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by

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ABSTRACT

This research simulates agricultural exports of four major crops from 1996-2004. Export value and volume is evaluated in relation to historical performance, as are potential implications of alternative assumptions about world trade expectations. The paper also highlights potential export ramifications of current FAIR Act policy provisions.

Key Words: Export Demand; Export Value; Price Inelasticity; China Corn Imports; EU Wheat Exports

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INTRODUCTION

United States (U.S.) agricultural exports are projected to exceed $56 billion in 1997 (USDA, 1997). Exports play a significant role in determining the level and stability of domestic crop net returns, as do expectations about future export demand. To a large extent, the nature of long-run projections for agriculture is based on assumptions about exports. However, long-run export prediction must contend with a great deal of uncertainty.

The primary objective of this research is to estimate projected changes in export volume and value under provisions of the 1996 Federal Agricultural Improvement and Reform (FAIR) Act for four major agricultural export commodities. Projections are evaluated in the context of historical performance of export volume and value. Additionally, the research seeks to identify assumptions embedded in such an analysis that may significantly influence export projections, and quantify changes in export value projections resulting from varying these assumptions. The analysis shows that current projections are sensitive to trade and market assumptions regarding China's corn imports and the European Union's (EU) wheat exports. Finally, the paper assesses potential export implications of specific elements of the FAIR Act.

METHODOLOGY

Analytical Tools and Baseline Assumptions

The baseline assumptions for all analyses, including macroeconomic indicators, input prices, economic and environmental policies, and numerous other variables, are

based on research conducted by the Food and Agricultural Policy Research Institute (FAPRI). These assumptions and the resulting baseline U.S. agricultural projections for 1996 to 2004 under a post-FAIR policy environment were published in May 1996. In July 1996, FAPRI released updated crop supply and utilization estimates for the 1996-98 crop years, but with no connection linking the updated estimates to the 1999-2004 estimates previously reported.

In light of the updated estimates, a POLYSYS simulation was conducted using the FAPRI assumptions and revised estimates to estimate noncrop-specific economic indicators, stock carry-overs and expected prices for 1996-1998 period. These POLYSYS results were then used to simulate changes from FAPRI's May 1996 baseline for the 1999-2004 period. Projections for this analysis are a combination of 1996 revised FAPRI baseline estimates for 1996-1998 and POLYSYS estimates based on the revised FAPRI data for the period 1999-2004.

Alternative Scenario Assumptions

One assumption embedded in the baseline scenario is that China will significantly increase its level of corn imports beyond the crop year 2000. Historically, China has been a net exporter of corn. But in 1994, China shifted from exporting 10.5 to importing 4.1 million metric tons of corn. The baseline assumes that China corn imports will remain near or below the 1994 level through crop year 2000, beyond which, China is expected to double the 1994 level by 2002, and triple the 1994 level in 2004. The assumption is based on a projection of annual GDP growth in China between 8 and 9 percent throughout the period, implying higher personal income and associated dietary changes. As consumption demand for meat increases, so will feed requirements, particularly corn. However,

cultural, political and economic conditions introduce additional uncertainty for the GDP growth assumption.

The projected level of China corn imports by the year 2004 is approximately 30% of U.S. corn exports for the crop year 1996. Thus, predicting such a significant import increase for China could impact projections for U.S. corn exports. Since predicted corn imports for China have the potential to influence world corn trade and since the prediction is an estimate with associated variation and error, an alternative projection for U.S. corn exports is modeled under the assumption that China corn imports will remain near their 2000 level (approximately 8 million metric tons) through 2004.

Another baseline assumption is that the EU will be able to profitably export wheat without export subsidies by the year 2000. Over the period 1983-1990, the EU exported an average of 0.56 billion bushels of wheat annually. Over the period 1991-1996, this average rose 14 percent to 0.64 billion bushels. The baseline assumes that EU wheat exports will increase to an annual average of 0.85 billion bushels beyond 2000, which is more than a 50 percent increase over the 1996 level. Such an increase would certainly impact world wheat markets, and would likely reduce U.S. wheat exports and world wheat prices. To gauge the effect of the EU wheat export assumption, an alternative scenario was considered in which U.S. wheat export demand is assumed to increase over the period 2001 to 2004 at a rate that will return the U.S. share of world wheat trade back to its 1998-9 average by 2004.

RESULTS

Baseline Crop Export Volume and Value

Figures 1, 2, 3 and 4 present the historical volume and value of corn, wheat, soybeans, and upland cotton exports since 1980, and projections from 1996-2004 under FAIR provisions. Export value data (volume multiplied by price) are calculated by crop year rather than fiscal year to keep projections consistent with the historical data in Ray et al (1994). Generally, exports for corn increase significantly over the projected period, while wheat and soybean exports initially rise, then decline beyond 2000, and cotton exports remain well below 1994 levels.

