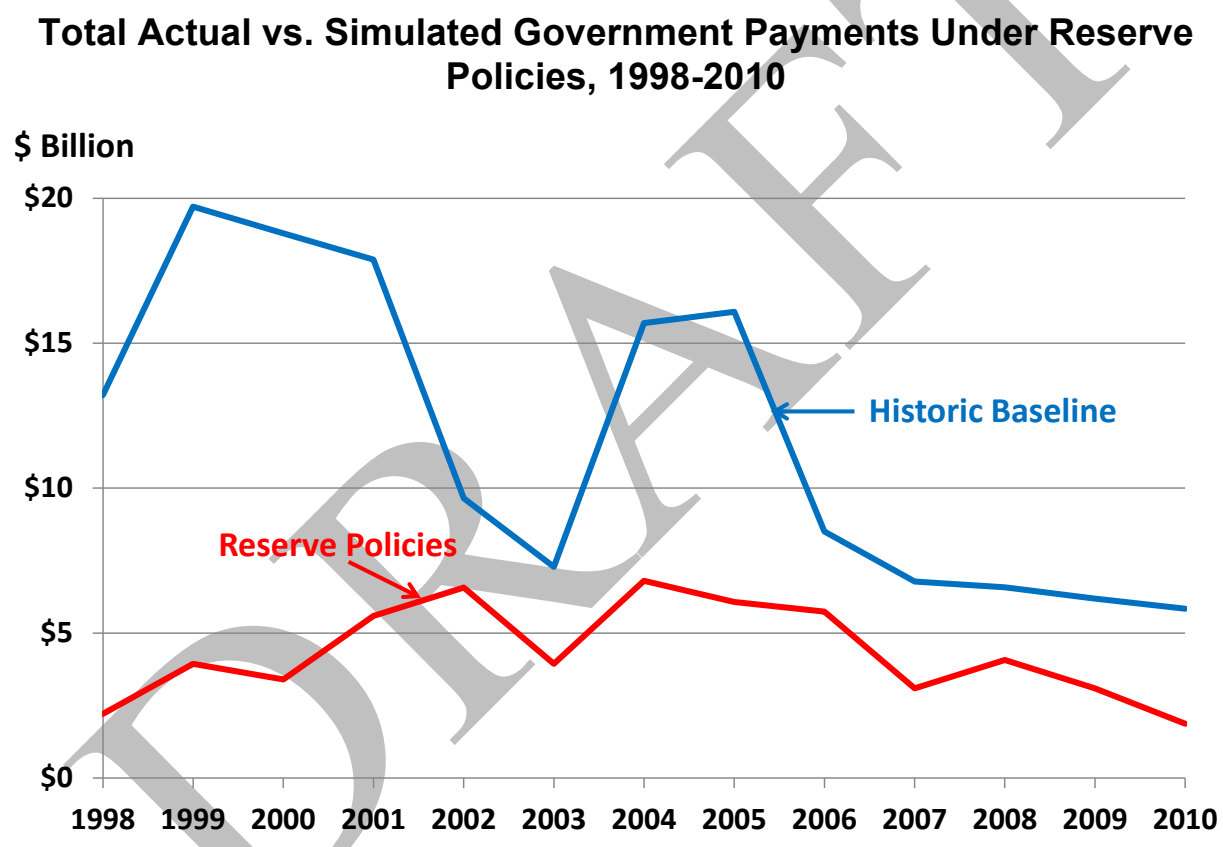

Figure 1. A comparison of actual U.S. Government expenditures for crop programs compared to what the expenditures would have been had a system of farmer-owned reserves been in effect, 1998-2010.
Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

In the first four years of the study period, 1998-2001, the value of production of the eight major crops was not sufficient to cover cash expenses (fig. 2). That means that, in aggregate, producers of the major crops used some of their government payments just to cover some of their cash expenses. This calculation does not take into account items like returns to investment and management. During that four-year period, cash expenses exceeded the value of production by between $4.2 billion and $8.5 billion. Farmers used between 33 and 45 percent of their government payments to pay some of the cash costs of production. Without the large amount of emergency payments distributed by the U.S. government during those years, the policies of the 1996 Farm Bill, which eliminated much of the farm safety net, could have resulted in a repeat of the farm crisis of the late 1980s.

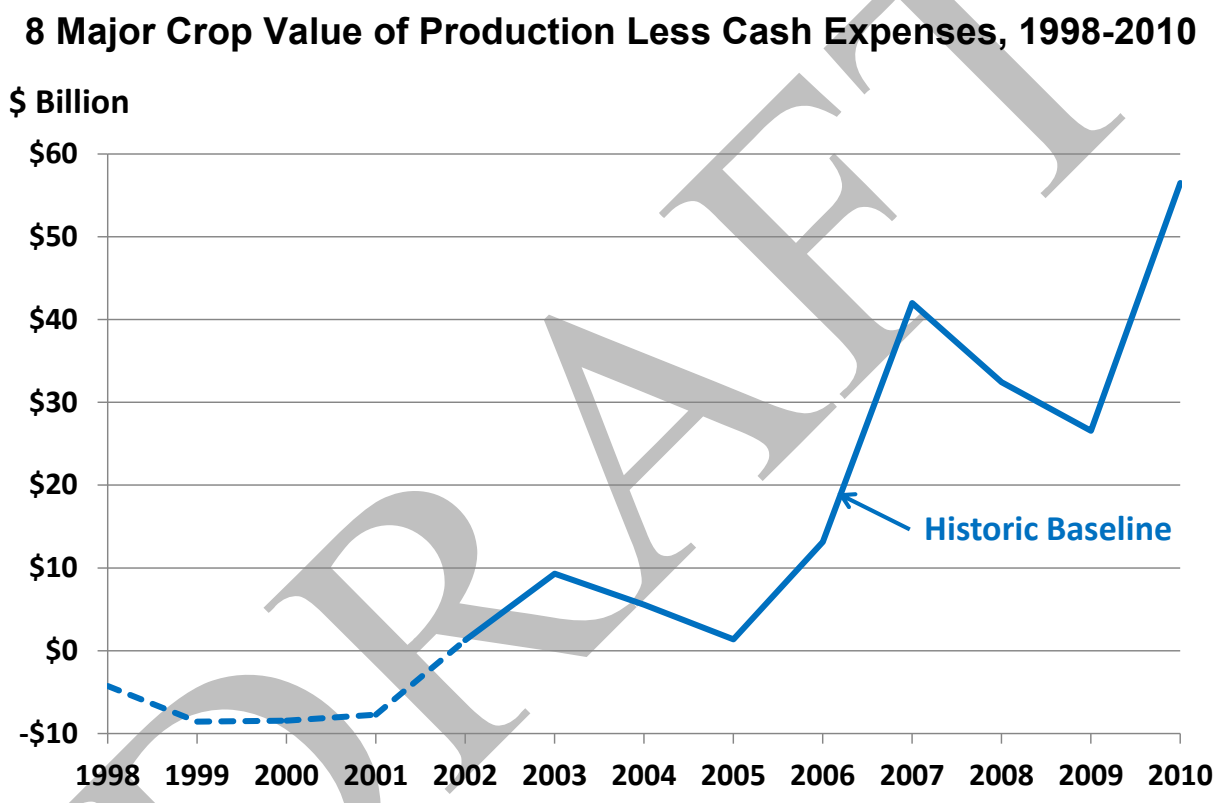

Figure 2. The value of production less cash expenses for the eight major crops (corn, grain sorghum, barley, oats, wheat, soybeans, cotton, and rice), 1998-2010. Source: USDA baseline.

Farmer-owned reserves, in addition to reducing government payments by more than 60 percent when compared to actual government expenditures on farm programs over the 1998-2010 period, would have provided nearly the same amount of net farm income (fig. 3). A system of farmer-owned reserves would have provided more income to farmers than they actually received during times of low prices (1998-2005) and somewhat less income than they actually received in high price periods (2006-2010).

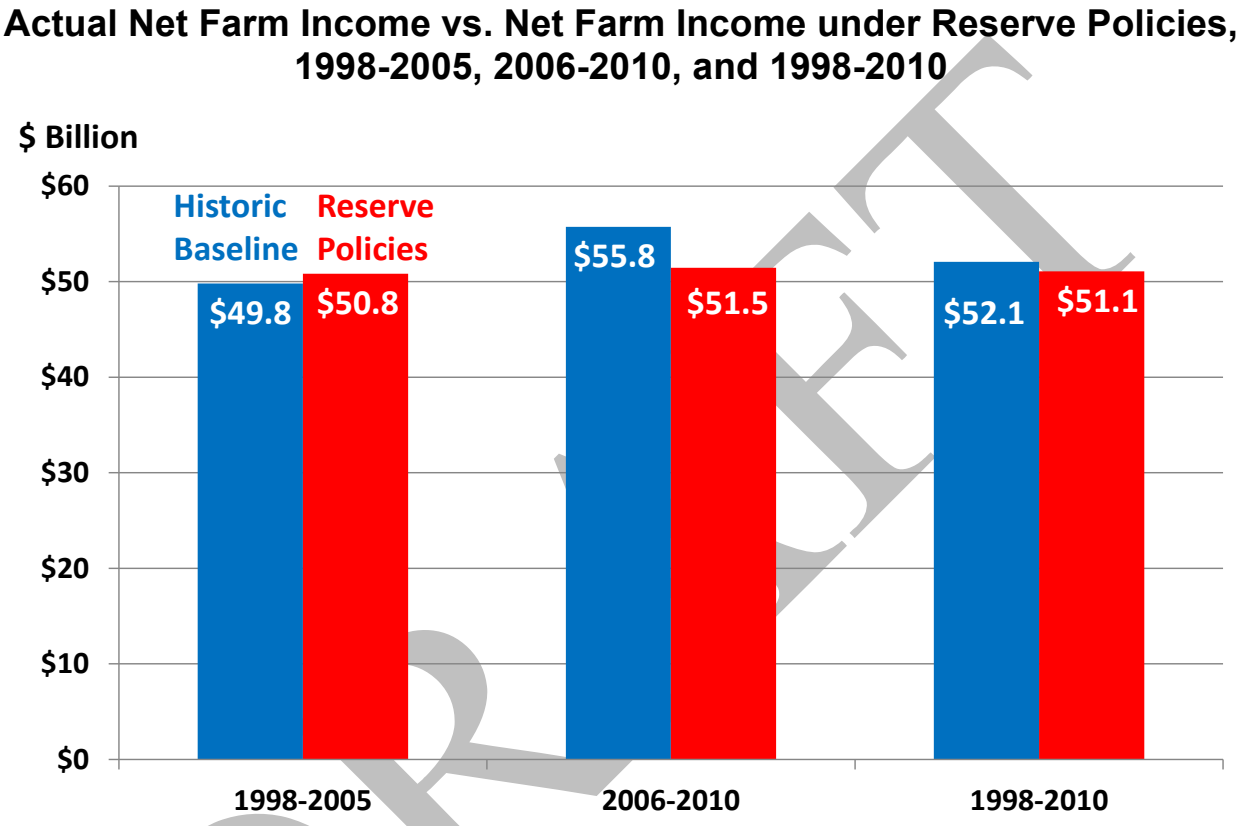

Figure 3. A comparison of actual net farm income to the net farm income generated under a simulation of a system of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

Impact of Farmer-Owned Reserves on Three Crops, 1998-2010

Corn

Government payments to corn farmers under farmer-owned reserves are consistently lower than they were under emergency payment responses, Agricultural Market Transition Assistance (AMTA) or direct payments, the Marketing Loan Grain program, revenue insurance, and various other policies that were in effect during the 1998-2010 period (fig. 5). Actual government payments for corn during the 13-year period were $56 billion while under a system of farmer-owned reserves the payments would have been $12 billion—less than $1 billion per year.

