How Will the 1996 Farm Bill Affect the Outlook for District Farmland Values?

By Russell L. Lamb

Farmland values in the states of the Tenth Federal Reserve District rose about 5.5 percent over the year ended June 30, 1997 (McDaniel and Lamb). Indeed, over the past two years prices in many parts of the country have risen sharply. The jump in farmland values comes at a time of dynamic change in the farm sector. Last year, the federal government enacted sweeping farm legislation that both lowers payments to producers and removes many government controls on farm production. Government payments have been an important source of farm income for many years, and have likely been capitalized into farmland values. Changes in federal subsidies could have important implications for values. Since farmland is three-fourths of the asset base of the farm sector, the impact of changes in policy on farmland values is crucial to the financial health of the sector.

What effect will the new farm bill have on farmland values? The final impact of program reform will depend on two forces. In isolation, the removal of government subsidies will depress farmland values. On the other hand, agriculture's newly found freedom could further lift land values. Subsidies have come with a price attached in the form of restrictions on planting flexibility and production, limiting farmers' ability to take advantage of expanding export markets. Freed from such restrictions, farmers may find that expanding export markets will lift farm commodity prices and farm income enough to outweigh the loss of income from declining subsidy payments.

The first section of this article discusses the provisions of the 1996 farm bill that have important implications for farmland prices. The second section lays out a simple present value model of farmland valuation and uses two important historical episodes in farmland prices to show how farm programs and export markets affect land values: the 1970s boom in farmland values and the mid-1980s downturn and recovery in land values. The third section discusses the factors that are likely to play a key role in determining farmland values in the future. The fourth section uses representative producers in the Tenth District to determine the potential impact of the new farm bill on the outlook for farmland values.

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I. WHICH PROVISIONS OF THE FARM BILL WILL AFFECT FARMLAND VALUES?

Government support has traditionally played a central role in keeping the farm sector healthy and at times has boosted farm income significantly. The Federal Agriculture Improvement and Reform Act (FAIR) of 1996 made sweeping changes in farm programs. This current legislation will have many important implications for the farm sector. This section focuses on those provisions of the bill that are most likely to have a direct impact on farmland values and farm income.

Two aspects of the new farm bill are crucial to the outlook for farmland values—declining payments and less government control over production agriculture. Direct subsidies are scheduled to decline substantially from 1998 to 2002, the last year of the current legislation. The cut in payments in isolation will reduce farm income and could lead to a fall in farmland values. Some subsidies remain, however, but these subsidies are no longer tied to farm production decisions. Farmers are no longer required to reduce output in order to receive payments. Consequently, farm output could climb, boosting farm income and farmland values. Moreover, the Conservation Reserve Program (CRP) has been made more explicitly a program to conserve natural resources, and thus is likely to lead to large regional shifts in enrolled acres. Such shifts will probably contribute additional output and income to the farm sector.

Farm subsidies decline in later years of the program

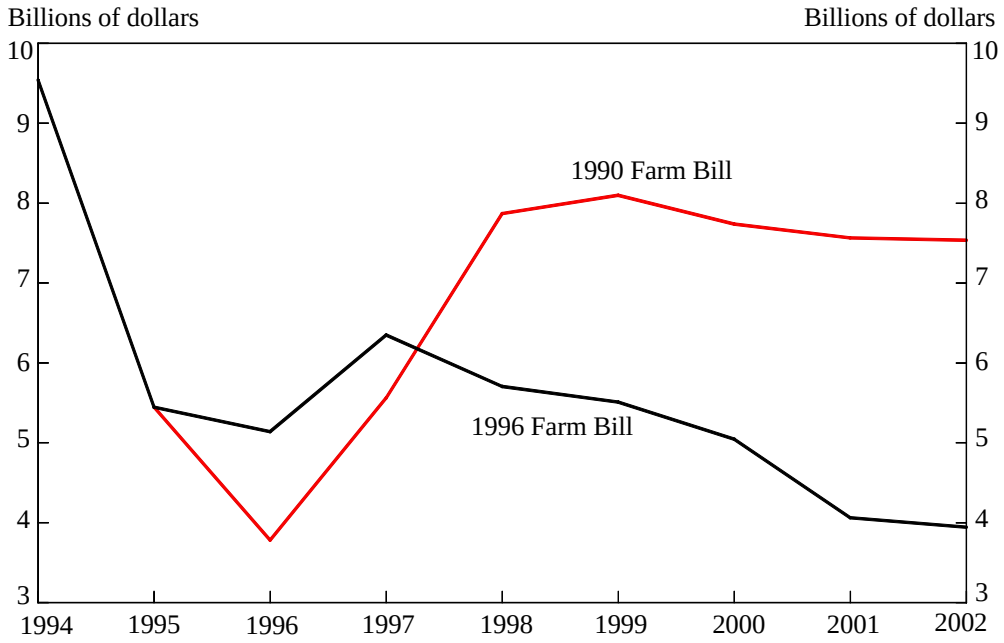
The new farm bill initially reduced the degree of government support to the farm sector relative to prior legislation and will phase down subsidies in the coming years. By the final year of the bill in 2002, direct commodity payments are projected to decline to $4.0 billion, far less than they would have been under the old legislation and less than half their 1994 level (Chart 1). The message to farm producers is clear: The government is getting out of the farm-subsidy business.

The phase-out of direct government payments has two important implications for land values. The loss of farm program payments has a direct impact on farm income. Everything else equal, a decline in farm subsidies results in a decline in farm income.[1] To the extent that farmers have perceived farm commodity payments as a permanent part of farm income, this decline will be indirectly reflected in farmland values. Moreover, the loss of farm subsidies could increase the variability in farm income, making agricultural production more risky. Under the new legislation, farmers are not protected from wild swings in the commodity markets. Government payments will not rise if surging world supply or lagging demand push U.S. prices below some threshold.

