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# BRIEFING

Briefing No. 68

May 2004

## Exchange Rates and Montana Agriculture: What are the Impacts?

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*The Agricultural Marketing Policy Center would like to acknowledge the support provided by Montana Department of Agriculture and Fort Peck Community College for this project.*

### Introduction

Currency exchange rates can play an important role in agricultural markets. In the United States, the relative strength of the U.S. dollar against currencies of other countries can have important impacts on prices for U.S. agricultural commodities.

For example, when the U.S. dollar appreciates (that is, increases in value) against a foreign customer's currency, this makes U.S. products relatively more expensive for foreign customers as they must buy higher priced dollars to purchase the U.S. commodities assuming U.S. prices are not affected by the exchange rate movement. This affect, however, is often short-lived as markets tend to adjust in response to foreign currency rate changes.

This briefing provides a review of research on the impacts of foreign currency changes and their impacts on beef and wheat markets, two primary agricultural commodities produced in Montana.

### Beef Prices and Exchange Rate Movements

Since the mid-1980s U.S. beef exports have increased because of higher foreign incomes and reductions in trade barriers. From 1985 to 2003, U.S. beef exports as a percent of total U.S. beef supplies grew from 1.3 percent to 8.3 percent. Japan, Mexico, Canada and South Korea are the primary export markets for U.S. beef, accounting for about 90 percent of U.S. beef exports.

Japan, by itself, accounts for over one-half of U.S. beef exports. As a result of export growth and the concentration of exports in a few countries, economic factors in these countries that lead to changes in beef demand can have sizable impacts on U.S. beef exports and prices.

Research by Miljkovic, Marsh and Brester found that movements in these foreign customers' currencies relative to the U.S. dollar caused U.S. beef prices to adjust. However, the relative importance of each country's currency on U.S. beef prices varied. The largest impacts occurred for Canada and Japan. Changes in these foreign currencies relative to the U.S. dollar caused U.S. beef prices to adjust substantially. For example, a 10 percent increase in the U.S. dollar against the Canadian dollar caused U.S. beef prices to decline by 9.3 percent, while a 10 percent increase in the U.S. dollar against the Japanese Yen led to a 3 percent decline in U.S. beef prices.

The large impact of currency values in Canada is indicative of the near perfect substitutability between U.S. beef and Canadian beef. Because Japanese companies purchase high quality meat cuts, their demand for U.S. beef tends to be less responsive to price. Thus, changes in exchange rates between Japan and the U.S. have a smaller impact on domestic beef prices relative to Canadian exchange rates.

When currency values in South Korea and Mexico change relative to the U.S. dollar, the impact on U.S. beef prices

are minimal. Again, this likely reflects import markets with few available substitutes for U.S. beef.

### Wheat Prices and Exchange Rate Movements

Like beef, the market for U.S. wheat consists of significant exports to foreign customers. However, exports of U.S. wheat play a more important role than in the case of beef. In recent years, U.S. wheat exports have accounted for about 40 percent of total U.S. wheat supplies. Furthermore, U.S. wheat competes in a heavily traded global market and, because of wheat's homogeneity (that is, wheat of a particular class from one country is fairly similar to wheat from other countries), price tends to be an important determinant of inter-country trade. As such, one might expect foreign currency changes to have larger effects on wheat markets than beef markets.

To examine this issue, we considered the impact of foreign currency changes between the United States and Canada on U.S. wheat prices. Canada represents a major competitor to the United States in the world wheat market. Both countries grow similar types of wheat and have similar export transportation costs. Furthermore, in recent years the quantity of Canadian wheat imported into the United States has increased because of the liberalization of trade barriers. These factors suggest that changes in currency values between these two countries may have important impacts on wheat prices in these two countries.

Monthly data from 1996 to 2002 were collected for wheat futures prices from the Chicago Board of Trade (CBOT), the Kansas City Board of Trade (KCBT) and the Minneapolis Grain Exchange (MGE). Each of these three markets trade different classes of wheat: soft red winter at the CBOT; hard red winter at the KCBT; and hard red spring at the MGE. The distinction of these wheat classes can be important, especially when considering the impact of Canada and United States wheat trading. In addition to price data, monthly imports of Canadian wheat into the United States were collected along with a monthly exchange rate between the United States and Canada.

Canada trades mostly hard red spring wheat with the United States. Therefore, it seems likely that exchange rate movements between the United States and Canada would have a more pronounced effect on MGE futures prices than on the other futures markets. A regression model of the following form was estimated for each of the three wheat markets:

$$F = \sum \alpha_j M_j + \beta_1 SUR + \beta_2 IMPORTS + \beta_3 EXCHANGE RATE.$$

The variable F is the nearby wheat futures price.  $M_j$  for  $j=1,2,\dots,12$  are a set of monthly dummy variables to account for seasonality in prices and SUR is a measure of U.S. ending stocks of wheat relative to total use. These independent variables account for normal forces that influence wheat prices. The variables IMPORTS and EXCHANGE RATE examine the impact on U.S. wheat prices from Canadian wheat imports into the United States and the U.S.-Canadian currency exchange rate.

This model was estimated for the three futures markets and most variables were statistically significant. The results suggest:

- A 10 percent increase in the U.S. dollar relative to the Canadian dollar leads to a 10 percent decline in U.S. wheat futures prices at the CBOT, KCBT and MGE.
- A 10 percent increase in Canadian wheat imports led to a 0.5 percent (less than 1 percent) decline in MGE wheat futures prices, but had no impact on CBT and KCBT prices.

Based on these results, we conclude that: (1) changes in currency values between the United States and Canada are passed through to the U.S. wheat futures markets and (2) Canadian wheat imported into the United States has only a minimal impact on MGE wheat futures prices and no impact on KCBT or CBT wheat markets.

Because Canada primarily exports spring wheat to the United States, it is not surprising that U.S. spring wheat prices are influenced by such imports.

Even so, the impact of these imports is relatively small. For example, between 2000 and 2002 Canadian wheat imports into the United States decreased by 23 percent. Based on our model's estimates, MGE wheat futures prices would have only increased by 4 percent due to the decline of Canadian spring wheat imports.

### Final Thoughts

Exchange rates do matter for U.S. commodity prices, but the impact will vary across agricultural commodities. As a general rule of thumb, the more homogenous a commodity and the more competition existing in world markets, the greater the risk of domestic price changes from currency rate changes. This rule of thumb was apparent in the case of wheat where a 10 percent increase in the U.S. dollar relative to the Canadian dollar was shown to lower U.S. wheat futures prices by 10 percent. On the other hand, the more heterogeneous a commodity is and the less competition there is for distinct types of that commodity, the less likely exchange rates will influence commodity prices. This was demonstrated for the U.S. beef market. A 10 percent increase in the U.S. dollar relative to the Japanese Yen led to a 3 percent decline in U.S. beef prices.

### References

Miljkovic, D., J.M. Marsh and G.W. Brester. "Japanese Import Demand for U.S. Beef and Pork: Effects on U.S. Red Meat Exports and Livestock Prices." *Journal of Agricultural and Applied Economics*, v34, n3 (December 2002): 501-512.



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