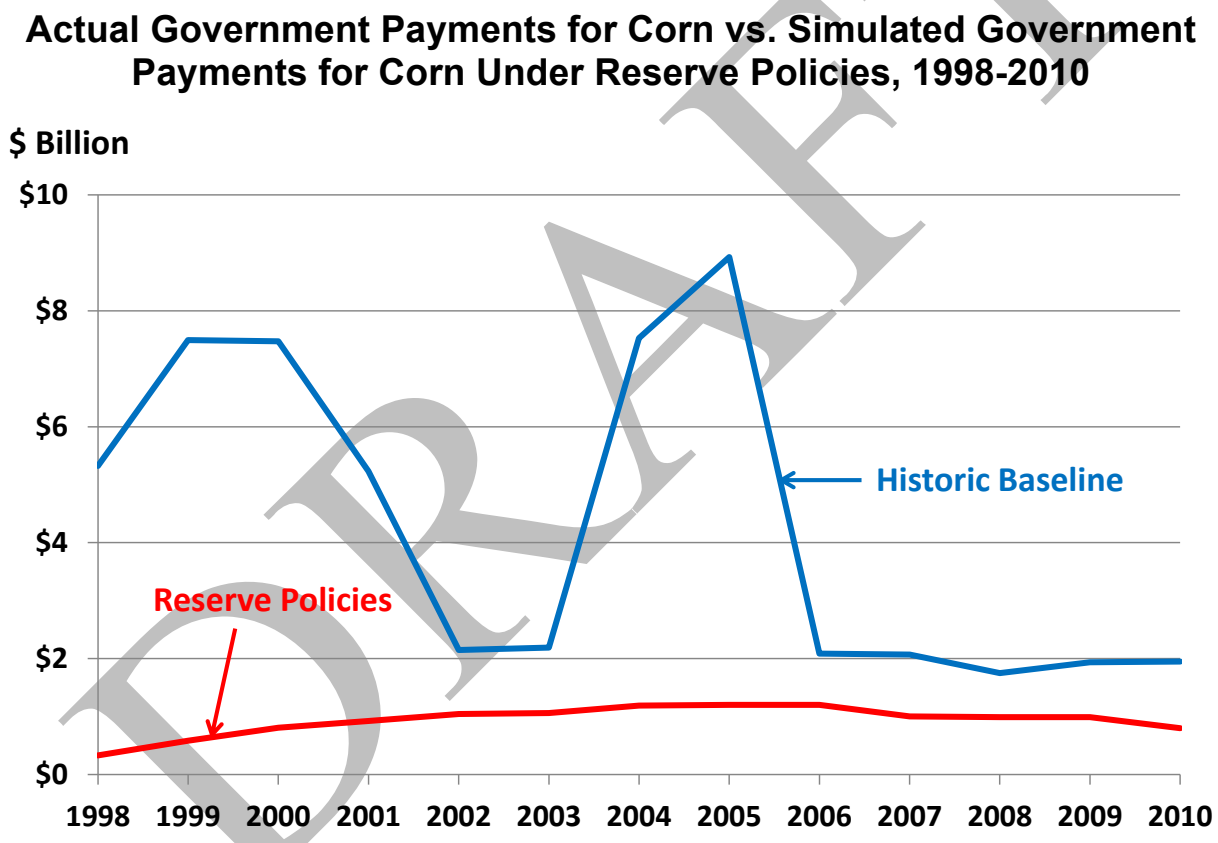

Figure 4. A comparison of actual government payments for corn to government payments generated under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

An examination of the impact of farmer-owned reserves on corn prices when compared to the actual prices in the 1998-2005 period—a time when corn prices were well below the cost of production—shows that farmer-owned reserves would have generated 63 cents per bushel more than the baseline policies (fig. 5), increasing farm income while reducing government payments. During the period of generally higher prices, 2006-2010, farmer-owned reserves generate corn prices that are about 31 cents per bushel lower than the baseline policies. Over the entire period, corn prices are 26 cents a bushel higher under a system of farmer-owned reserves than actually occurred.

If corn prices had been higher during the times of low prices, farmers would have received income from the marketplace rather than the government. Those higher prices would also have protected U.S. farmers from accusations of dumping subsidized corn on the world market at prices below the cost of production, which depressed prices for corn farmers worldwide.

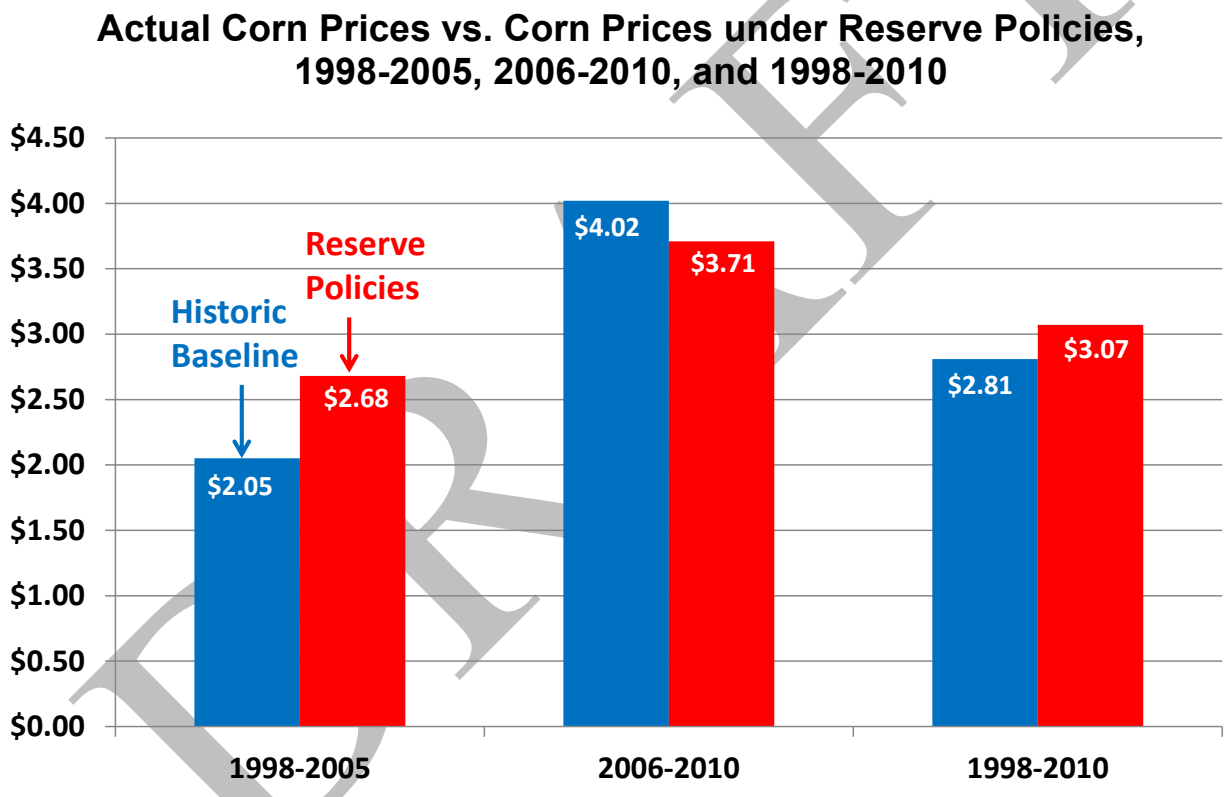

Figure 5. A comparison of actual corn prices to corn prices generated under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

With higher corn prices due to farmer-owned reserves, the overall value of corn production would have been higher between 1998 and 2006 than it was in the baseline, while the value of production is lower between 2007 and 2010 than it was in history (fig. 6). For the entire 13-year period, the value of production under the baseline policies was $413 billion while with farmer-owned reserves it would have been $446 billion–an average increase of $2.6 billion a year.

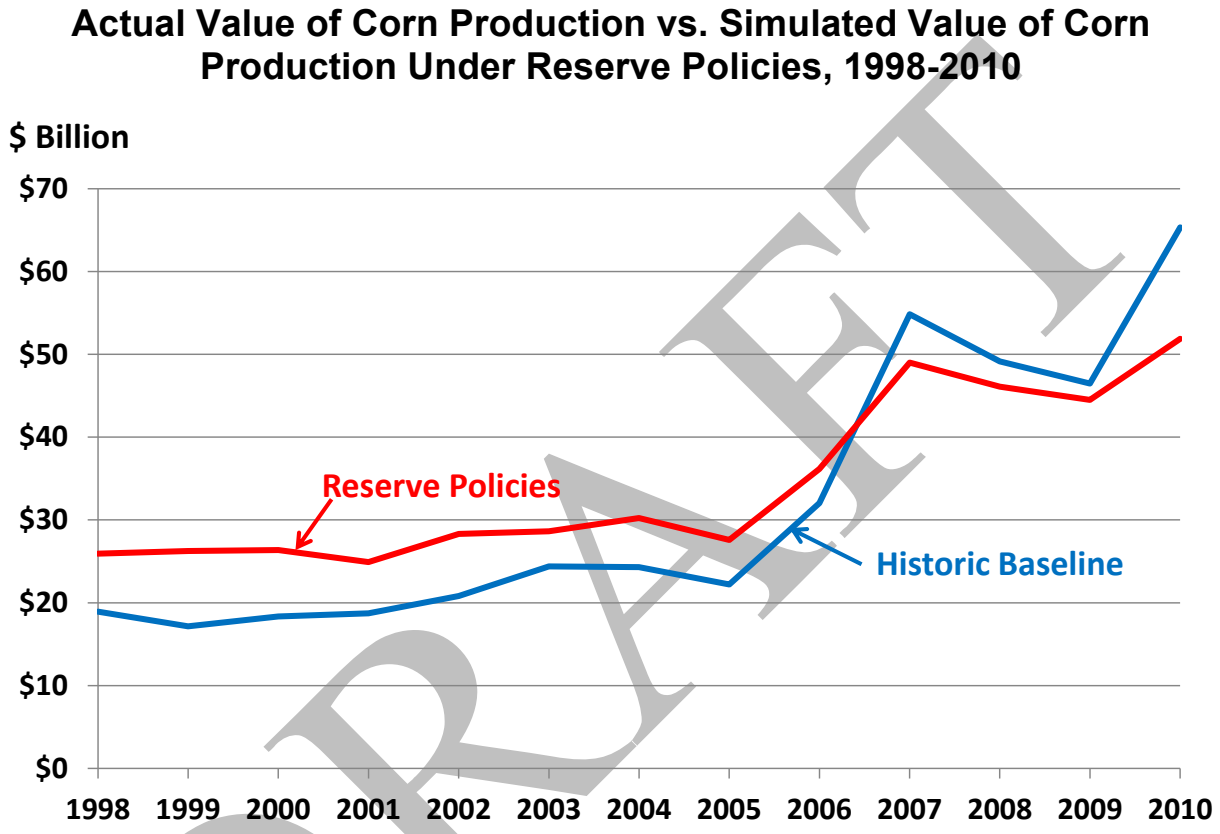

Figure 6. A comparison of the actual value of corn production to the value of corn production generated under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

Farmer-owned reserves would have provided corn farmers with a slightly higher value of production plus government payments than was produced under baseline policies during the 1998-2005 period (fig. 7). By providing nearly the same value of production plus government payments in years when farmers were receiving prices below the cost of production, farmer-owned reserves would have offered corn farmers a significant level of protection. For the 2006-2010 period, value of production plus government payments under a system of farmer-owned reserves would have been lower for corn farmers than history. By slightly reducing the level of value of production plus government payments during a period of historic high prices and volatility, farmer-owned reserves would have protected corn farmers from the tendency to capitalize those higher prices into land, thereby raising the cost of production over the longer term and increasing the potential for the collapse of land prices as was seen in the 1980s. The moderated level of the value of production plus government payments in the 2006-2010 period would have also reduced the incentive for farmers worldwide to bring land into production beyond what is sufficient to meet demands of an increasing population and increased industrial use.

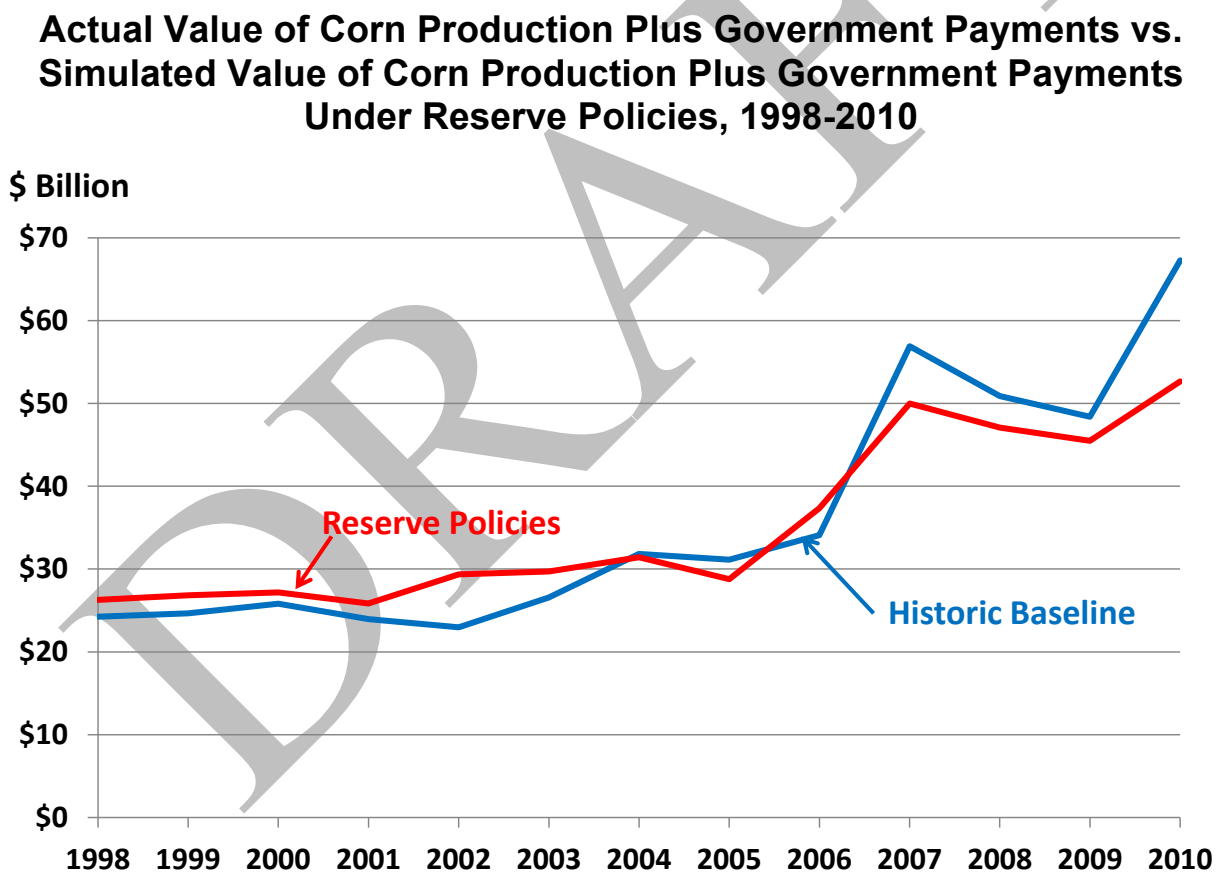

Figure 7. A comparison of the actual value of corn production plus government payments to the value of corn production plus government payments generated under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

By increasing prices in the early period of low prices, farmer-owned reserves would have resulted in slightly smaller export volumes of corn (fig. 8). Conversely, during the later period of high prices, farmer-owned reserves would have lowered corn prices, resulting in slightly increased export volumes.

