

Is the Strong Dollar a Problem in U.S. Agriculture

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In the 1980s agriculture has experienced many financial problems. The value and quantity of corn, soybean, and wheat exports from the United States has been steadily declining since the early 1980s (Figure 1). The depressed export market has been one of the major factors affecting the recent financial crisis in the U.S. farm economy. The deterioration of the farm economy has brought about many bankruptcies of family farms in the United States. Falling commodity prices and inflated land prices in the 1970s have also contributed to this problem. Some argue that the problem is due to overproduction which has created excess reserves and depressed commodity prices (Figure 2). Others argue that inflated land prices of the mid-1970s have caused the problems that agriculture is experiencing today. Falling land prices in the 1980s have put farmers in a credit squeeze because deterioration of their equity has made it difficult for them to secure operating loans. Another major reason for the recent farm problem could be the strength of the U.S. dollar. A strong U.S. dollar makes the price of U.S. commodities in foreign markets higher relative to the price of the same commodities purchased from another country with relatively weaker currency. Figure 3 shows the real weighted averaged exchange rates for corn, wheat, and soybeans. These exchange rates represent the average value of the U.S. dollar against major importing countries of each crop,

weighted by their volume of imports after adjusting for inflation in the countries involved. The value of the U.S. dollar was relatively high in the early 1970s and the early 1980s. In these periods, exports of wheat, corn, and soybeans were low. On the other hand, when the value of the U.S. dollar

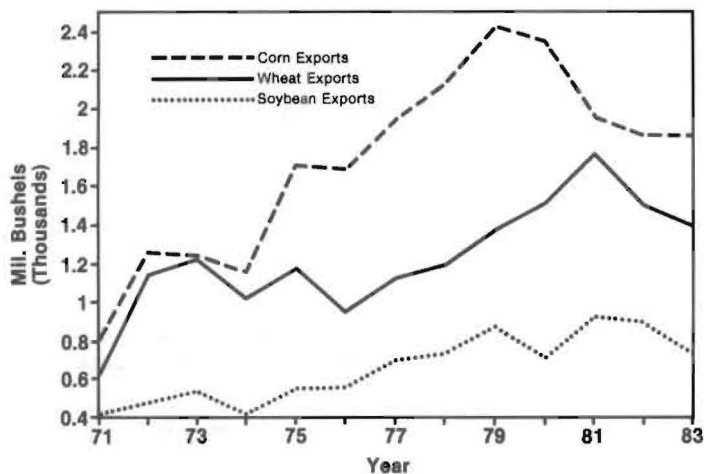


Figure 1. Comparison of Crop Exports in the United States, 1971-1983.

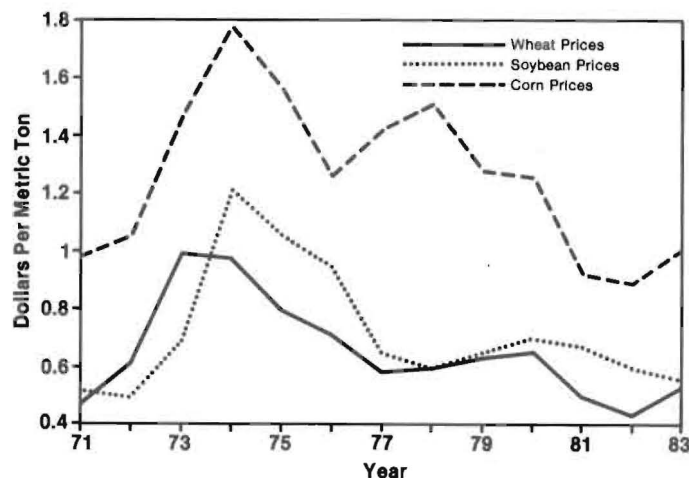


Figure 2. Comparison of Crop Prices in the United States, 1971-1983.