Framing the examination of the export projections in the context of historical export performance may provide insight useful for analyzing the projections. The case of corn value exports illustrates three generalities that may be extended to other crops. First, contrary to what economists were implying in the mid- and late -1980's, the peaks in value of exports tend to be associated with years in which prices are relatively "high" and the troughs tend to be years in which prices are relatively "low". Peaks in the 1980, 1983, and 1995 crop years occur when corn prices exceed $3.00; troughs in crop years 1986, 1992, and 1999 occur when corn prices are $1.50, $2.07, and $2.22, respectively.

Export values rise when there is a rightward shift in export demand which increases price and, hence, the product of volume and price. Conversely, a leftward shift in demand reduces prices and value. The data suggest that moving down the demand curve with lower prices does not generate more export revenue. The experience of the 1980's would leave little doubt that grain export demand is price inelastic. In fact, even though trade liberalization may have eased its price inelasticity somewhat, it seems plausible to think that major grain exports are presently at least as price inelastic as during

the 1950's and 1960's, a period when agricultural economists explained the existence of farm programs based on inelastic demand and supply in agriculture.

The primary factor influencing the continued inelasticity of grain exports is market structure. The role of the U.S. is either the dominant market force – as is the case with corn – or one of a small number of forces in a well-developed oligopolistic market, as is the case for wheat and soybeans. Recent history has shown that within days (if not hours) of a U.S. price adjustment, the marketing boards of the EU, Canada, Australia, and Brazil respond with similar adjustments. The net result of such a rapid reaction is a virtually unchanged allotment of world market shares. Since the total volume of exports increases proportionately less than price declines, export earnings for all market players decline. Traders, transporters and input providers benefit from the increased volume, but U.S. grain producers experience a revenue reduction.

Second, the steep climb in corn exports experienced between 1992 and 1995 will not continue. Given the conditions in the early fall of 1996, it is expected that corn export volume actually will decline from its 1995 level through 1998 and then recover to its 1995 level in 1999 before increasing again in the early years of the next century. Because prices fall during the early period and recover more slowly, the value of corn exports shows an exaggeration of this pattern. Much of the increase in export volume after the year 2000 is due to expected increased export demand from China, the effect of which is considered in more detail below.

Third, while crop-year corn export value has increased in recent years, it took fifteen years to reach its 1980 value. In fact, on a crop-year basis, the 1995 value (which was heavily influenced by the run-up in prices in mid-1996), is slightly under the 1980

value. Perhaps even more surprising is that after 1995, it takes until 2004 to again reach the 1980 (and 1995) crop-year value of corn exports.

The export situation is nearly the same for soybeans but is even less favorable for wheat and cotton. The 1995 crop-year value of soybean exports ($5.68 billion) nearly equals its historical 1983 level ($5.82 billion) then it declines to the 2000 crop year ($4.6 billion) and gradually increases to somewhat less than its 1983 value in 2004 ($5.48 billion). Although wheat export value for the 1995 crop-year ($5.62 billion) is well above recent years, it is $1 billion below its record level of $6.53 billion in 1983. Wheat export value falls after 1995 but unlike corn and soybeans, it does not recover at the end of the projection period (30 percent below the 1995 value at $3.88 billion in 2004). In the case of cotton, the crop-year historical record for export value was in 1994 at $3.13 billion. Cotton export value declines to $2.75 billion in the 1995 crop year and drops to $2 billion by 1997, remaining near that level for the rest of the period. Hence, by the end of the projection period, both wheat and cotton export values are about two-thirds of their 1995 or 1994 value.

Alternative Chinese Corn Import Assumption

As seen in Figure 5, the projected increase in U.S. corn exports over the 1997-2004 period moves parallel to the expected increase in China imports. In Figure 6, the change in the assumption about China's import projections results in corn prices remaining relatively flat after the year 2000, rather than curving upward as in the baseline simulation. Corn prices are down by $0.20 per bushel in 2004. Over the 2002 to 2004 crop years, corn farmers are expected to lose about $5.5 billion dollars, a 9 percent reduction.

Alternative European Union Wheat Export Assumption

As seen in Figure 7, the expectation that the EU will be able to profitably export wheat without export subsidies by 2000 contributes to flat U.S. wheat exports in the latter portion of the projection period and to wheat prices that continue to drop through 2003. Under the alternative assumption that U.S. wheat export demand increases from 2001-2004, the U.S. share of world wheat trade returns to its 1998-99 average. Wheat prices and net returns increase significantly under the alternative assumption, as seen in Figure 8. Wheat prices increase by $0.18 per bushel in 2001 and by $0.60 per bushel in 2003 and 2004. Over the period 2001 to 2004, increased exports and prices boost net income to wheat farmers by 27 percent or $4.5 billion.