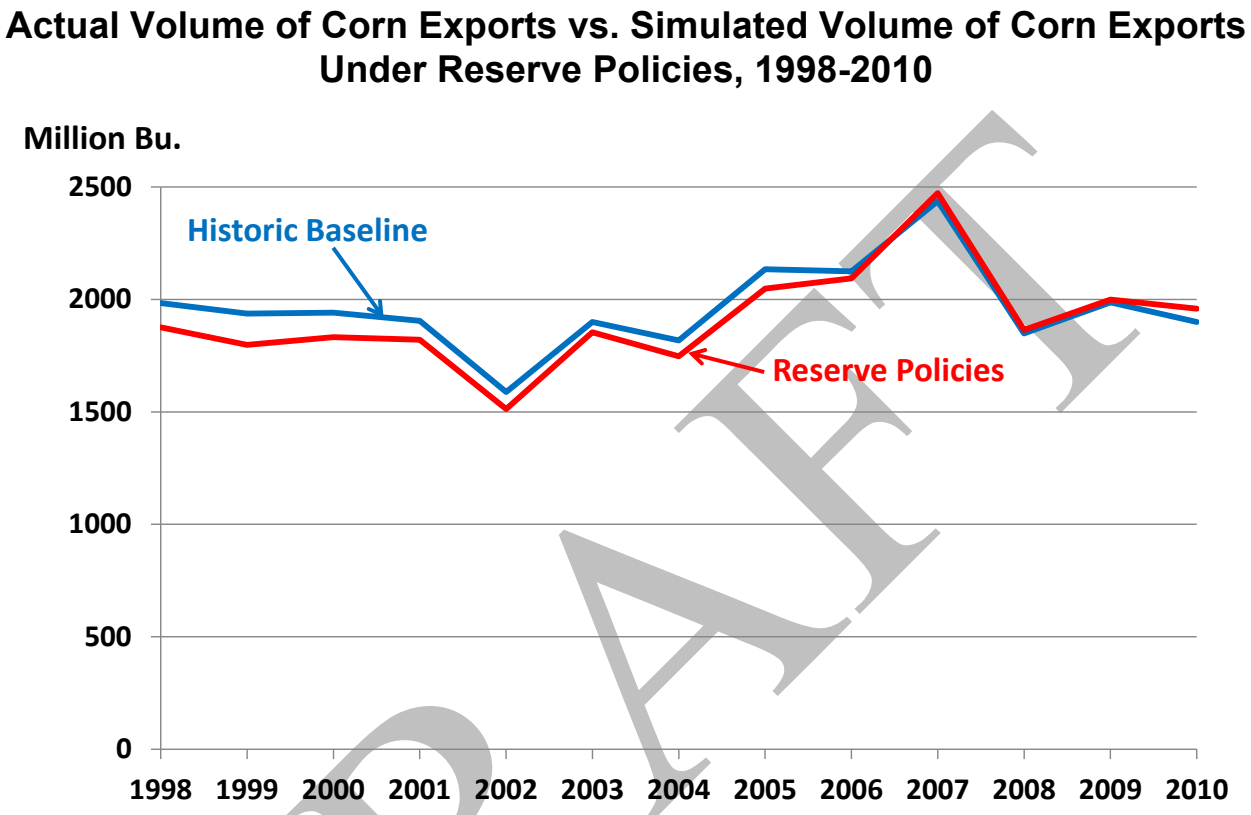

Figure 8. A comparison of the actual quantity of corn exports to the quantity of corn exports under a simulation of farmer-owned reserves. 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

However, the issue of exports is not simply a matter of quantity. More important is the value that those exports bring to the U.S. economy. During the era of low prices, 1998-2005, farmer-owned reserves would have resulted in a higher value of exports for corn (fig. 9), totaling an additional $8.8 billion over the eight-year period. For the latter period, 2006-2010, the value of exports under a system of farmer-owned reserves would have been lower than historical levels, due mostly to higher actual prices. Over the complete 13-year study period, the value of exports would have been $4.9 billion higher under farmer-owned reserves policies than historical conditions for that period. Farmer-owned reserves would have provided additional export income in years when corn farmers needed it the most.

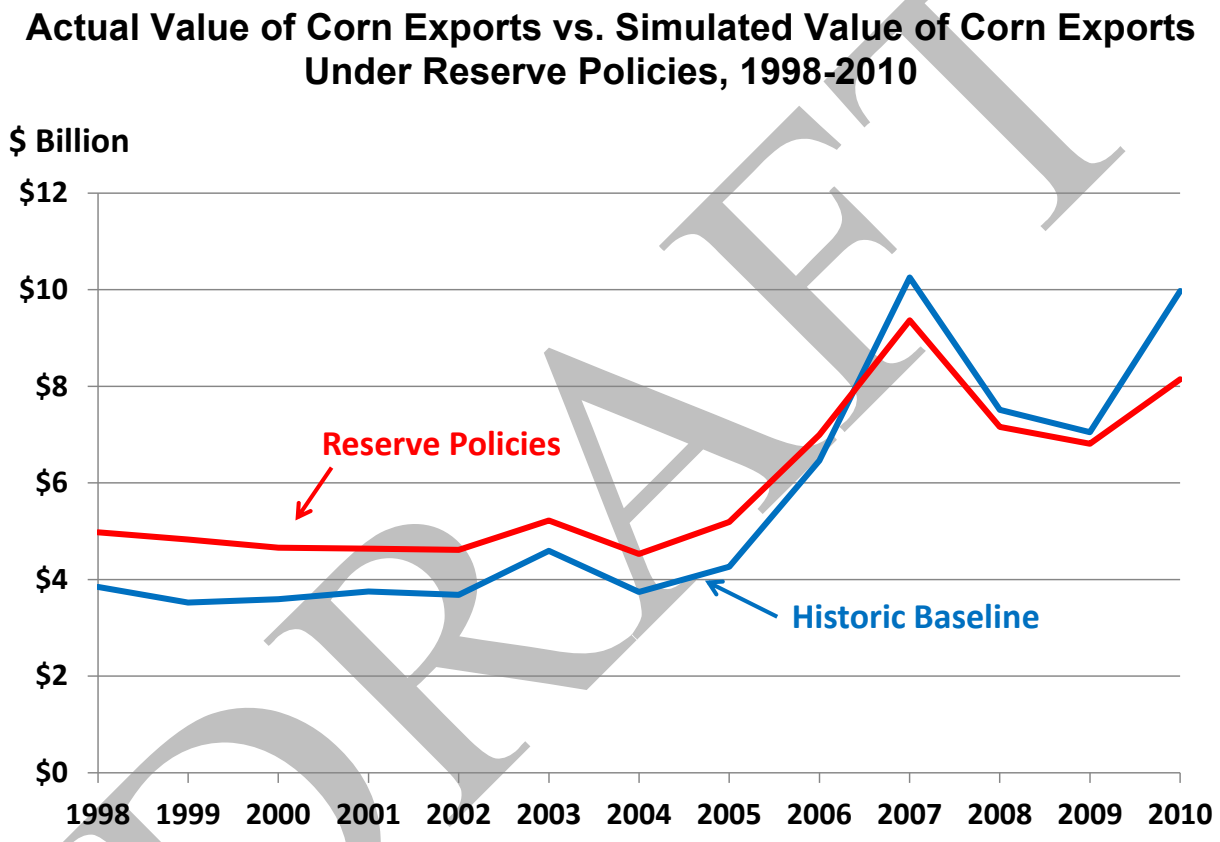

Figure 9. A comparison of the actual value of corn exports to the value of corn exports under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

Wheat

Government payments to wheat farmers under farmer-owned reserves would have been consistently lower than they were during the 1998-2010 period, which consisted of a system of emergency payments, AMTA/direct payments, the Marketing Loan Grain program, and various other policies (fig. 10). Actual government payments for wheat during the 13-year period were $22.9 billion while under farmer-owned reserves they would have been $2.8 billion, which amounts to less than $214 million per year.

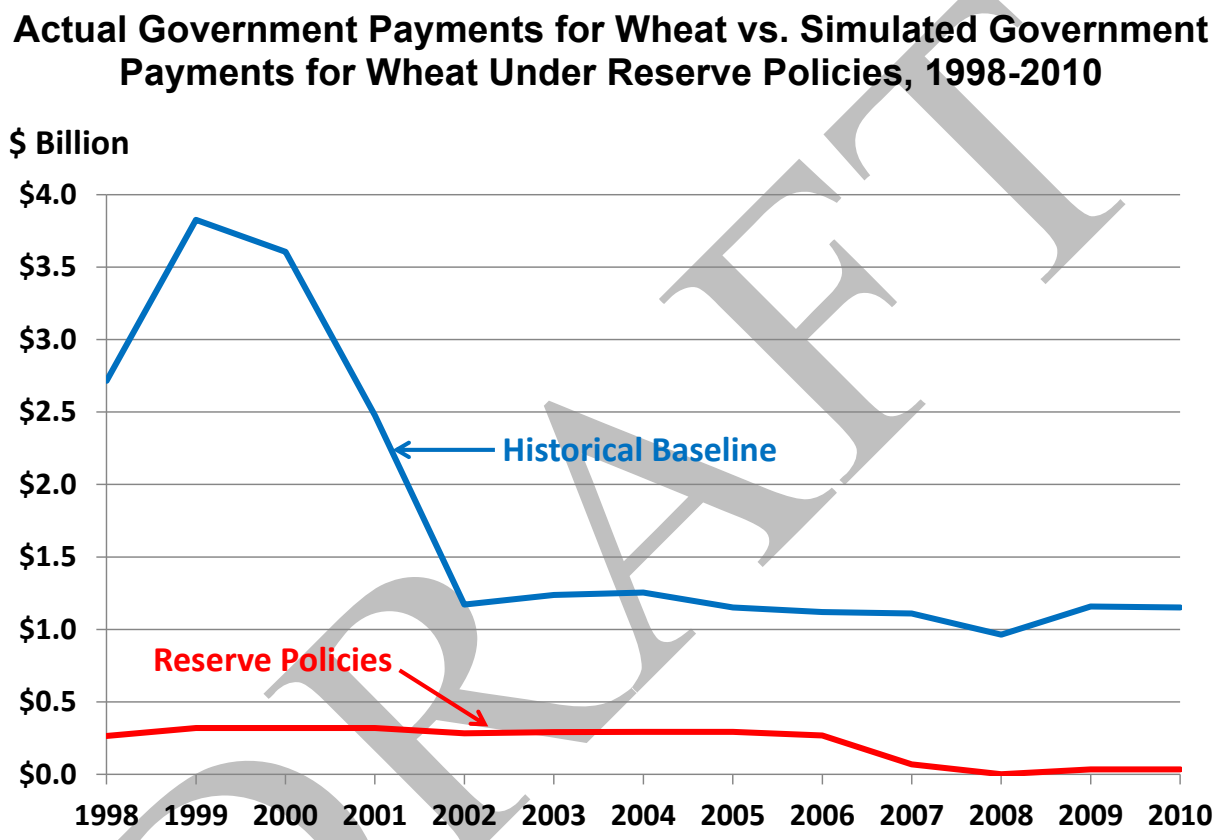

Figure 10. A comparison of actual government payments for wheat to government payments generated under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

An examination of the impact of farmer-owned reserves on wheat prices when compared to the actual prices in the 1998-2005 period—a time when wheat prices were well below the cost of production—shows that a system of farmer-owned reserves would have generated $1.06 per bushel more than the baseline policies (fig. 11). This would have increased cash receipts and reduced government payments. During the period of generally high prices, 2006-2010, farmer-owned reserves would have slightly lowered wheat prices by about an average of 43 cents per bushel. Over the entire 13-year period, wheat prices would have been 48 cents per bushel higher under farmer-owned reserves than they were in history. Additionally, the higher domestic wheat prices during the 1998-2005 period would have protected U.S. farmers from the accusations of dumping subsidized wheat on the world market at prices below the cost of production, which depressed prices for wheat farmers worldwide.