Subsidies are no longer tied to production decisions

The new farm policy no longer uses commodity programs to control output. Under previous farm legislation, annual set-aside programs became an important policy tool for controlling U.S. production of major program crops. To receive federal subsidies, farmers had to agree to "set-asides" of a portion of their acres. At various times, annual set-asides ranged from 5 to 27.5 percent of program acres for wheat, and as much as 20 percent of program acres for corn. The short-term Acreage Reduction Program was abolished in the current legislation, ending the days of annual supply management. Farmers are now free to plant as much of whatever crop they want.[2] This will likely increase farm output significantly, although the exact amount is hard to determine.

Chart 1
FARM BILL COMMODITY PAYMENTS



Source: U.S. Department of Agriculture.

While previous programs reduced U.S. output, prices for farm commodities did not rise as expected, reflecting the impact of world supply on domestic prices. The old program was designed to balance domestic demand and supply, and successfully reduced the high U.S. production and surpluses of the early 1980s. Foreign producers were free to raise output to make up for the decline in U.S. production, however, and foreign crop sales were often subsidized by their governments. The result was a loss of U.S. share in export markets without the full rise in U.S. prices that was expected. Thus, with the production controls abolished, the freedom to base planting decisions on market incentives rather than government programs will help U.S. producers recapture their share of the world market.

Increasing planting flexibility to 100 percent will also result in higher production levels. Previously, a farmer had flexibility in planting at most 25 percent of his base acreage without losing government subsidies. The distribution of program acres was based on historical production patterns and did not necessarily reflect market signals as reflected in prices. A good example is the relationship between wheat and grain sorghum. Grain sorghum can often be produced quite efficiently on wheat land. Under the old regime, even when grain sorghum prices rose, producers were often reluctant to plant it

for fear of losing their eligibility for wheat payments in the future. Under the new regime, farmers will switch production more readily.

In short, the new farm legislation frees farmers to think about the optimal mix of crops without being constrained by government payments. Thus, the new farm bill will raise productive efficiency, shift production to more productive regions, and boost aggregate output. While it is hard to predict all the changes that will take place in production, the important point is that farmers can respond to market signals in order to maximize farm income.

The CRP focuses on conservation

The FAIR act preserves the Conservation Reserve Program, the primary policy tool used to take land out of production for extended periods of time, but caps it at current levels and makes it more explicitly a conservation program. The current farm bill funds a CRP with 36.4 million acres, about its current size, through 2002. USDA regulations on the CRP, announced in spring 1997, have significantly lowered the maximum rental rates that can be paid on some acres to encourage farmers to enroll only less-productive land in the program. Moreover, USDA has announced that it intends to accept only the most environmentally sensitive land into the CRP.

The new farm bill also makes it easier for farmers to opt out of the CRP if they decide the return from farming the land exceeds the value of the government rental payments. Under certain conditions, a farmer may remove less environmentally sensitive land before his CRP contract expires.[3] This should make it easier for farmers to respond to market signals in the short run. In addition, farmers who signed up for the CRP before the recent increase in farm commodity prices might withdraw some land from the program. These changes in the CRP will likely help push up farm income even further, since farmers now have the freedom to take advantage of higher prices for their output.

II. HOW ARE FARMLAND VALUES DETERMINED?

Farm program reform will certainly have an impact on the farm sector by affecting income, prices, and farmland values. Farm policy affects many variables in the farm sector; therefore, translating the impact of farm program changes into the potential effect on farmland values requires a model of how farmland values are determined. One model which has been widely used is the present value model of farmland prices.

A present value model of farmland values

The present value model of asset pricing recognizes that the purchase of farmland is a decision to buy an asset today with the expectation that the asset will produce income in the future. The amount a buyer is willing to pay for land—that is, its value—is ultimately tied to the future income stream he expects it to produce.[4] A dollar of income at some future date, however, is worth less to a farmer (or anyone else) than a dollar today.[5] The *discount rate* is the rate at which the farmer discounts future income. The *present value* of farmland represents the sum of all future income from farming, appropriately discounted to reflect the difference between a dollar received at some future date and a dollar today.

In order to use the present value model, buyers of farmland must form expectations of the future income the asset will produce in some future period t, which can be denoted by $Y^e(t)$.[6] They must also know the discount rate, r, which reflects the difference in the value of money received

today and money received at some period in the future. If income is expected to remain constant at some level Y^e over the infinite future, then farmland values can be determined using a straightforward formula:[7]

$$\text{Value}(t) = \frac{Y^e}{r}. \qquad (1)$$

Expected future income may be derived from either expected market returns from farming, $M^e(t+1)$, or from expected government payments to the farm sector, $G^e(t+1)$. If both expected government payments and market returns are expected to be constant in the future, then farmland values may be written as:

$$\text{Value}(t) = \frac{M^e + G^e}{r}. \qquad (2)$$

If returns are expected to grow at some constant rate, say *g*, then farmland values are given by:

$$\text{Value}(t) = \frac{Y^e}{r-g} = \frac{M^e}{r-g} + \frac{G^e}{r-g}. \qquad (3)$$

The present value model makes clear that farmland values depend on both future income and the discount rate, r. The value of farmland rises or falls as potential buyers' expectations of future income rise or fall. Likewise, an increase in farmland value must be supported by an increase in farm income. A change in the discount rate used also has an effect on the present value, but the relationship is an inverse one: increases in the discount rate will push down farmland values, and declines in the discount rate will increase farmland values.