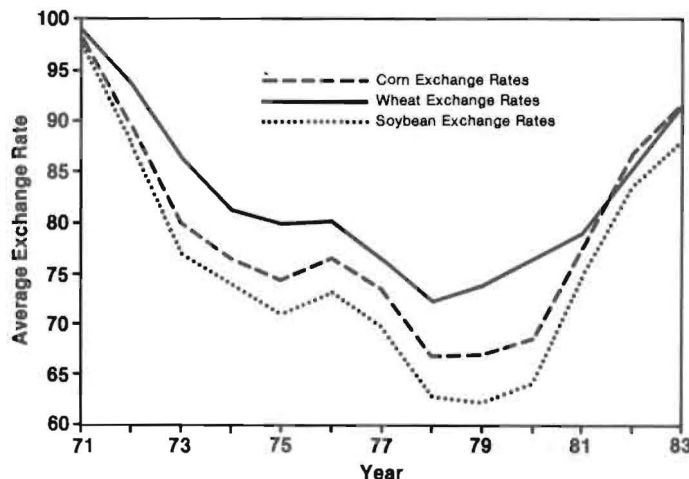


Figure 3. Comparison of the U.S. Dollar Values Against Major Importing Countries of Each Crop (Weighted Average Exchange Rate), 1971-1983.

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was the lowest from 1978 through 1980, exports of these commodities peaked. The strong U.S. dollar in the 1980s is due mainly to the U.S. economic policies. High budget deficits of the past few years resulted in high interest rates. Tight monetary policy has also helped to keep interest rates high and inflation low in the U.S. The high interest and low inflation rates have made investment in the United States attractive to foreigners and have, as a result, contributed to the strong dollar value. The objective of this study is to examine the effects of U.S. economic policies on the U.S. farm economy. This study is especially focused on the impacts of the exchange rate and grain price on the U.S. wheat exports.

Theoretical Background

Even though the dollar price of commodities may not change in our system freely fluctuating exchange rates, a change in the U.S. dollar value will affect the total payment that a foreign country has to pay, in terms of its currency, for U.S. commodities. This means that an increase in the value of the U.S. dollar has the effect of a decrease in value of foreign currency relative to the U.S. dollar.

The impacts can be two-fold. One impact is the direct price effect in importing countries, and the other is the substitution effect. First, the direct price effect occurs when an increase in the value of the U.S. dollar increases the price of commodities to foreign consumers and therefore decreases the quantity of commodities demanded. Assume for example that the price of wheat in the United States is \$4.00 per bushel, and the exchange rate of the dollar versus the Japanese yen (¥) goes from \$1.00 (U.S.) = 150 ¥ to \$1.00 (U.S.) = 200 ¥. This is an increase in the value of the U.S. dollar relative to the Japanese yen and conversely a decrease in the value of the Japanese yen relative to the U.S. dollar. The result is that wheat priced at \$4.00 per bushel changes in Japan from 600 ¥ (150 ¥ × \$4.00) to 800 ¥ (200 ¥ × \$4.00), which is a significant price increase. As a result Japan will decrease its imports from the United States. Second, the substitution effect occurs when an increase in the value of the U.S. dollar makes the price of commodities of other exporting countries more competitive in the world market. For example, assume the following: (1) the price of wheat is \$4.00 per bushel in the United States and Canada, and (2) the value of the Canadian dollar depreciates against the U.S. dollar from \$1.00 (Canada) = \$1.00 (U.S.) to \$1.00 (Canada) = \$0.67 (U.S.), resulting in \$1.00 (Canada) = 133 ¥ (200 ¥ × 0.67) against \$1.00 (U.S.) = 200 ¥. Under this circumstance, a bushel of wheat priced at \$4.00 costs Japan 800 ¥ if Japan purchases the wheat from the United States but it costs only 532 ¥ (133 ¥ × \$4.00) if purchased from Canada. Consequently, Japan tends to import more from Canada than from the United States as the value of the U.S. dollar appreciates against the Canadian dollar.

On the basis of the relationship between U.S. exports and the dollar value, foreign import demands for U.S. wheat, corn, and soybeans were estimated as a function of the prices of each crop and weighted average value of the U.S. dollar against the currency values of major importers of each crop. Data used in the analysis were obtained from USDA Agricultural Statistics and USDA Foreign Agriculture Circular. Yearly data were used from 1970 through 1983. The exchange rate used was the real weighted dollar exchange rate for each group studied. Ordinary least squares estimation was used to estimate parameters of equations.