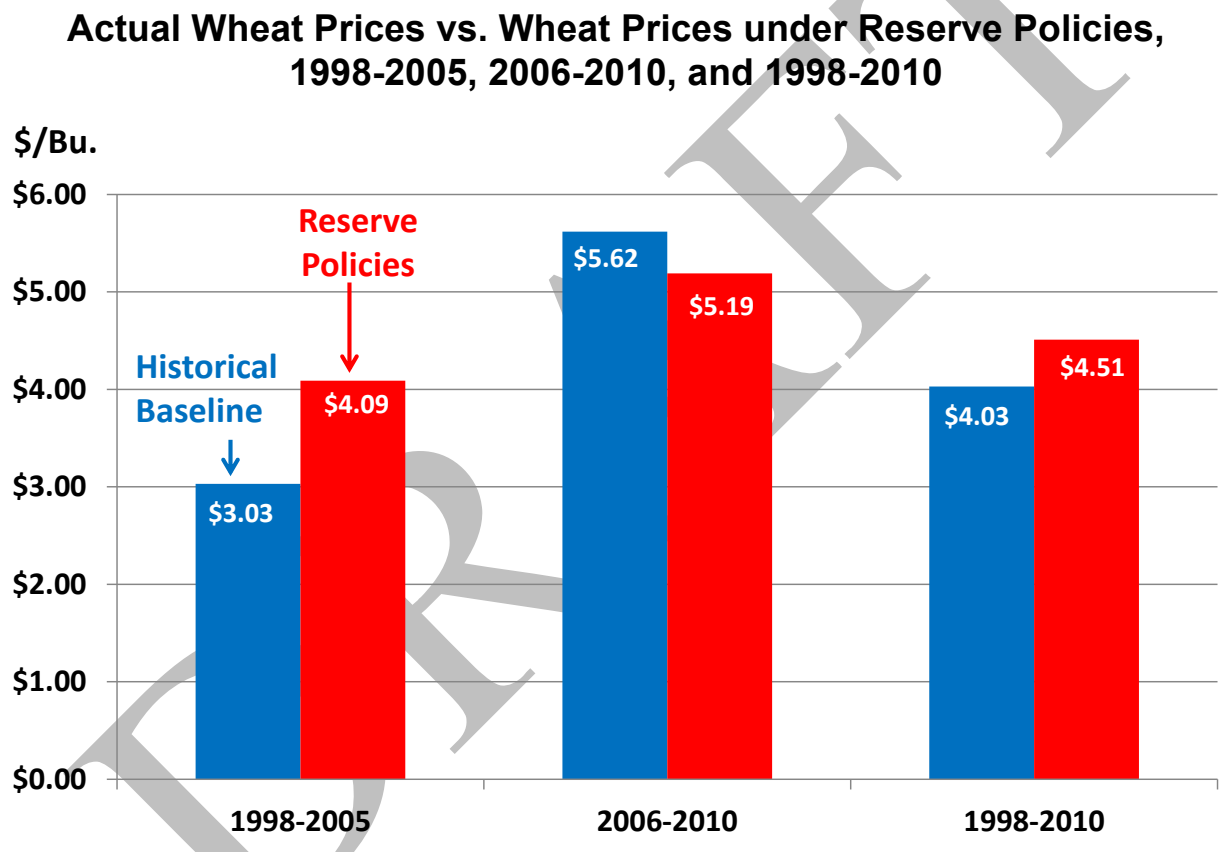

Figure 11. A comparison of actual wheat prices to wheat prices generated under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

An examination of the impact of farmer-owned reserves on the value of wheat production when compared to the actual value of production in the 1998-2005 period shows that a reserve-based policy would have increased the value of production in the early years (fig. 12). This would have increased cash receipts and reduced government payments. During the period of generally high prices, 2006-2010, farmer-owned reserves moderated the value of production.

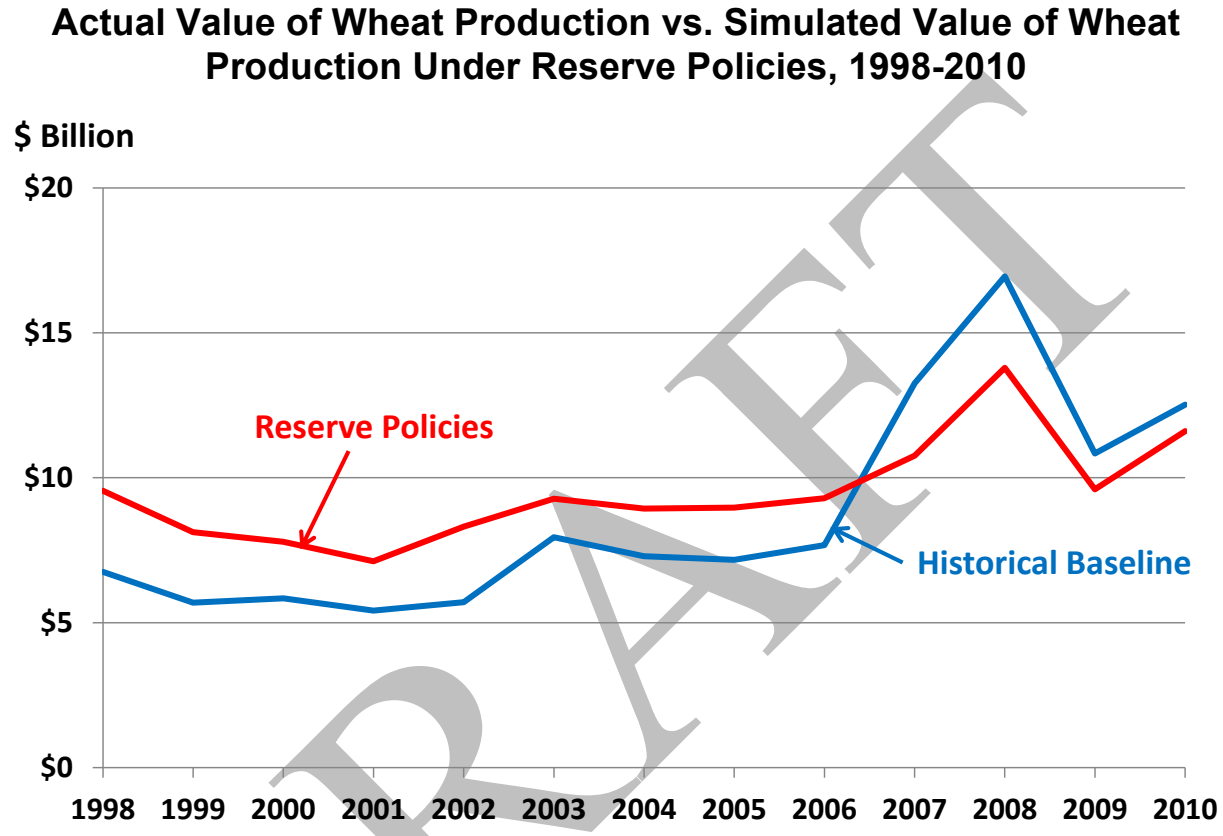

Figure 12. A comparison of the actual value of wheat production to the value of wheat production generated under a simulation of farmer-owned reserves, 1998 to 2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

A system of farmer-owned reserves would have provided wheat farmers with $151 million per year more in the value of production plus government payments than was produced under baseline policies during the 1998-2005 period. For the 2006-2010 period, the combination of the value of production plus government payments would have been lower with farmer-owned reserves for wheat farmers than the level that actually occurred (fig. 13).

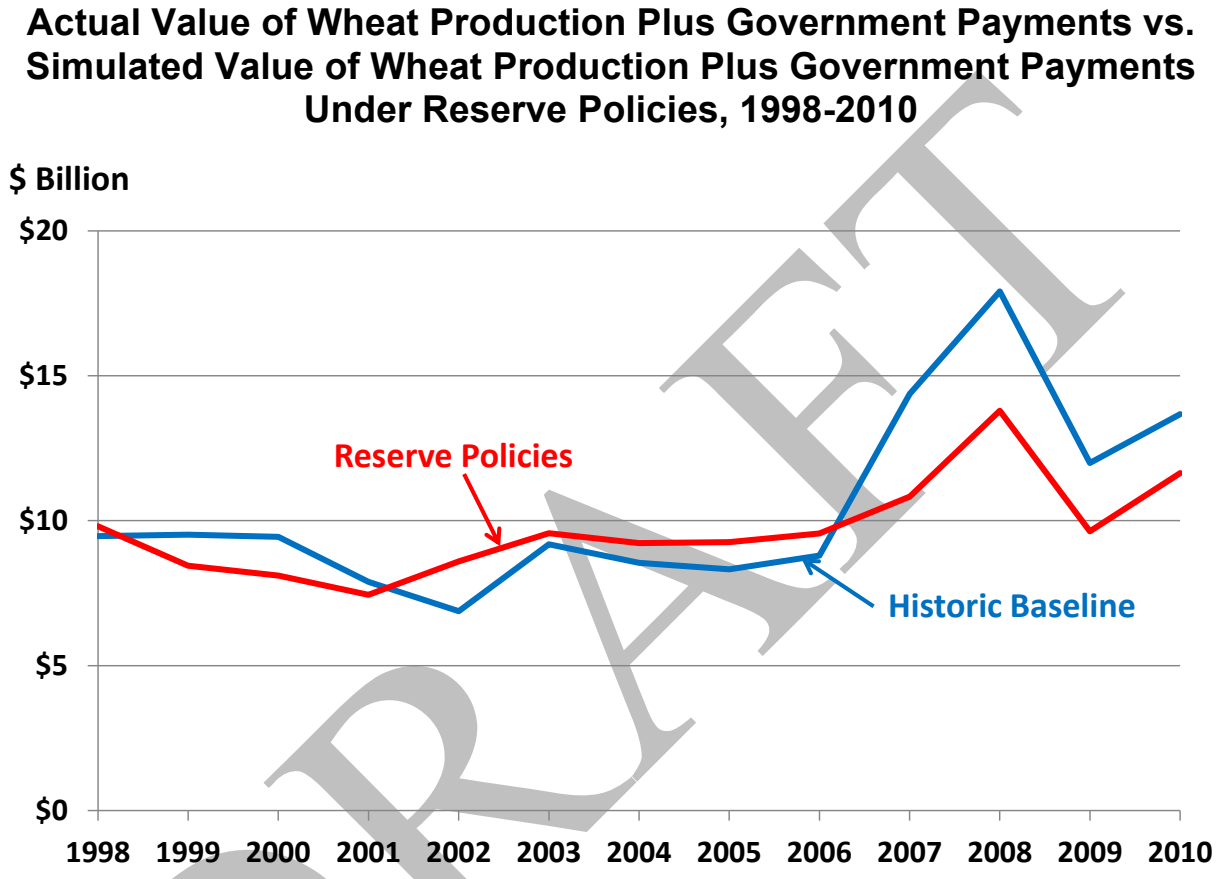

Figure 13. A comparison of the actual value of wheat production plus government payments to the value of wheat production plus government payments generated under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

A system of farmer-owned reserves would have had an impact upon wheat exports because the system would moderate prices. By increasing prices in the 1998 to 2006 period of low prices, exports of wheat would have been slightly below the historical baseline. Conversely, during the high prices of 2007 to 2010, farmer-owned reserves would have lowered wheat prices, thereby slightly increasing exports (fig. 14).

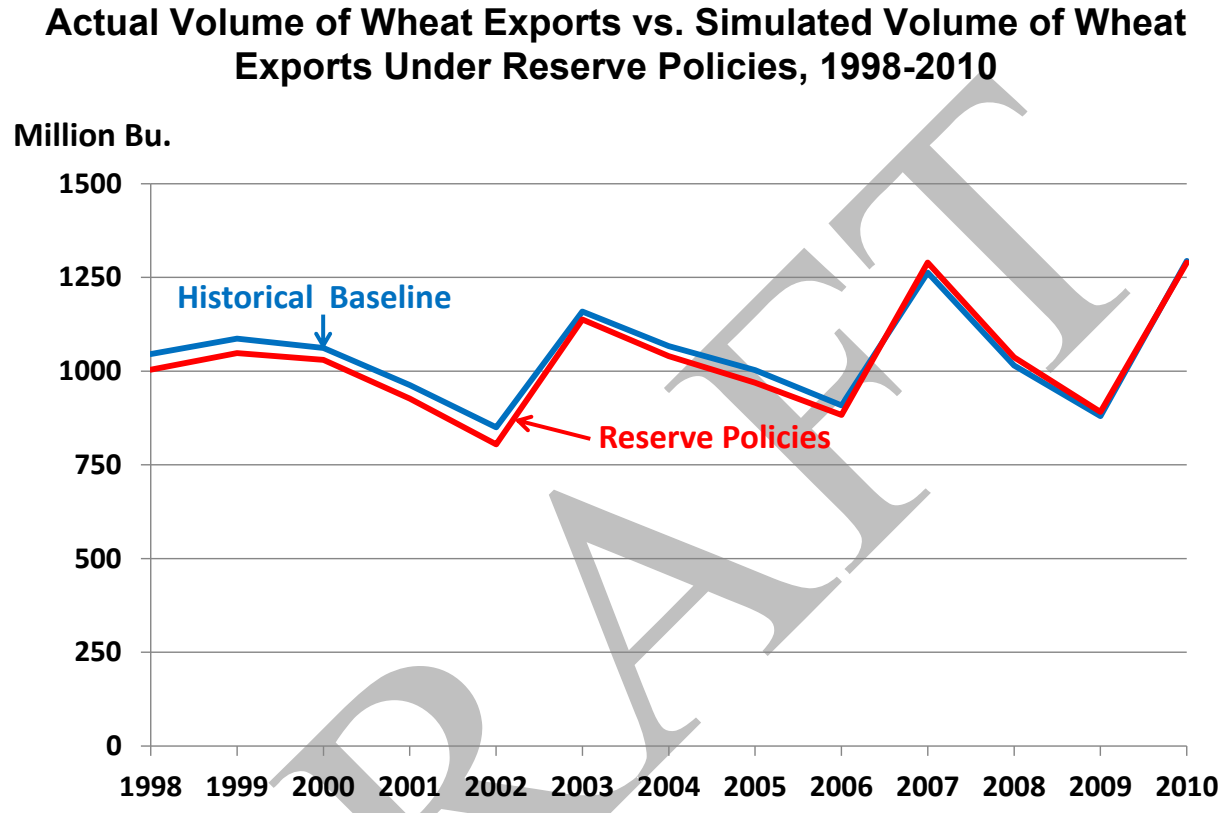

Figure 14. A comparison of the actual quantity of wheat exports to the quantity of wheat exports under a simulation of farmer-owned reserves, 1998 to 2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

The issue of exports is not simply a matter of quantity. More important is the value that those exports bring to the U.S. economy. During the era of low prices, 1998-2005, farmer-owned reserves would have resulted in a higher value of exports for wheat (fig. 15), totaling an additional $7.4 billion over the 8-year period. For the latter period, 2006-2010, the value of exports under farmer-owned reserves would have been lower than historical levels, due to price reductions that a farmer-owned reserves system would have triggered. For the overall 13-year study period, the value of exports would have been $5 billion higher with farmer-owned reserves than under historical conditions for that period. Farmer-owned reserves would have provided extra export income in the years when wheat farmers needed it the most.