Historical experience

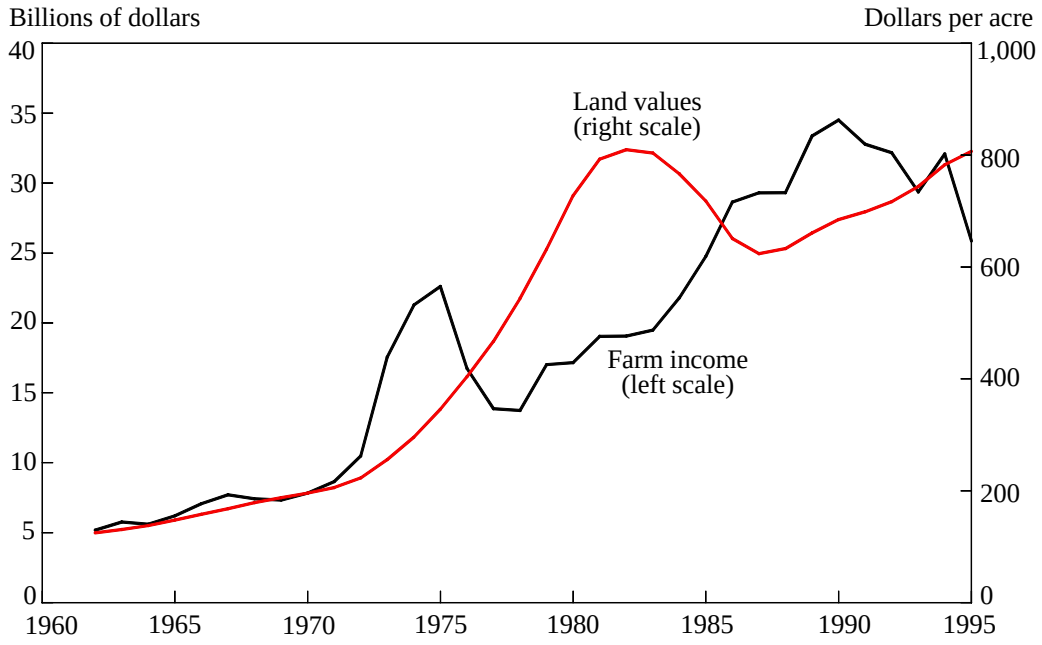
The 1970s and 1980s provide a useful historical context for examining the relationship between farmland values and farm income. In particular, they highlight the important role that market returns (M), government program payments (G), and expected future growth in farm income (g) have played historically in determining farm income.

In 1972 the Soviet Union reversed a long-standing policy against grain imports in the face of large production shortfalls in that country. At the same time world demand for soybean meal surged owing to the failure of the anchovy harvest and a resulting decline in fish meal production.[8] This confluence of factors sent prices of agricultural commodities and farm income soaring. Farmers were encouraged to plant "fencerow to fencerow" to capture the large market returns offered by the newly opened Soviet markets. As farm income soared with commodity prices, the government withdrew the subsidies it had used to support farm incomes. They simply were not necessary with higher commodity prices.

The runup in farm income that began in 1972 sparked a boom in farmland values that lasted for about ten years. In the context of equation (2), expectations of future market returns to farming—M^e—soared along with current income and, perhaps more important, investors raised their expectations of future growth in farm income (g). In essence, farmland took on the characteristics of a classic "growth stock." Farmland values began to grow more quickly in 1972 and soared throughout the last half of the 1970s (Chart 2). Although the trend toward sharp growth in farm income moderated in the mid-1970s, farmland values continued to rise. From 1972 to their peak in 1982 U.S. farmland values roughly doubled in real terms.[9]

But the 1970s boom in farmland values did not last long. The sharp growth ended with the slide in prices for most farm commodities that began in 1980. A U.S. embargo on grain shipments to the Soviet Union was instituted in the wake of the invasion of Afghanistan, sending export demand for U.S. farm products plummeting. Moreover, American farmers fell victim to their

Chart 2
FARM INCOME AND LAND VALUES
3-year moving average



Source: U.S. Department of Agriculture.

own productivity, as output of farm commodities rose sharply in the early 1980s. The sharp rise in the U.S. dollar that began in the early 1980s also helped pushed down agricultural exports. The decline in farm commodity prices showed up as a decline in farm income derived from the market. In the early 1980s expectations of future market returns from farming—M^e—plummeted. Moreover, government support for the sector had been largely withdrawn during the boom years of the 1970s, and farmers did not expect government payments to be significant either—G^e was small.

The decline in farm prices resulted in a sharp drop in farm income. Moreover, farmers had accumulated a pile of debt from farmland acquisitions in the 1970s, and high interest rates in the early 1980s raised the cost of servicing that debt. As investors revised downward their expectations of future growth in farm income (g), farmland values began to fall, and the debt-to-equity ratio in the farm sector rose. Many farmers were overextended and were forced to sell land to shore up their balance sheets. There was a farm crisis in the American Heartland. The specter of bank foreclosures on the family farm reminded some of the Depression-era farm problems.

In the wake of the crisis, the government boosted subsidies to the farm sector and put a floor under farm income. While the poor market returns to farming led most observers to dramatically lower their expectations of market

returns, farm income soon pulled out of the doldrums. Helped by increased government spending, total farm income—the sum of market returns and government subsidies—began rising again fairly quickly, at least in nominal terms.[10] Government commodity payments as a share of total farm income rose sharply in 1982 and remained high through 1988. In addition, the government authorized the Conservation Reserve Program in the 1985 farm bill, with the goal of removing the least-productive farmland from production for ten years or more.

III. WHAT FACTORS ARE CRITICAL FOR FARMLAND VALUES IN THE FUTURE?

Both economic theory and historical experience argue forcefully that farmland values reflect total income in the farm sector. As shown in equation (2), the 1996 farm bill will have an impact on farmland values through its impact on both government payments and income from the market returns to agricultural production. The course for government subsidies is uncertain after 2002. In fact, many analysts think government farm subsidies could end altogether. However, market returns to agriculture are likely to be healthy, owing mostly to strong growth in U.S. farm exports.