ASSESSING IMPLICATIONS OF 1996 FAIR ACT PROVISIONS

Before discussing export projections in the context of farm programs and the 1996 FAIR legislation, a review of the sources of year-to-year export variations and the fundamental, long-term determinants of export demand is in order. Short-run export demand variation is influenced by changes in prices, exchange rates, credit arrangements, country-specific trade policies, and a host of other factors. But the primary force that drives annual variation around expected trade flows is fluctuation in yields and production.

In the case of a country which produces a significant share of its demand requirements, short-run changes in imports above or below expected levels are largely dependent on crop yields in the current production period. Similarly, changes in export competitors' excess supply available for export - above or below expected levels - are also largely determined by yield and production variation. Hence, the lion's share of the variation in export demand for U.S. commodities around expected levels is due to

production shortfalls/bumper crops either in net importing countries or countries that are U.S. competitors in the world export market.

Baseline U.S. grain exports are determined by population (especially in developed countries), per-capita incomes (especially in less-developed countries), consumer preferences, long-and short-term credit arrangements, international and country-specific trade policies, and other demand-related factors. On the supply-side, dependability as a supplier is important, and the agricultural productivity of the U.S.'s export customers and competitors (whether that productivity is market or politically driven) can greatly affect U.S. grain export demand.

In general, farm program mechanisms such as acreage diversion or other acreage/production restrictions, base acreages, buffer stock programs, price levels relative to competitors, export subsidies, and other features of farm legislation and programs can affect the short-term availability of U.S. grain for exports. Some provisions affect exportable supplies positively (e.g., buffer stocks) and others negatively (e.g., base acreage planting requirements, acreage or production restrictions, non-competitive prices). In the long-run, commodity programs can affect the long-term availability of exportable supplies if farm programs influence agriculture's ability to create and maintain excess capacity. By and large, the level of productive capacity of agriculture is determined by technology. To the extent that farm programs provide a stable price and income environment which encourages farmers and their bankers to invest in new capital-intensive technologies, farm programs could expand the productive capacity of agriculture. Maintenance of diverted acreage which can revert to productive use relatively quickly also can allow farmers to capture a larger share of an exploding export market.

The FAIR Act performs will in terms of farmer's ability to respond to export markets by changing the mix of commodities. Producers are free to change crop mixes as market conditions suggest or as export markets emerge. Also, the CRP serves, in part, as a store of excess productive capacity that could be brought on-line if needed. Further provisions such as establishment of land trusts to preserve agricultural land and prevent future development outside agriculture also contribute to agriculture's new freedom to respond to changing export markets.

However, some provisions of the FAIR Act concurrently reduce the U.S.'s ability to quickly respond to changes in export situations. The legislation provides no commitment to maintaining buffer stocks. Marketing loans continue and are likely to be used to ensure little or no accumulation of Commodity Credit Corporation-owned grain and cotton stocks and the Farmer-Owned Grain Reserve is suspended. Additionally, no short-term diversions are available to respond to a spurt in export demand. Hence, tremendous variations in prices and income are possible under FAIR. If a tight domestic supply-demand situation was to occur and export customers even perceived a U.S. export embargo to be plausible, their food self-sufficiency goals would be intensified, encouraging export customers to arrange formal grain-delivery commitments with U.S. competitors.

Even before the summer of 1996, when the price of corn shot up to $5 per bushel and then fell below $2.35 within a 5 month time span, if there was one thing that analysts agreed on about the new legislation it was that it would subject agriculture to increased price and income risk. Also, if there is any agreement on how firms deal with risk, it is that firm operators are unable to use the post-hoc most-efficient combinations of resources

to produce the optimal mix of products in the short-run and that increased risk inhibits the adoption and banker financing of new, usually capital-intensive, technologies.

SUMMARY AND CONCLUSIONS

Under baseline assumptions, this research projects volume and value of corn exports to steadily increase over the next 8 years. Over the same period, wheat and soybean exports are projected to rise initially, then declined early next century, while cotton exports remain fairly constant well below 1994 levels. Examination of the projections in their historical context provides further support for price inelasticity in export demand. One factor significantly influencing the corn projection was shown to be an assumption that China will significantly increase imports beyond 2000. Holding the expected import level constant at its 2000 level significantly reduces the export projection. Similarly, temperance of the expectation of increased EU wheat exports beyond 2000 tempers the decline in U.S. wheat export volume and value beyond 2000.

Provisions of the 1996 FAIR Act are expected to influence U.S. ability to respond to changing export markets. Elements of the legislation that increase production flexibility and preserve excess productive capacity will facilitate producer response to changing world market conditions or emergent markets. However, other elements will simultaneously limit U.S. ability to quickly respond to changing conditions. In the short-run, virtual elimination of buffer stocks will further exacerbate price and income variation. Potential tightening of the domestic supply and demand relationship may also influence export response. In the long run, increased price and income risk resulting from a FAIR Act policy environment may inhibit technological development and adoption.

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