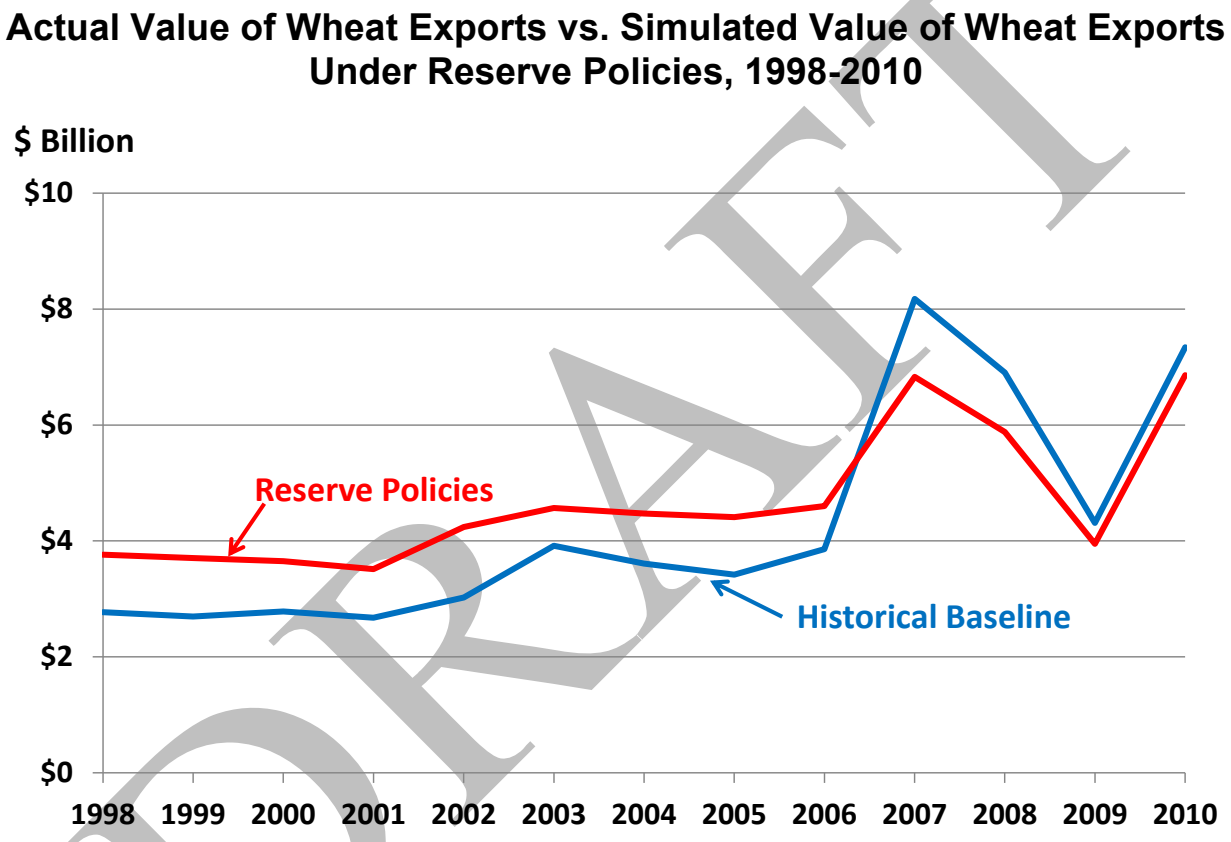

Figure 15. A comparison of the actual value of wheat exports to the value of wheat exports under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

Soybeans

Government payments to soybean farmers under farmer-owned reserves would have been consistently lower than they were under emergency payment responses, Agricultural Market Transition Assistance (AMTA) or direct payments, the Marketing Loan Grain program, revenue insurance, and various other policies that were in effect during the 1998-2010 period (fig. 16). Actual government payments for soybean farmers during the 13-year period were $15 billion while under farmer-owned reserves they would have been $1.4 billion, which amounts to less than $105 million per year.

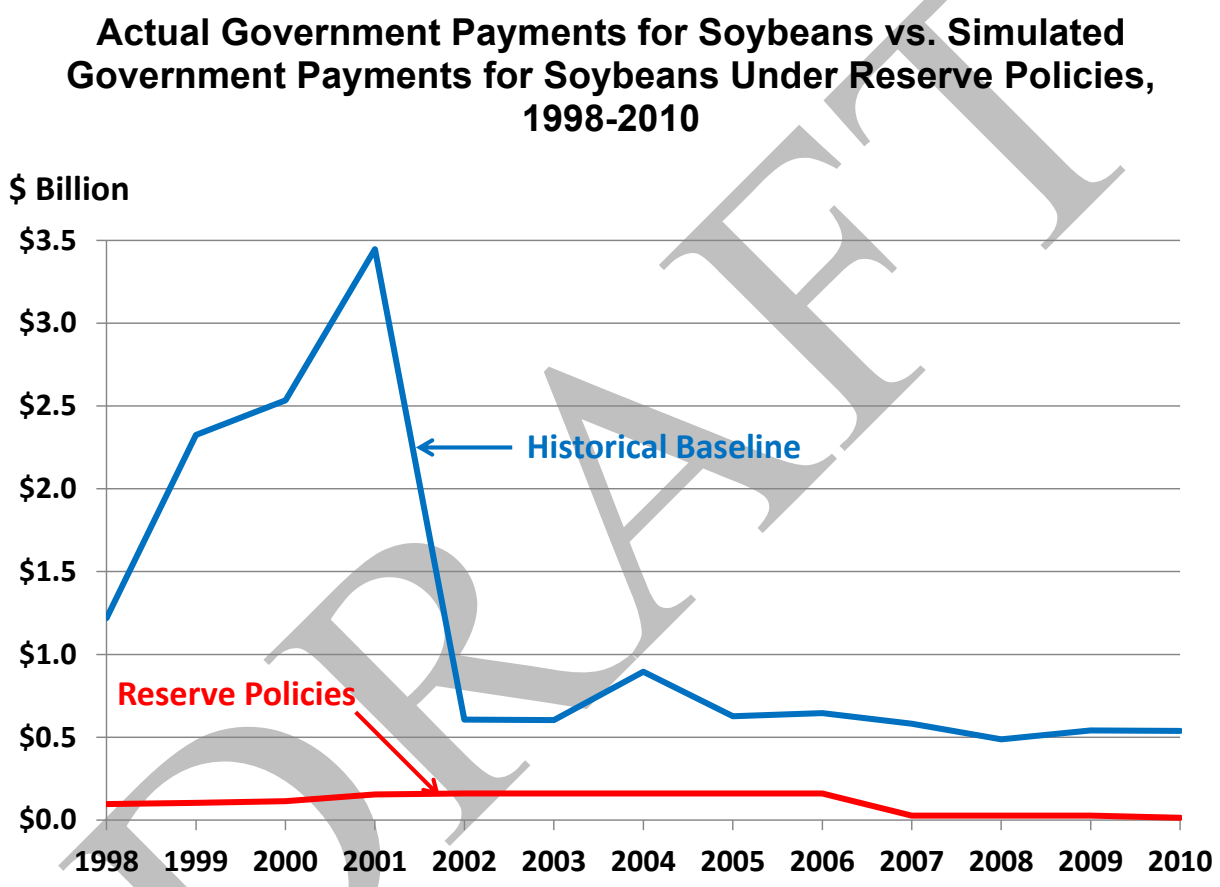

Figure 16. A comparison of actual government payments for soybeans to government payments generated under a simulation of farmer-owned reserves, 1998 to 2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

An examination of the impact of farmer-owned reserves on soybean prices when compared to the actual prices in the 1998-2005 period—a time when soybean prices were low but more profitable than other crops—shows that farmer-owned reserves would have generated $1.95 per bushel more than the actual policies (fig. 17). This would have increased cash receipts and reduced government payments. During the period of generally high prices, 2006-2010, farmer-owned reserves would have slightly lowered soybean prices by about 28 cents per bushel. Over the entire study period, soybean prices would have averaged $1.09 per bushel more under farmer-owned reserves than they actually were.

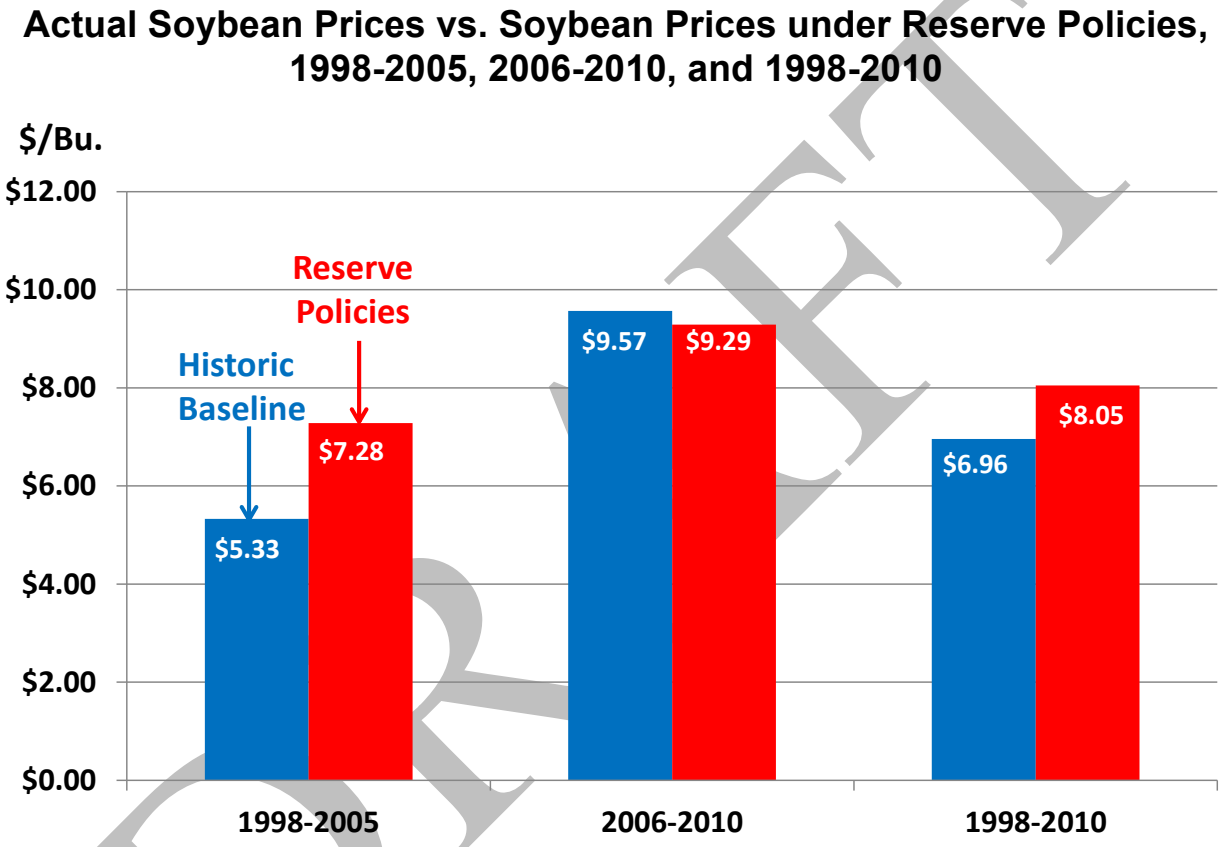

Figure 17. A comparison of actual soybean prices to soybean prices generated under a simulation of farmer-owned reserves, 1998 to 2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

With higher soybean prices under farmer-owned reserves, the value of soybean production is greater between 1998 and 2006 than it was in the baseline, while the value of production would have been lower between 2007 and 2010 (fig. 18). For the entire 13-year period, the value of production with the baseline policies was $268 billion while under farmer-owned reserves it would have been $302 billion, an increase of $34 billion

