Journal of Agricultural and Applied Economics, 36,1(April 2004):257–260

Effects of Japanese Import Demand on U.S. Livestock Prices: Reply

Dragan Miljkovic, John M. Marsh, and Gary W. Brester

In responding to a comment article, we concur that quantifying U.S. livestock price response to changing Japanese meat import demand requires nonzero supply elasticities beyond one quarter. However, rigidities in market trade and empirical tests justify the inclusion of exchange rates in the short-run analysis. Producer welfare asymptotically approaches zero for increasing supply elasticities in the long run, but short-run transitions in producer surplus are meaningful to producers.

Key Words: exchange rates, import demand, supply response

JEL Classifications: Q17, F14, C32

Long run is a misleading guide to current affairs.
In the long run, we are all dead.

—John Maynard Keynes

We appreciate Henry Kinnucan's *Comment* on our December, 2002 *Journal of Agricultural and Applied Economics* article titled "Japanese Import Demand for U.S. Beef and Pork: Effects on U.S. Red Meat Exports and Livestock Prices." His *Comment* adds to the literature by questioning the role of exchange rates (if any) on trade, the role of supply response in quantitative analyses, and issues related to short- and long-run producer surplus as a result of changes in demand. We find it necessary to briefly respond to Kinnucan's *Comment.*

Dragan Miljkovic is associate professor, Department of Agriculture, Southwest Missouri State University, Springfield, MO. John M. Marsh and Gary W. Brester are professors, Department of Agricultural Economics and Economics, Montana State University, Bozeman, MT.

This work was supported by the Montana State University Trade Research Center and the Montana Agricultural Experiment Station. The authors wish to thank John Penson, Jr., for his assistance on the manuscript.

The goal of our initial research was to examine and quantify the effects (if any) of macroeconomic variables in a major U.S. beef and pork export market (Japan) on the U.S. red meat industry. In general, the U.S. red meat industry faces a mature domestic market and has become increasingly dependent on foreign consumer markets for growth. For example, approximately 9% of domestic beef supplies and 7% of domestic pork supplies are exported. Japan is the destination for about 50% of all U.S. beef exports and 45% of U.S. pork exports. Hence, we found it interesting to consider whether or not changes in Japanese incomes, exchange rates, and tariffs influence Japanese import demand for U.S. beef and pork. Ultimately, we were most interested in whether such factors influence U.S. beef and hog prices.

Kinnucan finds three problems with our research: (1) the use of short-run rather than longer-run domestic supply elasticities for beef

and pork production, (2) the inclusion of exchange rates in import demand equations, and (3) the implication that short-run changes in demand cannot generate long-run gains in producer surplus.

U.S. Domestic Cattle Supply Responses

We acknowledge and appreciate the observation that, in the long run, U.S. domestic red meat supply elasticities are much more elastic than short-run elasticities. In fact, one could readily argue that the U.S. beef and pork sectors are characterized by constant returns to scale and are thus best represented by completely elastic long-run supply functions (Wohlgenant). Kinnucan modifies our initial model to include supply response behavior and finds that our estimates of U.S. cattle and hog price effects are overstated (on average, by a factor of two for the exchange-rate variable and by a factor of six for changes in Japanese income). The overstatement is the result of our assumption of completely inelastic supply responses in quarterly data in our original paper. We agree. In fact, we should have included such a discussion and, perhaps, we should have included results for both short-run and total response supply elasticity estimates.

Nonetheless, we feel that one cannot ignore short-run price effects that result from changes in import demand factors. These transitional consequences occur because of biology, technology, and expectational factors that cause rigidities in supply response (Marsh). Such rigidities are particularly plausible when considering trade issues using quarterly data as units of observation. In our initial research, we treated livestock (beef and pork) supplies as fixed on a quarterly basis. Some authors have found empirical evidence that such an assumption is reasonable even in annual data (Wohlgenant). Thus, changes in Japanese exchange rates, tariffs, or income caused import demand shocks, which translated into nonzero effects on U.S. cattle and hog prices. However, we did project such changes over longer time periods because of the variability of macroeconomic factors that occurred in the Japanese market during the 1990s. The correct way to make such projections is to alter supply responses as time periods are extended.

As noted by Kinnucan, it is unlikely that foreign (or domestic) demand changes will have any significant impact on commodity cattle and hog prices in the long run. A lack of entry and exit barriers will cause those in the industry to earn only normal returns. Nonetheless, demand increases (decreases) do generate transitional gains (losses) in such industries as supply responses gradually become more elastic. In addition, although long-term cattle prices are primarily driven by technology and cost structures, most would agree that a demand-induced expansion of an industry is preferable to a contraction, even if prices remain constant.

Exchange Rates and Import Demands

The law of one price (LOP) states that, when prices have been converted to a common currency and transportation costs have been accounted for, a homogenous product should sell for the identical price in differing countries. However, an ever-growing empirical literature on LOP and purchasing power parity (PPP) provides some support that these concepts are frequently violated.[1] Several recent surveys of the literature are available (Barrett; Miljkovic; Rogoff). Rogoff goes so far to say how a few empirically literate economists take LOP and PPP seriously as a short-term proposition but instinctively believe in some long-run variant of the two concepts. However, "warm, fuzzy feelings about PPP (and LOP) are not, of course, a substitute for hard evidence" (Rogoff, p. 647).