Government subsidies are uncertain after 2002

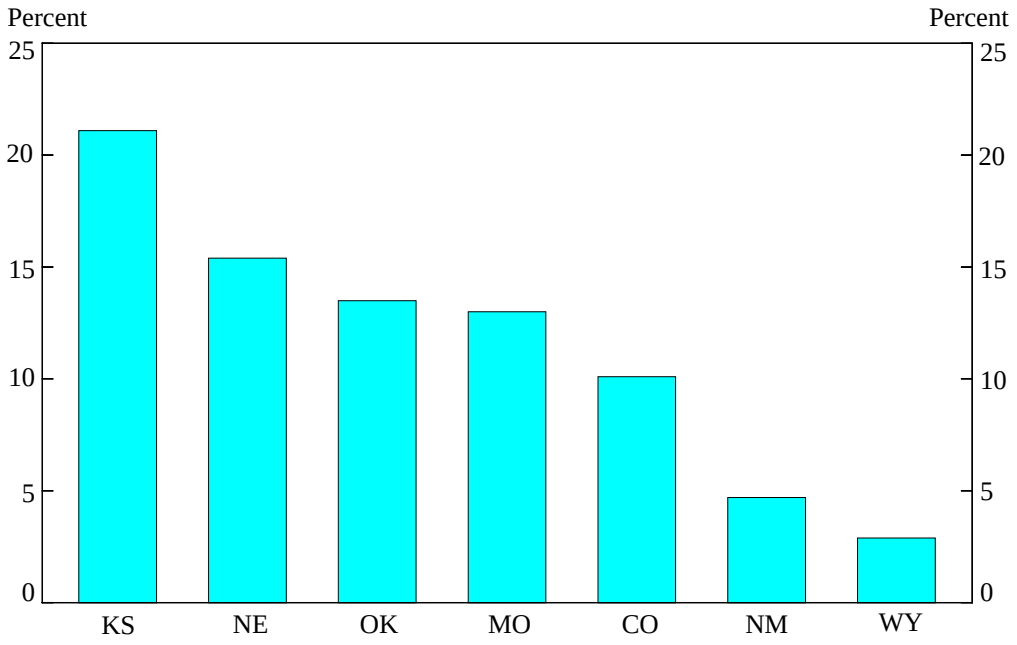
Congress will have to revisit the role of farm subsidies by 2002, when the new legislation expires. Farm subsidies as a share of farm income have been declining for several years, after peaking in the mid 1980s, and will decline further under the new legislation. Moreover, public support for farmers—who can no longer claim to be poorer or less sophisticated on average than other Americans—appears to have weakened. On the other hand, the government tried to get rid of farm subsidies in the 1970s, but subsidies rose again when prices for farm commodity prices fell. A downturn in farm prices could lead to renewed calls for government spending on farm programs.

Uncertainty about the future of government subsidies means that the impact of the new farm legislation on farmland values is unclear. Since the new legislation was passed in a period when both farm prices and farm income were high, the decline in subsidies could be temporary. If farmers view the decline in subsidies as temporary, the decline will likely have little effect on farmland values. On the other hand, if the decline in farm subsidies is viewed as permanent, farmers will be willing to pay less for farmland, reflecting the impact of lower government subsidies on future income.

Finally, whatever the course of government subsidies, the impact on agriculture will likely vary considerably across regions. Those states which have benefited more from farm payments in the past will likely see their farm income drop sharply. Since farm programs have been structured so that crop producers received the direct payments, those states where crop production figures most largely in agricultural output are states where direct payments have been the largest, and these may be the states where the impact of removing farm subsidies is most important. Even within states, the impact will also vary considerably across producers, based in part on crop mix and the degree to which crop patterns interact with the historical development of subsidies. For example, since soybeans have not been eligible for deficiency payments, soybean producers receive no payments.

The regional variation in farm subsidies is especially evident in Tenth District states. Kansas is the district state most dependent on government payments, deriving about one-fifth of its farm

Chart 3
SHARE OF NET CASH INCOME IN DEFICIENCY PAYMENTS
1991-95



Source: U.S. Department of Agriculture.

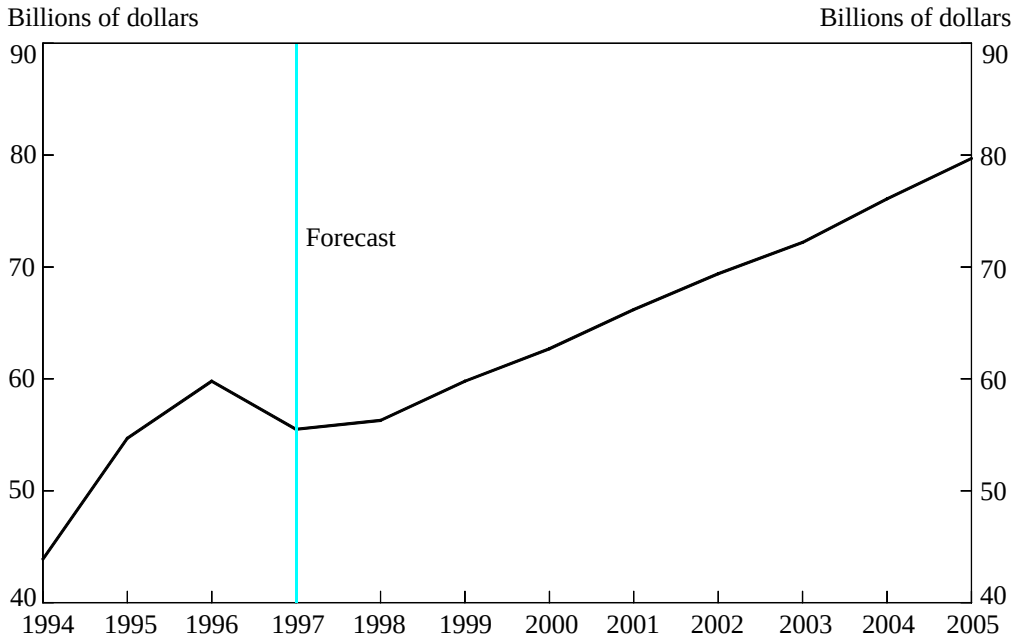
income (Chart 3). In contrast, New Mexico and Wyoming, states in which ranching is the most important agricultural activity, derive less than 5 percent of their income from government payments. Nebraska, Oklahoma, Missouri, and Colorado represent a middle ground, since they earn between 10 and 15 percent of their farm income from federal payments. Obviously, the impact of removing government subsidies will vary considerably across these states.

Market returns seem likely to grow in the period ahead

While the future of government payments is uncertain, market returns seem likely to continue to grow in the future, mainly as a result of growth in farm exports. Domestic demand for farm products is likely to grow slowly in the United States, reflecting the maturity of the domestic economy. Consumer expenditures on food will continue to grow moderately on a per capita basis, but they are unlikely to contribute significantly to growth in farm income. Since much of the growth in food expenditures is for restaurant meals, the growth will go to pay the costs of further processing rather than paying for farm products. So while domestic food demand will provide a solid base of demand for farm commodities, it is not likely to rise significantly.