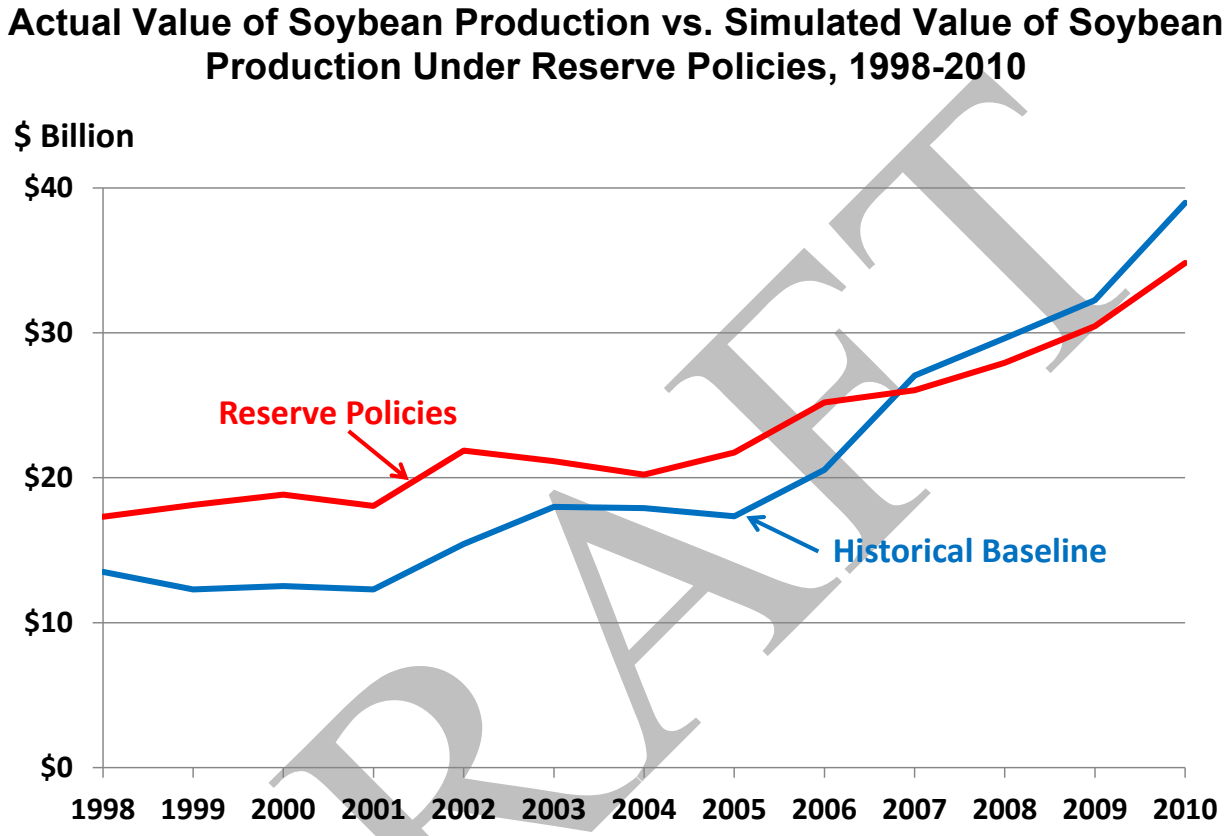

Figure 18. A comparison of the actual value of soybean production to the value of soybean production generated under a simulation of farmer-owned reserves, 1998 to 2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

A system of farmer-owned reserves would have provided soybean farmers with an average increase of $3.4 billion per year in the value of production plus government payments than was experienced during the 1998-2005 period (fig. 19). During the 2006-2010 period, the combination of the value of production plus government payments would have decreased by $1.3 billion per year for soybean farmers. For the entire 13-year period, farmer-owned reserves would have provided soybean farmers with $1.6 billion per year more than they received under the historical policies.

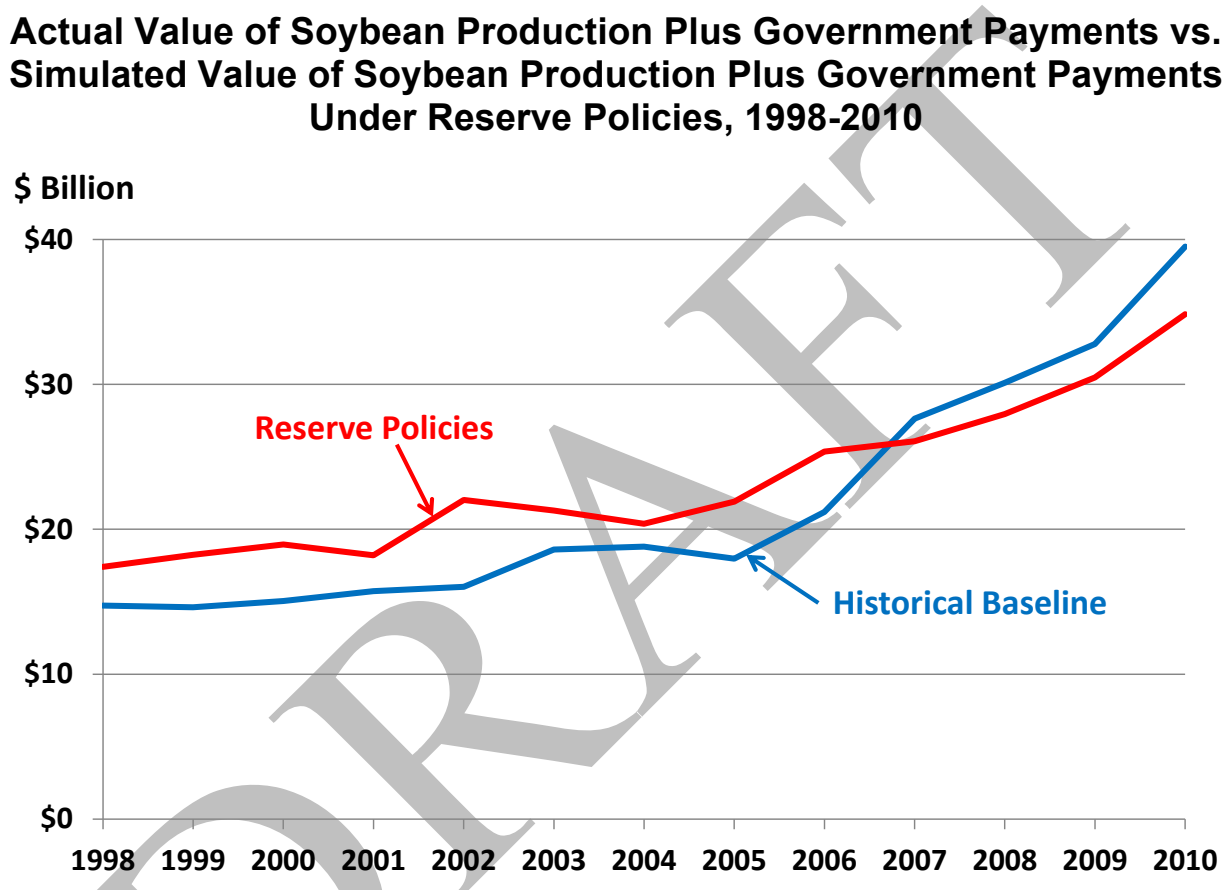

Figure 19. A comparison of the actual value of soybean production plus government payments to the value of wheat production plus government payments generated under a simulation of farmer-owned reserves, 1998 to 2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

Because farmer-owned policies would have moderated price volatility, exports would have been affected. By increasing prices in the early period of low prices, soybean exports would have decreased slightly. Conversely, during the high prices in 2007 to 2010, farmer-owned reserves would have lowered soybean prices, which would have resulted in slightly increased exports (fig 20).

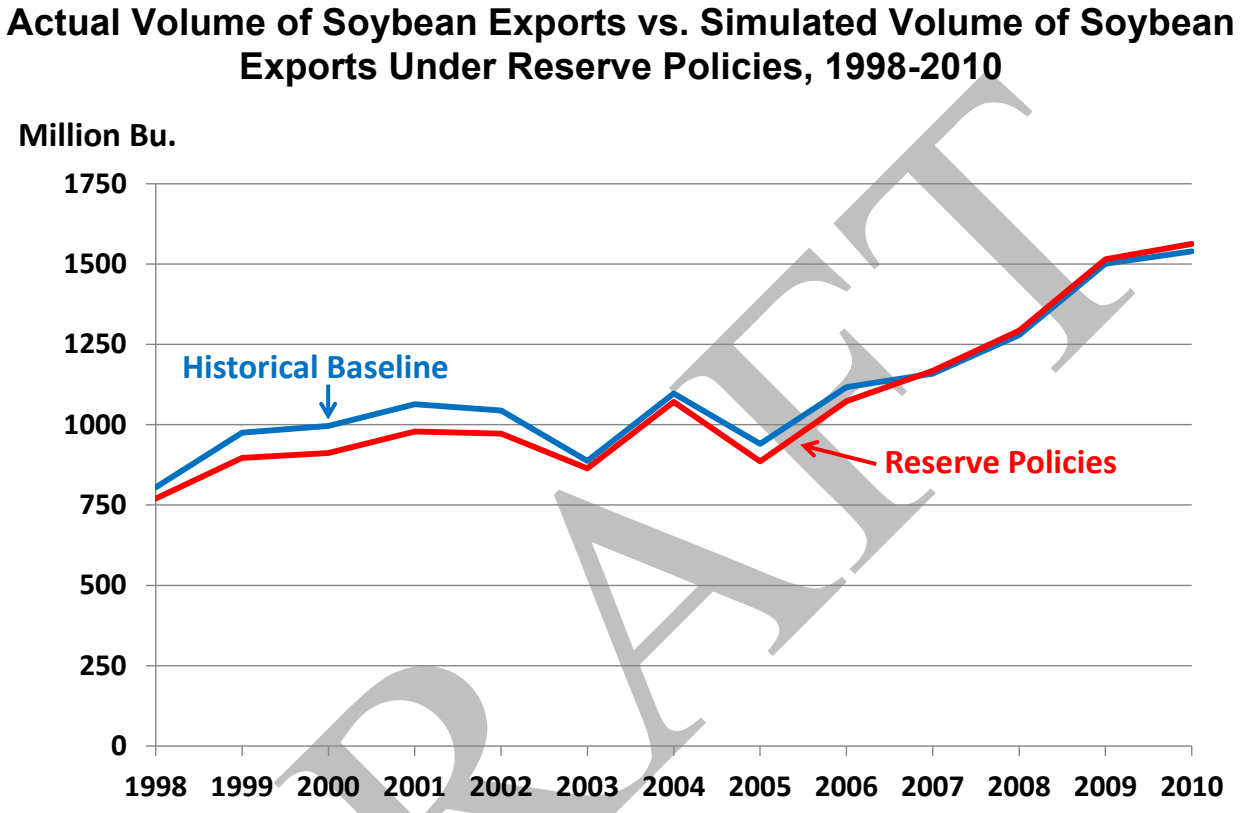

Figure 20. A comparison of the actual quantity of soybean exports to the quantity of wheat exports under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

From 1998-2005, farmer-owned reserves would have brought a higher value of exports for soybeans, totaling an additional $12 billion over the 8-year period. For the latter period, 2006 to 2010, the value of exports under farmer-owned reserves would have been lower than historical levels, due to lower prices. Over the complete 13-year study period, the value of soybean exports was $9.8 billion higher with farmer-owned reserves than under historical conditions for that period. Just as with the two other crops, corn and wheat, farmer-owned reserves would have provided extra export income in the years when soybean farmers needed the income the most.

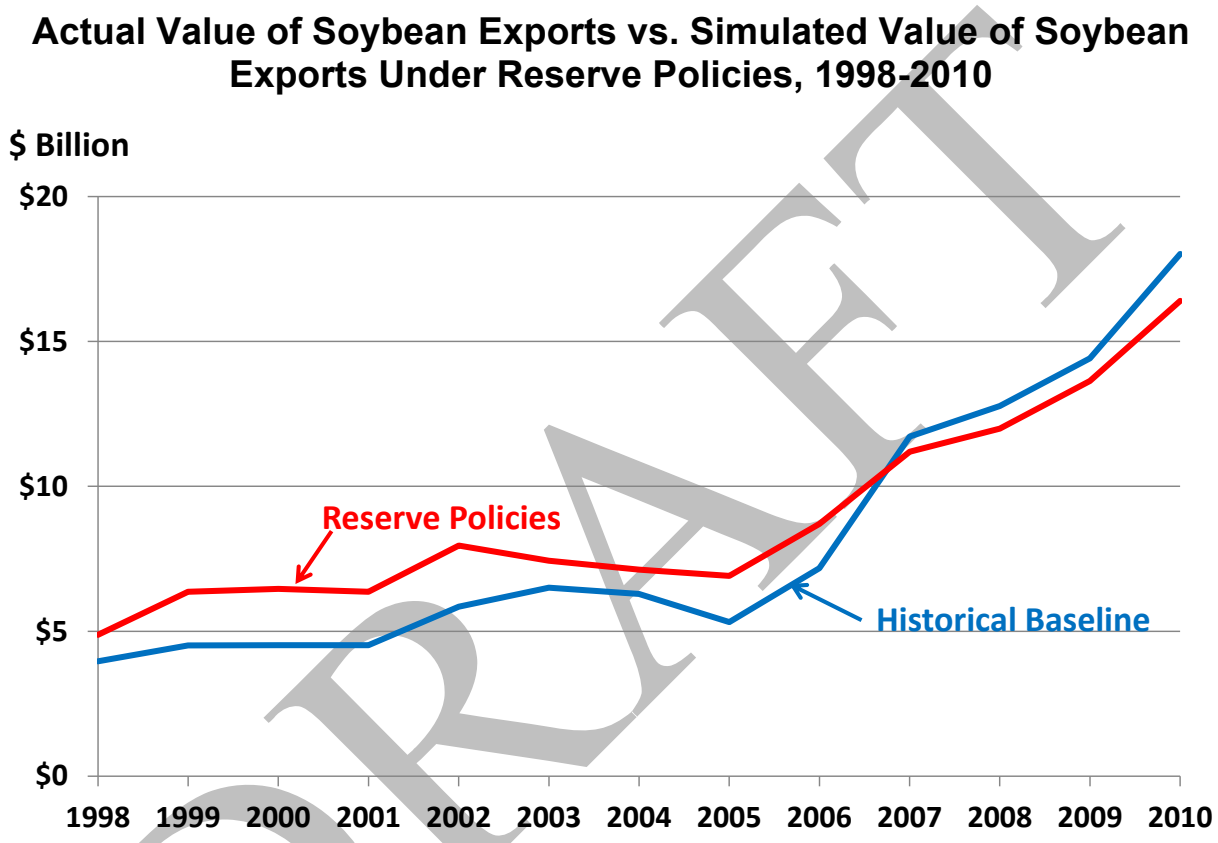

Figure 21. A comparison of the actual value of soybean exports to the value of soybean exports under a simulation of farmer-owned reserves, 1998-2010. Source: USDA baseline and Agricultural Policy Analysis Center POLYSYS simulation.