Results

The estimated foreign import demand equations for wheat, soybeans, and corn or shown in Table 1. As expected, export volume of each crop is inversely related to the price and the real weighted average exchange rates of the crop. The exchange rates are, however, more significantly related to export volume than the price of the crop.

The relationship between crop exports and prices on the relevant exchange rates can be explained by using the term "elasticity." Export elasticity of each crop with respect to its own price (a ratio of percentage changes in the quantity of each crop exported to percentage changes in the price of the crop) is inelastic; wheat is the most inelastic at -0.15 and soybeans are the least inelastic at -0.56 (Table 2). Corn has an elasticity of -0.33. An elasticity of -0.15, for example, means that a 10 percent decrease in wheat prices would result in only a 1.5 percent increase in the quantity of wheat exported and vice versa. A similar interpretation would be given to soybean and corn elasticities. This means that export volume is not much influenced by the price of grain.

Table 1. Estimated Aggregate Foreign Import Demand for U.S. Wheat, Soybeans, and Corn.

	Wheat	Soybeans	Corn
Intercept	4.586 (3.04)	7.632 (3.24)	8.384 (2.46)
P_t	-.146 (1.64)	-.558 (2.45)	-.332 (1.21)
r_t	-.914 (3.26)	-1.075 (3.14)	-1.018 (1.21)
D_t	.622 (4.02)		
Q_{t-1}	.915 (9.88)	.559 (3.82)	.453 (2.12)
R^2	.909	.887	.897

P_t = real price of each grain.

r_t = real weighted exchange rate of U.S. dollars against the currencies of major importing countries of each grain.

D_t = dummy variable representing USSR's grain imports in 1973.

Q_t = quantity of each U.S. grain imported by all importing countries.

Table 2. Estimated Aggregate Foreign Import Demand Elasticities for Wheat, Soybeans, and Corn with Respect to Prices and Exchange Rates.

	Wheat	Soybeans	Corn
Price Elasticity			
Short-run	-.146	-.558	-.332
Long-run	-1.75	-1.27	-.607
Exchange Elasticity			
Short-run	-.914	-1.07	-1.02
Long-run	-10.75	-2.43	-1.86

Export elasticity of each crop with respect to the relevant exchange rates is much more elastic than with respect to grain prices. Export demand for soybeans is most elastic at -1.07 which means that a 10 percent increase in the exchange rate would have the effect of reducing soybean exports by almost 10.7 percent. Export demand elasticities with respect to the relevant exchange rates are -0.91 for wheat and -1.02 for corn. The reason that export volume is more sensitive to the exchange rates than to prices is that price adjustments among exporting countries are made simultaneously while the exchange rate adjustments are not. For instance, when the United States reduces the price of wheat at the Gulf to increase exports, other exporting countries reduce their wheat prices to maintain their market share. Exporting countries' market share, therefore, remains unchanged as a result of the simultaneous changes in prices. On the other hand, an increase in the U.S. dollar value against foreign countries makes only U.S. commodities more expensive in foreign markets while the prices of the same commodity from other exporting countries remain constant. Thus, the United States will lose its market shares in the world market through the direct price and substitution effects which were discussed above. This implies that the recent decreases in U.S. grain exports are due mainly to the over-valued dollar in addition to other factors such as fixed loan rates which are directly related to grain prices.

Concluding Remarks

The prices of grain and the real value of the U.S. dollar are known as major factors influencing U.S. grain exports. This study reveals that the quantity of grain exported from the United States is influenced more by the real value of the U.S. dollar than by the price of grain. This is because adjustments in grain prices are made simultaneously among exporting countries while an increase in the U.S. dollar value makes the prices of U.S. commodities higher relative to those of the same commodities produced in other exporting countries. This clearly indicates that the value of the U.S. dollar should be lowered to stimulate exports of agricultural commodities. The value of the U.S. dollar should be lowered through sound monetary and fiscal policies. Other policies to stimulate U.S. exports, such as export subsidy and protectionism, could be very costly to consumers in the United States.

References

- U.S. Department of Agriculture. **Foreign Agriculture Circular: Grains**, various issues.
- U.S. Department of Agriculture. **Foreign Agriculture Circular: Oilseeds and Products**, various issues.
- U.S. Department of Agriculture. **Agricultural Statistics**, various issues.