With domestic demand stable, rising farm exports could be crucial to boosting farm prices and farm income. Most analysts agree that world

Chart 4
U.S. AGRICULTURAL EXPORTS
USDA baseline



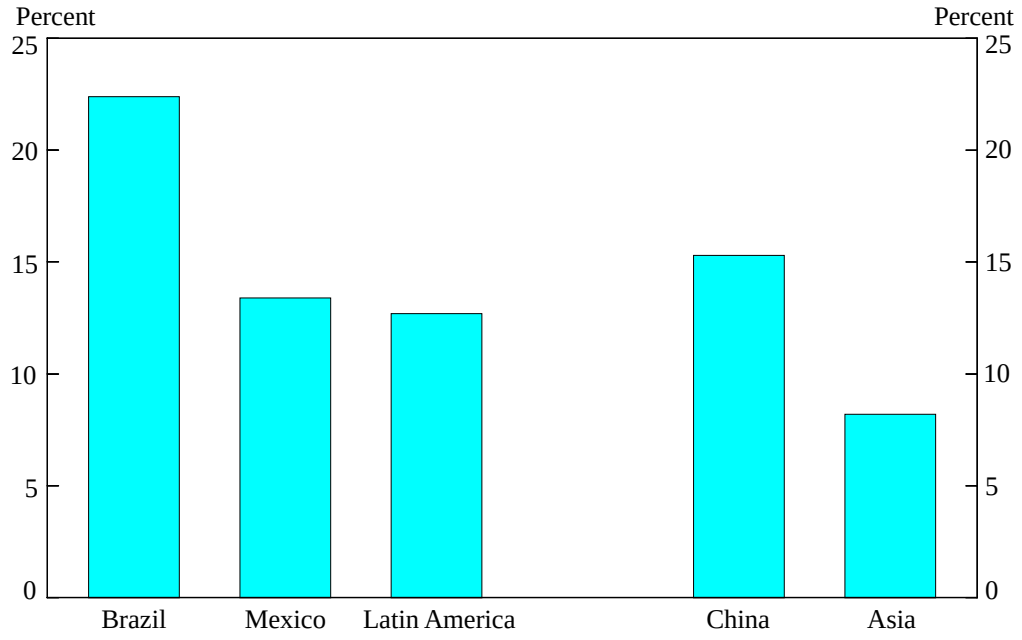
Source: U.S. Department of Agriculture.

demand for food will increase substantially over the next three decades, due to rising income and improving diets in developing countries. The United States is uniquely poised to capture a large share of the increased exports because of its advantage in producing farm products, freer trade, and farm policy reform. From 1996 to 2005 U.S. agricultural exports are projected to rise by a third in nominal terms to roughly $80 billion (Chart 4).

The surge in agricultural exports will likely benefit substantially from an increase in exports to both Latin America and Asia. Latin America's proximity to the United States, the strong income growth in those countries, and the movement to liberalize trade between North and South America are all likely to raise U.S. exports to that region. Strong growth and open trade have already contributed to a surge in U.S. exports to Latin America (Chart 5). Exports to Brazil have soared over 20 percent per year, and exports to Mexico and other countries have grown over 10 percent per year in the 1990s. Moreover, U.S. trade with Latin America is poised to continue to grow robustly over the next several years, as standards of living in those countries continue to rise.

Asia is also likely to be a source of strong demand for U.S. farm products. Asia includes many of the most populous countries in the world and has experienced dramatic increases in living standards in recent years. The "Asian Tigers"—Hong Kong, Singapore, Taiwan, and

Chart 5
GROWTH IN U.S. EXPORTS
Average annual rate, 1990-96



Source: U.S. Department of Agriculture.

South Korea—have grown by as much as 10 percent per year during the 1990s and could grow more than 7 percent per year between 1997 and 2002 (USDA). China's economy has grown over 10 percent per year during the 1990s translating into increased food demand. Such strong growth has led to a boom in U.S. exports to Asian countries during the 1990s.

In spite of strong growth in Asian economies, recent problems in Asian currency markets has highlighted the need for some attention to the financial sector. Overall, Asian financial problems will likely lead to a modest decline in U.S. agricultural exports to Asia in 1998. Moreover, U.S. exports may grow more slowly than the industry had expected over the next two to four years. Countries like South Korea and Indonesia, which previously offered substantial growth in food consumption and food imports, will likely experience slower economic growth than previously expected. How long this period of slow growth will persist is unknown, but the length depends on how policymakers in the region respond to current difficulties. Once this relatively brief period of adjustment is past, however, the long- term fundamentals still point to the potential for the United States to sell substantially more food and agricultural products in Asia.

In isolation, the removal of government subsidies will tend to lower farmland values. But,

those subsidies have historically come with costs attached in the form of restrictions on planting flexibility and the ability to fully farm the land. Thus, the newfound planting flexibility allowed by the removal of subsidy requirements could cause farmland values to rise further, especially if foreign demand keeps commodity markets strong.

IV. THE OUTLOOK FOR TENTH DISTRICT FARMLAND VALUES

Since farmland represents over three-fourths of the capital stock in agriculture, the impact of changes in subsidies and market returns on farmland values is crucial to the financial health of the sector. Continued growth in agricultural exports could support a bright outlook for U.S. agriculture, but the question most relevant for producers, lenders, and policymakers is the impact at the farm level. While considerable attention has been given to the outlook for the agricultural sector, less attention has been paid to farm-level impacts of policy reform. In particular, since agriculture involves a relatively large capital investment, and much of that investment is in farmland, the impact of policy reform on farmland values is crucial. Moreover, the impact is likely to vary across regions and across crops within a region.