Stakeholder Impacts

A policy with the ability to hold reserve stocks of corn, wheat and soybeans has benefits for a large number of stakeholders, including taxpayers, consumers, crop farmers, livestock farmers and industrial users of raw agricultural commodities.

Taxpayers

Compared to current policies, the most obvious beneficiaries of a policy of holding reserve stocks would be U.S. taxpayers. In a time of tight federal budgets, any policy that can provide farmers with the same level of farm income at less than half the government cost is a policy that must be taken seriously. By setting up a system that allows the price to reflect the cost of production, these policies allocate the costs to the major users of commodities, both domestic and international, rather than expecting the U.S. federal government to subsidize their purchases. Government costs are lower in large part because the loan rate would be paid on only the portion of the crop that is put into farmer-owned reserves and not on every bushel that is produced—in the model, this amounts to less than 633 million bushels of corn in a given year vs. making a loan deficiency payment on every bushel for every year the price is below the loan rate. In addition, the loan plus interest (if it is charged) would be paid back to the government when the grain is released from the reserve into the commercial market. In the long-term, the only potential net cost is the interest that is forgiven plus storage payments to the farmer.

Consumers

In addition to the benefits they would receive under a farmer-owned reserves system as taxpayers, U.S. consumers would benefit from more stable commodity prices that would reduce the volatility of food costs. While commodity prices under reserve policies increased in the 1998-2005 period according to the model, the farm portion of most processed food costs that U.S. consumers eat is relatively small, resulting in minimal long-term pressure on food prices. Average commodity prices in the 2006-2010 period under proposed farmer-owned reserves policies would not have increased as much as they did under existing policies, reducing upward pressure on food prices.

Because the U.S. would hold some buffer stocks under farmer-owned reserve policies, importers of U.S. corn, wheat and soybeans would be assured of a stable supply of storable commodities in the international marketplace, reducing the need for countries to protect local supplies of grains.

Crop farmers

Under the proposed farmer-owned reserves system, crop farmers in the U.S. would have benefitted from higher crop prices in the 1998-2005 period. Farmers would have also benefited from slightly lower prices in the 2006-2010 period as the lower prices reduce the tendency to capitalize higher returns into land. While sufficient to keep current land in production, the moderated prices do not provide the kind of price signals that would lead to an overexpansion of productive capacity and lower prices over the longer term.

With a reasonable loan rate, farmers could make long-term investments in their farming operation that improve their long-term profitability. While farmers would be provided a level of

price stability with a reserves program, they would not be guaranteed a profit. Farmers still need to engage in wise agronomic and financial management to survive. Farmers also would have benefited from price signals that more closely reflect the supply/demand situation at a given time, than when futures prices reflect herd-following speculative behavior on the part of some market participants.

Farmers who put their corn, wheat and/or soybeans into farmer-owned reserves would benefit from the receipt of storage payments. In addition, they would have the possibility of benefiting from the future sale of their stored commodity at the higher release price.

With farmers constituting as much as 60-70 percent of the poor in developing countries, higher prices in the 1998-2005 period under proposed farmer-owned reserve policies would not adversely affect these farmers because of the large amount of food that they produce for self-consumption. In addition, they would receive a more stable income for the product they do sell into the market.

In times of high prices, many subsistence farmers and urban poor are often priced out of the market, increasing the number of chronically hungry persons in the world. As a result of the price spike in 2007 and 2008, more than 200 million people fell into the chronically hungry category. By moderating the price spikes, reserve policies reduce the price pressure on the poor in developing countries. In addition, reserve policies assure participants in the marketplace of an adequate supply of grain, reducing the hoarding tendency, which often results in localized price spikes.

Because the U.S. would not be subsidizing commodities below the cost of production, accusations of dumping during trade negotiation sessions would be lessened.

Livestock farmers

The major benefit of reserves to livestock producers comes through the long-term moderation of prices. In the 2006-2010 period, higher prices put some producers over the financial edge; however, the farmer-owned reserve policies would have reduced commodity prices to a more reasonable and survivable level. Livestock producers are vulnerable to rapidly increasing prices, which they cannot quickly pass on to the consumer. Farmer-owned reserve policies provide livestock producers with security in the availability of feed supplies and the range of commodity prices they might expect.

Industrial users

Industrial users of agricultural commodities would benefit from farmer-owned reserves by having access to a stable supply within a more predictable price range, allowing them to engage in long-range planning. Industrial users would be able to adapt when sharp disruptions in supply or demand threaten to reduce available supplies because the reserve would provide supplies of commodities and mitigate market disruptions such as those experienced in recent years. Within the loan rate and release price band, prices would respond to the supply/demand situation, sending appropriate price signals to both producers and consumers of agricultural commodities.

Past Criticisms of Reserve Programs

"Costly"

One of the charges that has traditionally been made against reserve programs is that they are too expensive for taxpayers. This prompts the natural question, "Compared to what?" During the study period of 1998-2010, the U.S. government spent $152 billion on farm program payments, not including insurance subsidies, environmental programs and other targeted activities. The results of the model suggest that farmer-owned reserves would have cost between $55 and $67 billion—including net loan principal and interest costs—over the same 13-year period. The matrix of programs that were used in the 1998-2010 period cost the U.S. government at least $85 billion (56 percent) more than a program that includes the use of supply management tools. These savings do not include the savings that would accrue from the reduction of price risk in the subsidized insurance products that were offered to farmers. These savings also do not include the $5 billion repayment value of the crops that were held in the farmer-owned reserve at the end of the simulation study or the additional $3 billion that farmers would receive when the crops were released from the reserve.

"Market-manipulating"

Farm gate prices that range, using corn as an example, from $1.50 to near $8 per bushel give the agriculture sector conflicting resource allocation signals—signals that are far afield from prices that some economists call "normal" or long-run equilibrium prices that cover all production costs and a reasonable profit. Such whipsaws in prices are disruptive to the farm economy, resulting in livestock producers and other ingredient purchasers basing their production and profitability on grain prices that are below the cost of production when prices are low and then absorbing exorbitantly high feed/ingredient costs when grain prices are high. In the case of crop farmers, government payments skyrocket when prices plummet because no means are available to cut back on supplies reaching the market. When prices are at the high end, crop farmers receive excess profits, much of which is capitalized into the price of land or cash rent. The current policy set accentuates this misallocation of resources compared to an alternative policy that results in prices being less distant from economists' long-run price expectations for competitive markets—that is, prices that equal minimum average long-run costs.

A Brief History of Reserves

In the past, prices were supported by offering farmers non-recourse loans using the farmers' storable commodities as collateral. Grain and other commodities accumulated by the government under the non-recourse loan programs served as sources of reserves or buffer stocks which could be used during years of severe production shortfalls. This provided more supply-dependability to the domestic livestock industry and major corn import customers. These functions can be illustrated by looking at the impact.

1947-1952

During World War II (WWII), the U.S. government controlled prices as part of the war effort. As the war came to an end, price controls were taken off and farmers became concerned

with whether or not they would face the same low price/overproduction problems they faced at the end of World War I (WWI). The low prices that began at the end of WWI plagued farmers for most of the next twenty years.

The Commodity Credit Corporation (CCC) began to store corn in 1938. Storage peaked at 132 million bushels of corn in September 1941, two months before entering the war, providing some stability until production was ramped up to support the war effort. By September 1942, CCC corn stocks were down to 30 million bushels. They were at zero for the remainder of the war.

In the 1946-1947 crop year with wartime price controls at an end, corn prices rose to a season average price of $1.53 per bushel on a production of 3.2 billion bushels and a demand of 3.1 billion bushels. Year-ending stocks were 283 million bushels.

The CCC held no stocks going into the 1947 crop year when a wet spring and poor planting conditions drove production down by 27.7 percent (862 million bushels) to 2.4 billion bushels. This production was well below the previous year's demand.

With carry-in stocks of just 283 million bushels, 1947 season average corn prices rose to $2.16, exports fell from 127 million bushels to 7 million bushels and domestic demand fell by 472 million bushels. In a time of tight supplies, a bad weather year resulted in extraordinarily high corn prices for producers and demanders alike.

As sometimes happens, a short crop year is followed by a bin-buster and plummeting prices. 1948 saw a 56.9 percent increase in production, year-ending stocks increased to 27.9 percent, and prices fell to a season average of $1.28 with some local areas seeing prices below $1.00.

While the CCC program was in effect, legislation limited CCC's authority to build or lease storage facilities. This reduced the ability of the CCC to mitigate the negative price impact of the bumper crop of corn. Eventually 68 million bushels of the 1948 corn crop were placed in CCC storage. But it was a case of too little, too late.

Although 1949 saw the eleventh largest year-to-year percentage decline in corn production (-10.9 percent), production was still slightly ahead of demand. This small surplus added to the previous year's crop surplus resulted in an increase in total year-ending corn stocks. CCC stocks increased to 253 million bushels, while commercial stocks fell by 153 million bushels and the season average price slipped to $1.24 from the previous year's $1.28. Without the price supporting effect of CCC stocks, prices could have fallen much further.

Grain surpluses and low prices became an increasing problem. In his book, Farm Policies & Politics in the Truman Years, Allen Matusow writes, "By the beginning of 1950 [in the middle of the 1949 corn crop year], a great disquiet was permeating American agriculture. Net farm income, which totaled a record $17.3 billion in 1947, had declined to $13.7 billion in 1949 and was expected to fall to $12 billion in 1950. To support prices in 1949, the CCC had nearly exhausted its $4.7 billion borrowing capacity, forcing the administration to request an additional $2 billion for 1950. The largest corn carry-over in history threatened hard times in the Midwest, and the nearly 300 million bushels of [corn] under government loan would no doubt be augmented by new surpluses in the coming season. Faced by the prospect of overproduction in 1950, the government decreed acreage allotments for all basic commodities."

The agricultural crisis vanished in June 1950 as the US found itself in the midst of a war on the Korean Peninsula. As Matusow put it, "suddenly the surpluses of yesterday became essential material for fighting the Korean War." As at the beginning of WWII, the CCC stocks proved beneficial in enabling the country to meet new market dynamics.

1970-1973

Following the Korean War, CCC corn stocks built up to unprecedented and politically unacceptable levels. By the late 1950s ending-year government stocks exceeded one billion bushels of corn, representing as much as 37 percent of demand. In the 1960s, acreage reduction policies were put into place to reduce the level of CCC stocks. By the end of the decade the corn stocks-to-use ratio was in the low single digits. The absolute level of CCC stocks was reduced to below 300 million bushels.

In 1970, despite an increase of 2.6 million acres, corn production fell by 535 million bushels, 11.4 percent, due to a yield decline of 13.5 bushels to a national average of 72.4 bu./ac. As a result of the production shortfall, year-ending CCC stocks fell from 255 million bushels to 30 million bushels and feed usage declined by 232 million bushels. The 1970 corn price average received by farmers increased by 15 percent to $1.33, thirty cents higher than it was in 1967.

Farmers responded to the higher corn price by increasing 1971 corn plantings from 66.9 million acres to 74.2 million acres. The additional acres and a national average record yield of 88.1 bu./ac. resulted in an increase in production of 1.5 billion bushels. Feed utilization returned to trend line levels. CCC stocks slightly increased to 47 million bushels while the year-ending commercial stocks-to-use ratio exploded from 14 percent in 1970 to 21 percent in 1971. For the first time in history commercial stocks exceeded 1 billion bushels. Not surprisingly, the corn price fell to $1.08.

In 1972, farmers once again responded to the low price, this time by shifting 7.1 million acres back out of corn and into other crops. This acreage reduction was offset by another record corn yield, 97.0 bu./ac., resulting in production that was just 66 million bushels below the prior year. Much to everyone's surprise, the USSR responded to their own short crop by importing grain instead of reducing their livestock numbers. Corn exports jumped by 50 percent from nearly 800 million bushels to 1.3 billion bushels. In addition, feed utilization increased by 200 million bushels. As a result the season ending stocks-to-use ratio declined by half to 11 percent and the price jumped 45 percent to $1.57.

In 1973, strong export demand continued as production remained flat for the third year in a row. The production was flat despite a 5.2 million acre increase in corn acreage due to lower yields. The stocks-to-use ratio fell to 8 percent and the corn price zoomed to $2.55 per bushel, 136 percent above the price two years earlier.

It looked as if export demand was going to be able to sop up any excess US corn production. As a result, under Secretary of Agriculture Earl Butz, reserves and stocks management were abandoned as policy instruments as he urged farmers to plant fencerow to fencerow. Farmers responded and by the 1977 crop year corn prices had fallen to $2.02 from a season average high of $3.02 in 1974.