There appears to be a consensus in the literature concerning both LOP and PPP regarding two areas. First, prices tend to satisfy the LOP in the long run. However, the speed of convergence to LOP and PPP is generally slow in that deviations from these principles appear to dampen by about 15% per year (Rogoff). Second, short-run deviations from LOP

[1] PPP is simply the aggregate version of LOP applied to the entire vector of tradable goods in an economy.

and PPP are often large and volatile. Although reasons for deviations from LOP and PPP are various, the important issue here is that the use of exchange-rate variables in short-run models seems appropriate (Miljkovic; Rogoff). Nonetheless, we view this as an empirical issue. Thus, we followed the theoretical development of including exchange-rate variables in import demand equations as provided by Cushman (1983, 1988), Hooper and Kohlhagen, and Kenen and Rodrik.

Kinnucan takes exception to our approach of including exchange-rate variables in our Japanese import demand equations for beef and pork. Specifically, he develops an alternative model in which ". . . international markets are assumed to be integrated such that the law of one price holds after taking into account tariffs and transportation costs." However, our regression results support the inclusion of an exchange-rate variable using quarterly data in Japanese beef and pork import demand equations. Kinnucan provides an alternative explanation for that result. He indicates that his revision of our model provides the following testable restriction for the null hypothesis that complete exchange-rate pass-through occurs: $\eta_J = \eta_R$. Specifically, complete exchange-rate pass-through (i.e., LOP) is testable if the cross-price effects in the model are zero. In addition, he argues that the inclusion of exchange-rate variables constitutes a specification error and may be the reason for the statistical insignificance of own-prices in the import demand equations.

To empirically test the issue, we reestimated the import demand equations after excluding the real exchange-rate variables. The regression results from this exercise indicated (1) that there was a reduction in the adjusted R-squares of 1.4% and 6.6% in the beef and pork equations, respectively, and commensurate increases in the standard errors of the equation of 0.7% and 2.3%, and (2) that the own-price effects were again statistically insignificant at the $\alpha = .10$ level. The remaining coefficient estimates were not altered appreciably. Thus, we conclude that important information on a quarterly basis is included in exchange rates

cal insignificance of own-prices in the import demand equations probably is best explained in that beef and pork exports to Japan are constrained by tariff-rate quotas (TRQs). Thus, changes in U.S. export prices of red meats would likely have little influence on import demand quantities if the TRQs are binding. Indeed, this has been the situation throughout our sample period, and our original regression results confirm this issue.

Changes in U.S. Livestock Producer Surplus

Finally, we address the issue of U.S. livestock producer welfare effects subject to changes in Japanese import demand. Kinnucan correctly notes that as supply responses become more elastic, producer surplus declines. In fact, no producer surplus (i.e., economic rents) occurs when supply is completely elastic. But realistically, producers operate in the short run as markets move toward long-run equilibriums. Thus, short-term gains (or losses) of producer surplus are meaningful and cumulative. Therefore, we argue that the short run is important to producers.

We agree that our empirical results do not indicate, by themselves, that increasing export demand is the most important issue facing the red meat industry. However, our research provides a measure of the short-run impact of Japanese macroeconomic variables on U.S. beef and hog prices. Hence, the costs and benefits of investments that expand export demand must be weighed against the costs and benefits of investments that increase product quality, address consumer health and food safety concerns, and reduce domestic production costs. Nonetheless, all of these investments suffer from the same long-run malady as that resulting from increased export demand—that is, highly elastic long-run supply functions cause producer surplus to asymptotically approach zero. The process of entry and exit in a relatively competitive market ensures this adjustment process.

Summary

We appreciate the opportunity to correspond

supply responses, exchange rates, and import demand. We agree that one should consider longer-term supply responses when projecting changes in demand shocks over time. We argue that reasons exist for including exchange-rate variables in import demand equations. But, ultimately, the importance of doing so is an empirical issue. Finally, we appeal to Keynes and note that the short run is likely important to many livestock producers.

[Received August 2003; Accepted August 2003.]

References

Barrett, C.B. "Measuring Integration and Efficiency in International Agricultural Markets." *Review of Agricultural Economics* 23(Spring/Summer 2001):19–32.

Cushman, D.O. "The Effects of Real Exchange Rate Risk on International Trade." *Journal of International Economics* 15(August 1983):45–63.

———. "U.S. Bilateral Trade Flows and Exchange Risk During the Floating Period." *Journal of International Economics* 24(May 1988):317–30.

Hooper, P., and S.W. Kohlhagen. "The Effects of Exchange Rate Risk and Uncertainty on the Prices and Volume of International Trade." *Journal of International Economics* 8(November 1978):483–511.

Kenen, P., and D. Rodrik. "Measuring and Analyzing the Effects of Short-Term Volatility in Real Exchange Rates." *Review of Economics and Statistics* 68(May 1986):311–15.

Keynes, J.M. *A Tract on Monetary Reform.* New York: Prometheus Books, 1923.

Kinnucan, H.W. "Japanese Import Demand for U.S. Beef and Pork: Effects on U.S. Red Meat Exports and Livestock Prices: Comment." *Journal of Agricultural and Applied Economics* 36,1(April 2004):251–55.

Marsh, J.M. "Estimating Intertemporal Supply Response in the Fed Beef Market." *American Journal of Agricultural Economics* 76(February 1994):51–66.

Miljkovic, D. "The Law of One Price in International Trade: A Critical Review." *Review of Agricultural Economics* 21(Spring–Summer 1999): 126–39.

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* 34(December 2002):501–12.

Rogoff, K. "The Purchasing Power Parity Puzzle." *Journal of Economic Literature* 34(June 1996): 647–68.

Wohlgenant, M.K. "Demand for Farm Output in a Complete System of Demand Functions." *American Journal of Agricultural Economics* 71(May 1989):241–52.