Representative farm framework

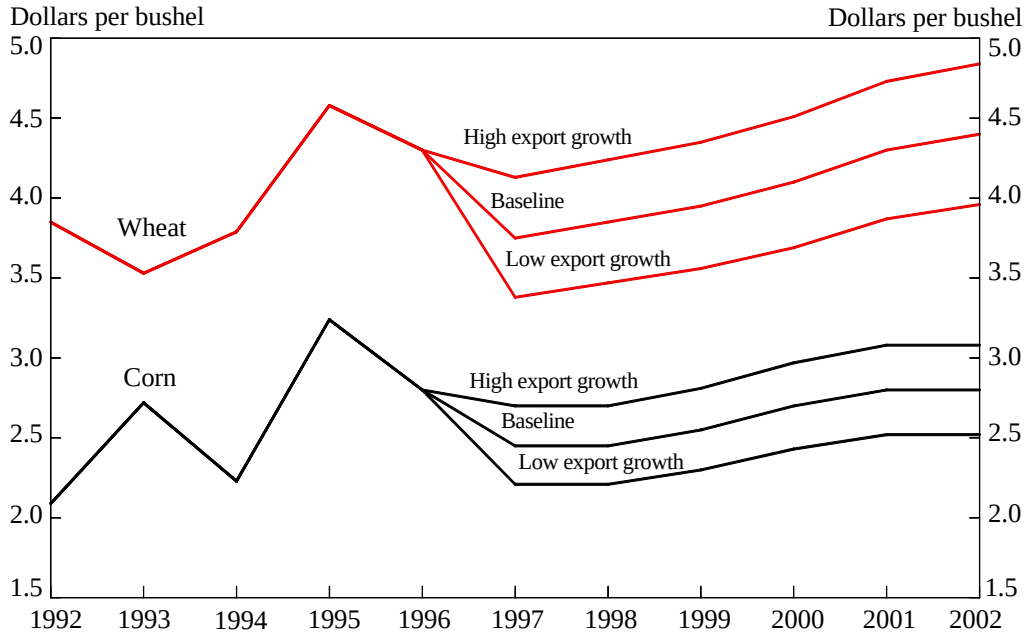
To derive the impact of the 1996 farm bill on Tenth District farmland values the capitalization formula derived in equations (1) through (3) was applied to a range of representative farms in the district. The capitalization formulas require forecasts of net income generated by farmland in different cropping environments. To summarize differences across the Tenth District, representative farm models based on historical data for yields, production costs, government subsidies, and other variables were constructed. Market income accruing to different types of farmland is derived using data on productivity as reflected in crop yields and production costs, and the outlook for prices of different crops. The forecast for government farm payments in the future is derived using information on the past dependence on farm subsidies as a share of farm income.

In constructing representative farm models, this analysis draws on a number of different data sources. The analysis begins with data on production costs and yields for several distinct production environments in the Tenth District, drawn from both USDA data and various farm management records information.[11] The analysis projects future costs using forecasts for price increases in various components and historical data on costs.[12] Price forecasts from USDA's Baseline Outlook are used in performing the analysis (USDA). Finally, the analysis makes assumptions about the appropriate discount rate and growth path for future farm income, then applies the capitalization formulas developed above.[13]

In addition to differences across farms, the analysis also considers the impact of different paths for U.S. agricultural exports on a handful of different farms. The USDA forecasts of commodity prices assume that exports will continue to grow moderately, implying that prices of farm commodities rise gradually through 2002. The USDA baseline projection for corn prices calls for corn prices to average $2.45 per bushel in the 1997 crop marketing year, and then to rise through 2002 to about $2.80 per bushel. Wheat prices are projected to average $3.75 in 1997, then rise to $4.40 in 2002 (Chart 6).

In addition to the baseline scenario, both low-export and high-export scenarios are considered in the analysis. In the low-export alternative, exports grow more slowly than in the baseline, and thus prices for farm commodities are lower.

Chart 6
ALTERNATIVE PRICE SCENARIOS



Source: U.S. Department of Agriculture.

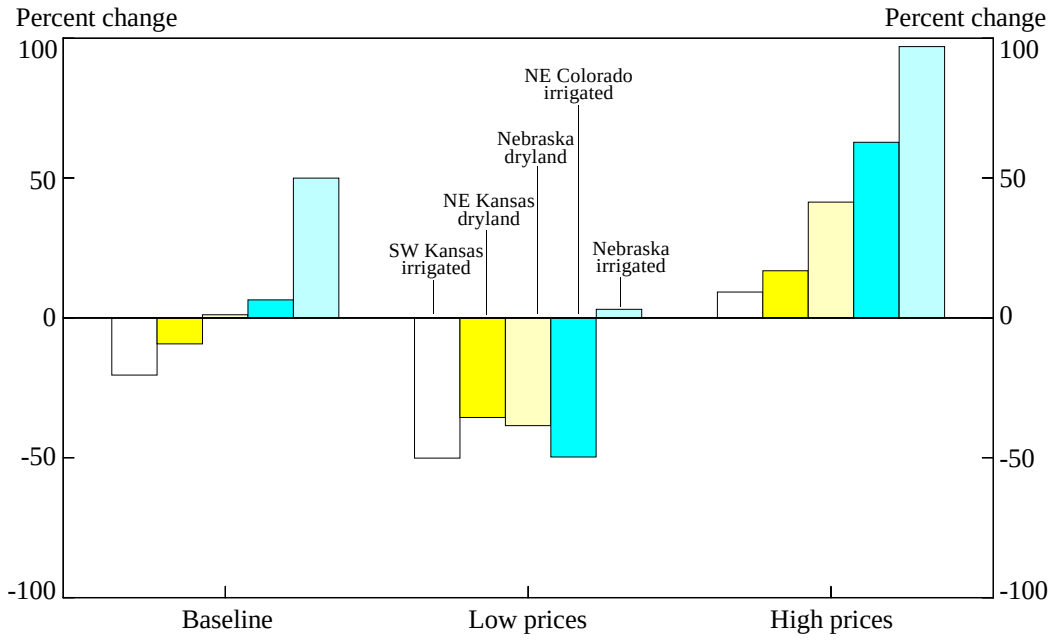
Under the high-export alternative, exports are assumed to grow more quickly and prices for farm commodities rise more substantially over the projection period. The three scenarios for crop prices are shown in Chart 6. Although the scenarios examined here are defined by differences in export growth, it is important to remember that exports affect farmland values entirely through their impact on farm prices and farm income, according to equation (1). Export growth is likely to be reflected in higher farm incomes and thus higher farmland values.