While it is clear that stocks were too high in the post-Korean War years of the late 1950s, abandoning Wallace's concept of an ever-normal granary by seeking to eliminate all government stocks had its consequences as well. At the very time that an ever-normal granary could have stabilized supply, the granary was empty. Wide annual yield swings and farmer reaction to the subsequent high/low prices set up a yoyo effect in the corn market that left it temporarily unprepared to provide a sufficient supply of crops to meet the new export demand in 1972.

As a result, the immediate high prices had three effects: the drawing of additional resources—particularly land—into crop production, an increase in the price of land and a reduction in the amount of corn used by animals for feed. Between 1973 and 1974 feed demand declined by 1 billion bushels and would not recover until 1978. The presence of an effective

reserve in the early 1970s could have moderated the yield-related price swings, provided supplies adequate to meet the increased export demand, avoided a disastrous soybean embargo, and slowed down the rate at which additional land resources were drawn into crop agriculture.

Late 1970s and the FOR

In the late 1970s, growing surpluses necessitated the implementation of farmer-owned reserves. In the five crop years prior to the surge in exports (1967-1971), an average of 68.3 million acres was planted in corn, while an average of 21.8 million corn acres were taken out of production. By 1975, farmers had responded to two years of good corn prices with plantings of 78.7 million acres, 10 million acres more than the 1967-1971 average. In the absence of a diversion program corn acres jumped again in 1976 to 84.6 million acres. Corn acreage remained above 80 million acres until the 1983 Payment In Kind (PIK) program.

With this additional acreage, corn production in the 1975-1979 period exceeded total utilization by 1.5 billion bushels despite an annual increase in exports of 1.3 billion bushels by the end of the period and an annual increase in domestic demand for feed of 1.4 billion bushels by the end of the period. In the middle of this period, a change in administration brought about a change in policy and the introduction of the farmer-owned reserve under the Carter administration to manage the growing surplus while supporting prices—wheat and rice in April 1977 and feed grains in September in the 1977 Farm Bill. As President Carter said as he signed the 1977 Farm Bill into law:

> It, for the first time, makes a major step toward tying target prices to actual production cost … this bill also sets up a means for maintaining adequate food reserves. Although we have been blessed recently with bountiful crops, we don't have an excessive reserve supply of crucial food and feed items on hand. This bill permits us to maintain adequate reserves, and it also encompasses a provision that's very dear to me, and that is that most of the reserves will be under the control of farmers and that there's a very careful safeguard against the dumping of agricultural products on the market, artificially, to force prices down and, therefore, to damage the economy of farm families. (1977)

By 1979, the farmer-owned reserve had accumulated 670 million bushels of corn with an additional 260 million bushels in CCC stocks. Together these stock programs kept commercial stocks at a modest 14.5 percent and the season average price of corn at $2.48 a bushel. The farmer-owned reserve was emptied in 1980 when the corn yield fell by 16.9 percent and total production declined by 1.3 billion bushels. The availability of the farmer-owned reserve allowed the US to maintain export levels while continuing to make grain available for domestic feed and other use.

PIK and the 1980s

Throughout the 1980s and early 1990s, the farmer-owned reserve faced increased political pressure. 1980 and 1981 crop years saw near-record and record yields with production exceeding 8 billion bushels for the first time. Despite the availability of corn at or near the loan rate ($2.40 in 1980 and $2.55 in 1981), exports dropped by 400 million bushels in 1980 and nearly another 200 million bushels in 1981. Feed demand increased by 300 million bushels in 1981, barely offsetting the decline in export demand. With record production and declining total demand, farmer-owned reserve and CCC stocks filled quickly as farmers forfeited some corn to the CCC and held onto the rest of their grain in a three-year farmer-owned reserve in hopes of above loan rate prices down the line. Faced with 3 billion bushels of corn enrolled in government

programs, the Reagan administration instituted the Payment-In-Kind (PIK) program encouraging farmers to take land out of production in exchange for ownership of grain in the two government programs.

The response from farmers was dramatic as 1983 corn acreage fell by 25 percent to 60.2 million acres. What no one counted on was bad weather. The national average corn yield fell by 38.1 percent from the previous year's record 113.2 bushels per acre. As a result, production fell by 50 percent to 4.2 billion bushels and the price rose to $3.21. Combined CCC and farmer-owned reserve stocks fell from 3 billion bushels to 756 million bushels, making grain available even with dramatically reduced acreage and yields.

With the adoption of the 1985 Farm Bill, the CCC and farmer-owned reserve loan rates were reduced from $2.55 to $1.92 as they were blamed for the decline in exports. The argument was that high loan rates kept the US price above the world price and gave our export markets to other export competitors. By 1990, these rates were reduced to $1.57 making storage programs ineffective. Total stocks peaked once again in the 1985-1987 crop years growing to 4.3 billion bushels (54.9% of total utilization), but significantly shrank as the result of a 29 percent fall in corn yield in 1988, reducing corn production by 2.2 billion bushels.

Following the adoption of the 1990 Farm Bill, government stocks became marginal. The 1996 Farm Bill and the wide use of the marketing loan program spelled the end of the government holding any significant amount of grain reserves. The expectation of the authors of the 1996 Farm Bill was that the commercial sector would determine and hold the necessary stock reserves.

1996-2010

With the adoption of the Federal Agricultural Improvement and Reform Act of 1996, the holding of grains either by the Commodity Credit Corporation or farmers in a farmer-owned reserve was made ineffective with the extension of the marketing loan program to all crops. Under the marketing loan program, farmers did not have to forfeit their crop to pay off their government loan when the price fell below the loan rate. Instead, when the price was below the loan rate, they could go into the local county office and pay off the loan at the posted county price and be forgiven the difference between the posted county price and the loan rate. Thus, it was to the advantage of farmers to attempt to pay off their loans when they thought the posted county price was the lowest, because that would minimize their repayment amount. In addition they could keep the grain so that instead of removing excess grain from the market this program allowed the grain to overhang the market, keeping prices below the loan rate for over four years.

Part of the logic behind the end of the grain storage program was the belief that if there were a need for stocks, participants in the commercial sector would buy up those stocks at a low price and later sell them at a higher price with no cost to the government. As became apparent in the 2006-2007 period when non-farm investors began to join farmers in investing in ethanol plants and the USDA projected a massive increase in the use of corn for ethanol production, there were no commercial stocks to ease the transition. As a result, commodity prices skyrocketed as the USDA projected a decade of corn stocks-to-use ratio in the 5 percent range, less than half of the usual range in the teens. As the present study shows, the availability of government stocks would have made stocks available to the market while moderating the price rise. Sufficient stocks would also have been available to stabilize the market in mid-2010 when it became apparent that the 2010 crop might not meet expectations.

Unique Characteristics of Crop Agriculture

So what is it about aggregate crop agriculture that makes it unique and causes it to experience repeated financial belly flops? Understanding the nature of crop and food markets is the key to recognizing the precarious situation that, in turn, crop demanders and producers may face in the years ahead.

Farmers are price takers, not price makers. As a result, farmers continually search out new technologies to reduce per-unit costs as the means of improving net income since they cannot influence prices. Because of weather and pests, individual farmers and the agricultural sector experience an inordinate degree of supply variability compared to firms and industries of other sectors.

Yield volatility and inability to greatly influence production once a crop is planted would contribute to farmers' price and income problems even if agricultural markets adequately self-corrected from one production period to another. But this is one of the central problems of agricultural markets: adjustments in total resource-use from one production period to the next do not occur in the crop sector as quickly or completely as in other product-producing sectors.

In the case of a typical non-agricultural product sector—whether it is houses, clothes, or DVDs—low prices induce consumers to buy more while at the same time causing producers to produce less. The responses of consumers and producers work in concert to relatively quickly restore the market to equilibrium in which price equals the cost of producing an additional unit of the product.

Now consider food and agriculture. Consumers do not switch from eating three meals a day to four or five in response to a dramatic decline in food/agricultural prices. Lower food prices may make it possible for consumers to eat out more often and purchase more expensive food products, but aggregate food consumption remains relatively flat. The amount that is needed is relatively fixed and remains stable over a wide range of prices.

When considering aggregate crop production, a very similar phenomenon is evident. Crop farmers reduce their production little in response to declines in major-crop price levels, particularly if the price remains above the variable cost of production. Some farmers will continue to operate as long as the bank will let them.

Whether owner or renter, operators generally do not let land lie idle since they have no incentive to do so. Also, since the quantity they produce does not affect price, they tend not to scrimp on yield-determining inputs in the face of declining output prices. On-farm expenditures likely would be cut, but compromising seeding rates and application rates for fertilizer and pesticides generally "costs" too much in lost revenue to be a significant source of reduced expenditures.

Changes in the relative prices of farm commodities cause farmers to alter their mix of crops, but the overall level of total agricultural output remains fairly constant. Even in the long term, when a farmer goes out of business, the land generally remains in agricultural production as part of another farmer's operation.

Since neither agricultural producers nor agricultural product consumers readily respond to the signal that markets use to self-correct—price—the result, quite understandably, is that aggregate agriculture does not self-correct in a reasonable length of time. Lack of price responsiveness would not be a problem for agriculture if the combination of domestic and export demand expanded as fast as or faster than the expansion in aggregate supply. If, on the other hand, aggregate supply expands faster than demand, prices decline and crop agriculture

continues to produce at essentially full productive capacity. It has been a societal policy to make public investments to continually expand agriculture's productive capacity and ensure supply growth. Over time, growth in productive capacity has tended to exceed total growth in domestic and export demand, largely because of public policy.

In addition, the lack of price responsiveness causes wide swings in prices when weather and other uncontrollable factors—for example, competition from exports in the past or the current demand for ethanol feedstock—cause random or sudden shifts in either domestic supply or demand. These shifts have always been, and will continue to be, a feature of agriculture and historically only last a few years. We are currently experiencing a high price period where demand grows faster than supply and prices increase sharply.

In the years following WWI, the U.S. has generally dealt with the chronic price/income problems of the crop sector in one of two ways: 1) implementing policies that manage the productive capacity of the U.S. crop sector in much the same way that a CEO of an industrial firm does on a regular basis (treating the causes of the problems) or 2) adopting policies that assume that on average, crop production and prices are acceptable and what is needed are policies to protect farm income from occasional low prices (treating the symptoms of the problems). As we have seen, beginning with the work of Henry A. Wallace as U.S. Secretary of Agriculture in 1933, U.S. policy was designed around the concepts of the establishment of an ever-normal granary to deal with variability in production and demand, and supply management to gauge the use of the productive capacity of crop agriculture to the current level of demand. Through his earlier work as a farm newspaper editor and publisher, Wallace came to recognize that though it makes sense for every farmer to reduce production by a small amount in the face of oversupply and lower prices, no one farmer has an incentive to do so because individual farmers cannot affect price. This phenomenon aligns with the classic free-rider problem of economic theory; if every other farmer decreases production by a small amount, then there is an incentive for an individual farmer to increase production to take advantage of the higher prices. Only by the decision of a CEO, or, in this case, the secretary of agriculture operating under authority given by Congress and signed by the president, can agriculture remove this incentive by implementing a reduction in the use of the productive sector, often through an acreage set-aside. To protect against variability of supply (production) and demand, supply management policies in crop agriculture are combined with a commodity storage program in order to ensure a stable supply of product to the marketplace. Storage programs are generally managed using a floor price (loan rate) at which supplies are put under storage and a higher release price at which supplies are made available to commercial markets.

Over time, these programs fell into disfavor, on the one hand being blamed for establishing too high a loan rate, which reduces domestic demand and prices the U.S. out of the export market—and on the other being blamed for setting the release prices too close to the loan rate, which creates excessive stocks that overhang the market and prevents farmers from benefitting from price rallies that have been cut off by the release price. These concerns were crystallized by the Payment-in-Kind (PIK) Program of the Reagan years which, combined with weather-related disasters, resulted in a dramatic reduction in acreage in 1983 and, consequently, a sharp reduction in the need for equipment, repairs, seed, fertilizer, various farm chemicals and other services farmers use in crop production. The input suppliers who heretofore had not been the dominant player in farm bill debates became fully engaged, seeking policies that would never again confront them with a sharp reduction in demand for their service. The result over the next dozen years was a move toward lower loan rates, more emphasis on subsidized market

development and the institution of risk management tools—primarily insurance—that protected farm income while leaving the production function untouched. Because these new risk management policy tools deal with the symptom (low farm income) and not the causes (overproduction) they have ended up costing double what the supply management programs cost while guaranteeing income levels well above the cost of production in high price years and little income protection in low price years.

Summary

The price and income problems that U.S. farmers face can be traced back to shortly after the European settlement of the North American colonies. Within 40 years of the beginning of the export of tobacco to England, colonial farmers became so adept at growing tobacco that production exceeded English demand and prices plummeted. As a result, some colonies began to experiment with acreage controls to better match supply with demand. The price/income problems first seen with tobacco were eventually seen in indigo, cotton and corn. As additional Midwest and Southwestern acreage was brought into production following the Civil War, corn and cotton prices began a slow decline, creating farmer unrest during the waning years of the 19th century. There has been historical support for policies that respond to the causes of the price/income problems that are an inherent element of crop production. The abandonment of commodity storage/supply management principles in the 1996 Farm Bill resulted in lower commodity prices and higher government costs as shown by the present study. In a time of concern over the amount of money that may be available for the 2012 Farm Bill, the establishment of farmer-owned reserves along the principles described in this report has merit. These policies can reduce government costs while protecting farmers from a repeat of a long period of low prices and assuring consumers of a stable supply of food and feed.

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