This analysis restricts attention to differences within the Tenth Federal Reserve District. While producers certainly grow other crops in the Tenth District, corn and wheat are particularly useful for summarizing the impact of the 1996 farm bill on farmland values. Corn and wheat dominate agricultural production in district states in terms of value and acreage. Moreover, they have traditionally been the largest recipients of government commodity payments in the district. In addition, corn and wheat represent two extremes of agricultural production, with corn requiring high levels of moisture, while wheat can be grown on all but the driest land.

Corn

Tenth District states represent vastly divergent production environments and serve to illustrate

Chart 7
LAND VALUES
Corn cultivation



Source: U.S. Department of Agriculture.

the different impacts of the farm bill on corn producers across different environments. For example, eastern Nebraska lies in the fertile Corn Belt, and contains extremely productive farmland supporting nonirrigated corn production. Corn production in central Nebraska, on the other hand, is almost entirely irrigated, due to the lack of adequate rainfall. Likewise, in northeastern Kansas, nonirrigated corn production is possible because of sufficient rainfall while in southwest Kansas corn production must be irrigated owing to the drier climate. Colorado is drier than Kansas, so only irrigated corn may be grown there. In describing the impact of the farm bill on values for land used in corn production, five representative farms were constructed: Nebraska irrigated land, Nebraska nonirrigated land, northeast Kansas nonirrigated land, southwest Kansas irrigated land, and northeast Colorado irrigated land.

The impact of policy changes on values for corn acres under the baseline scenario for export growth are summarized on the left side of Chart 7. In particular, the percent change between 1996 and 2002 in the value of land used in corn production is shown. Under the baseline scenario, the outlook for farmland values varies substantially across the different cropping environments. The outlook for more productive corn land is generally good. Under the baseline assumption, the value of irrigated corn land in

Nebraska is projected to rise almost 50 percent over the next several years, while values for nonirrigated Nebraska corn land are projected to be essentially unchanged. The value of irrigated cropland in southwest Kansas is projected to fall under the baseline, while the value of northeast Kansas nonirrigated cropland will drop less. The decline in southwest Kansas values in this model largely reflects the high production costs associated with irrigation; irrigation does not push up yields enough to offset the higher costs. On the other hand, irrigated cropland in Nebraska is more productive, and so the price is projected to rise more in coming months.

Of course, it is possible that export growth could be less robust than is currently expected. World food demand could grow less quickly than expected, other countries could increase their agricultural production more, or the baseline forecast could turn out to simply be too optimistic. Lower farm exports implies lower prices for farm commodities, lower farm income, and lower farmland values. If prices turn out to be significantly lower than under the baseline scenario, farmland values are likely to fall in many parts of the Tenth District.

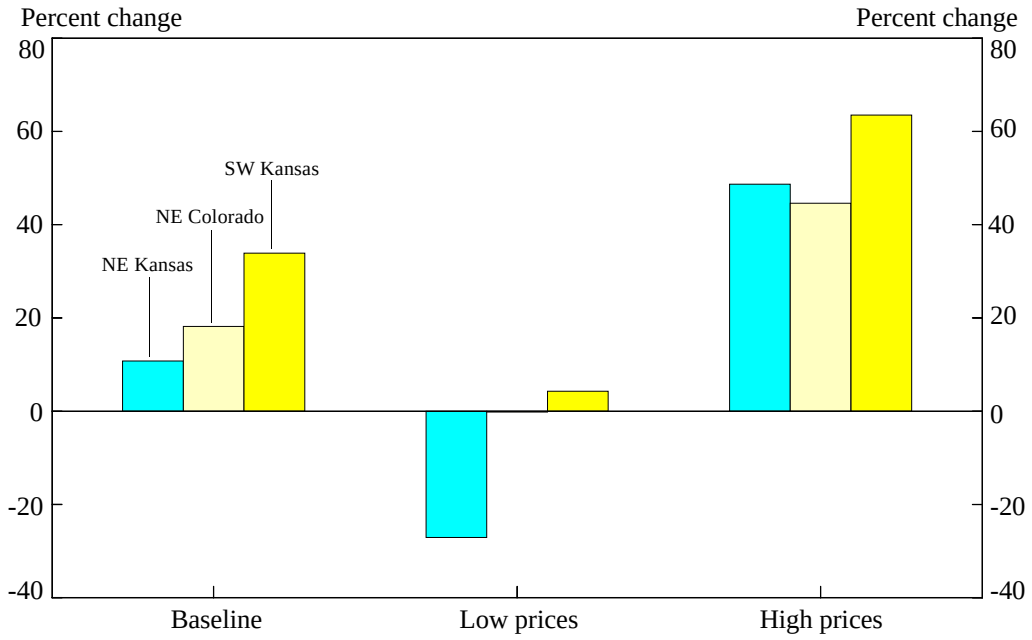
The change in farmland values under the low-export scenario is summarized in the middle panel of Chart 7. Values decline for almost all the representative farms considered here; only for irrigated Nebraska corn land do values edge up. The impact of low prices is most severe for relatively low-productivity, irrigated farmland, which stands to lose more of its value with weak prices than nonirrigated land. Since prices are assumed to be only about 10 percent lower under the low-export scenario, the sharp drop in farmland values may seem surprising. However, the impact of a 10 percent decline in prices on the *net* return to farmland is much greater than 10 percent, since farm costs are assumed to be constant. In essence, the impact of changes in prices is magnified before it affects farmland values.

While the baseline scenario embodies a conservative forecast for farm exports (and commodity prices and farm income), farm exports could grow more than suggested by the baseline scenario. The impact of higher exports on the value of land used in corn cultivation is presented on the right side of Chart 7. Under the high-export scenario, farmland values are expected to rise for all types of corn land. Farmland values rise modestly for both the Kansas farms under the high-export scenario. Values of irrigated corn land in northeastern Colorado and nonirrigated corn land in Nebraska rise more quickly. Farmland values soar, however, for irrigated cropland in Nebraska under the high-export scenario, essentially doubling by the end of the period. In Nebraska, the high productivity of irrigated land, coupled with the high prices under the high-export scenario, push up farmland values.

Wheat

While values for highly productive corn land could rise dramatically, is this impact likely to be widespread across other types of farmland? Chart 8 summarizes the outlook under different scenarios for nonirrigated wheat acres. Wheat production in three different production environments is considered: the northeast and southwest corners of Kansas and northeast Colorado. Under the baseline scenario the value of land used in wheat production is likely to rise substantially over the coming period. Indeed, the gains in value are more uniform for wheat land than for corn acres considered above. The projected increase under the baseline scenario likely reflects the impact of recent factors on wheat farms. Wheat yields were poor in much of the region in both 1995 and 1996. Moreover, much of the area considered in this analysis was hard hit by the drought in 1996, and the wheat crop was severely

Chart 8
LAND VALUES
Dry wheat cultivation



Source: U.S. Department of Agriculture.

affected. Because of that, the value of that farmland has been under pressure in recent years. The increase in values under the baseline scenario likely reflects the rebound from those factors.[14]

Under the low-export-growth scenario, export demand proves to be an even more important determinant of wheat prices than it is of corn prices. The impact of lower prices for wheat on values for wheat land is reported in the middle panel of Chart 8. Under the low-export growth scenario, values of northeast Kansas wheat acres are projected to decline by about 20 percent. The value of wheat acres in northeast Colorado is unchanged, while the value of wheat acres in southwest Kansas is projected to edge up. These results are, in a sense, surprising, since northeast Kansas is a more productive agricultural region than southwest Kansas, and the normal yields for wheat acres in northeast Kansas are higher than in southwest Kansas. However, the higher yields in northeast Kansas are achieved with substantially higher production costs. In part, this reflects higher labor costs in northeast Kansas. The higher costs more than offset the impact of higher yields, resulting in lower net returns to growing wheat in northeast Kansas.

Of course, export demand could also rise more than expected under the baseline forecast. If export demand grows more than expected under the baseline, and prices rise more as a result,

values of wheat acres would rise substantially. As shown on the right side of Chart 8, values of wheat acres could rise as much as 60 percent under the high-price scenario. Values for all three representative farms considered here are projected to rise substantially if world demand for wheat grows more than expected.

The impact of changes in farm policy on the value of wheat acres is less dramatic than for corn acres, and there are fewer regional differences across the farms considered. Under the baseline scenario values for all types of wheat acres are projected to rise moderately. The greater uniformity in the outlook for the values of wheat acres reflects the greater conformity across the production environments summarized by the representative farms. The results suggest that farm program reform is not likely to push values for wheat acres down in the regions considered here. Of course, it is possible that the farm program reform could have a large negative effect on farmland values in other areas where wheat production is important.

V. CONCLUSIONS

Farmland values have risen sharply in many parts of the country over the past two years. Most analysts now wonder what impact declining government subsidies will have on farmland values. While many analysts expect land values to decline, it is important to remember that federal subsidies have come with a price attached in the form of restrictions on planting flexibility and production. These restrictions have limited farmers' ability to take advantage of expanding export markets. Looking ahead, further growth in export markets could lift farm commodity prices and farm income enough to outweigh the loss of income from declining subsidy payments. The outlook for farmland values depends on which force dominates.

This article shows that farm exports are likely to increase in coming years, owing to strong income growth in developing countries. The growth in exports will likely support high prices for farm commodities and thus lead to strong farm income. The 1996 farm bill frees U.S. farmers to expand output to meet the rising tide of world demand for farm products. Under a conservative baseline scenario, farmland values are projected to rise for land used in wheat production. The impact of the farm program reform on land used in corn production varies dramatically across production environments, with the most productive land likely to rise in value substantially. Moreover, if exports jump more than forecasters expect, farmland values for the most productive cropland could rise still further.

ENDNOTES

[1] Of course, it is important to distinguish between authorization for farm program payments and actual expenditures. With the old commodity-based programs, payments to farmers would have been smaller with higher commodity prices anyway.

[2] There are restrictions which prohibit the planting of fruits and vegetables on land that is enrolled in the program, and farmers are required to maintain their environmental plans.

[3] The contract must be at least five years old, and the contract must have been entered before 1995.

[4] It is important in deriving the price of the asset that only the economic returns to the land is used in deriving its value. In particular, the wage the farmer must pay himself for his labor in agricultural production should not be included as part of the value of the farmland.

[5] Note that this is independent of inflation; one should always be careful to distinguish between inflation effects and the real discount rate, which measures simply the cost of waiting.

[6] The superscript "e" denotes that this is an expected income, since the agent cannot know the actual income he will realize.

[7] For a simple proof see Ross, Westerfield, and Jaffe.

[8] The failure of the anchovy harvest was a result of "el nino," a weather pattern which many believe continues to drive agricultural production in the U.S. today.

[9] Farmland prices rose 275 percent while the consumer price index rose 131 percent during the same period.

[10] Since the general price level was also rising, the real return to farming was not rising as quickly as would be suggested by the graph shown here.

[11] Historical data on costs and returns for representative farms are drawn from a variety of sources, including USDA's *Farm Costs and Returns Survey*; Kansas State University, *Kansas Farm Business Records*; Colorado State University, *Crop Enterprise Budgets for Colorado*; University of Nebraska, *Nebraska Farm/Ranch Business Management Annual Reports*.

[12] The assumptions concerning price increases for certain components of costs of production are taken from Texas A & M University, Agriculture and Food Policy Center, *Representative Farms Economic Outlook, January 1997 Baseline*, January, 1997.

[13] The analysis assumes a discount rate of 10 percent. Earnings are assumed to remain constant at the level achieved in 2002. Implicit in this assumption is a continuation of farm program payments at the 2002 level.

[14] Wheat yields rebounded sharply in Kansas in 1997 and net income rose. This analysis assumed only a return to trend yields in the regions considered here, so they may understate the rise in land values somewhat.

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