US Export Beef Competitiveness: Do Cattle Inventories Matter?[1]

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THE US beef industry operates in a highly competitive world market. As a global leader in the production of beef cattle, its competitive advantage in beef production stems from a well-developed infrastructure as well as a reputation for quality. Nevertheless, US beef has a disadvantage in the relative cost of production. For instance, the majority of US beef is grain-fed, while a pound of grass-fed beef can be produced at a lower cost. Lack of animal traceability and mandatory national identification systems can also put US beef in a vulnerable position competing with other major export countries. There is no doubt that the US beef industry today faces a highly competitive global market place. However, are US beef exports facing significantly greater economic competition today than they did in the past, or have those export markets always been highly competitive? The beef industry has become more concentrated over the past 30 years, suggesting that examinations of export

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competitiveness should consider the possibility of market power. We also question whether global competition is affected by the inherent dynamics of cattle production and marketing in beef exporting nations. Livestock production is impacted by a biological cycle that affects the production of final meat products, and as cattle are capital and consumption goods, current breeding and consumption decisions impact future stocks.

To test the general competitive efficiency of the United States and its rivals, we construct a model of revealed comparative advantage (RCA) based upon work by Balassa to investigate market dominance of the United States. The analysis is used frequently when looking for changes in a country's trading status. Our constructed model shows how each exporter's trade-weighted share of the export market has changed over time. We include variables for cattle inventories to explore the impact of stocks on RCA.

To test for market power, we employ a model developed by Goldberg and Knetter, which has been used

extensively in research on export markets. As in the RCA model, we incorporate livestock inventories into the model in order to ascertain whether market power has changed and how much these changes (if any) are due to the underlying inventories.

Based on the examination of trade flows from 1994 to 2015, the eight largest importers of US beef are chosen for the analysis along with 11 major export competitors to the United States.[2] Trade in animal-derived products is often impacted by trade agreements and phytosanitary emergencies, which can change exports dramatically. A pertinent example is the BSE discovery in December 2003 and trade losses in many nations through 2007 (Figure 1). In our simulations, we ask what markets would have looked like had such impacts not have happened in order to focus on the competitive aspects in the major export markets. Simply put, we are looking for evidence that competition changed for the United States with respect to its 11 major competitors.

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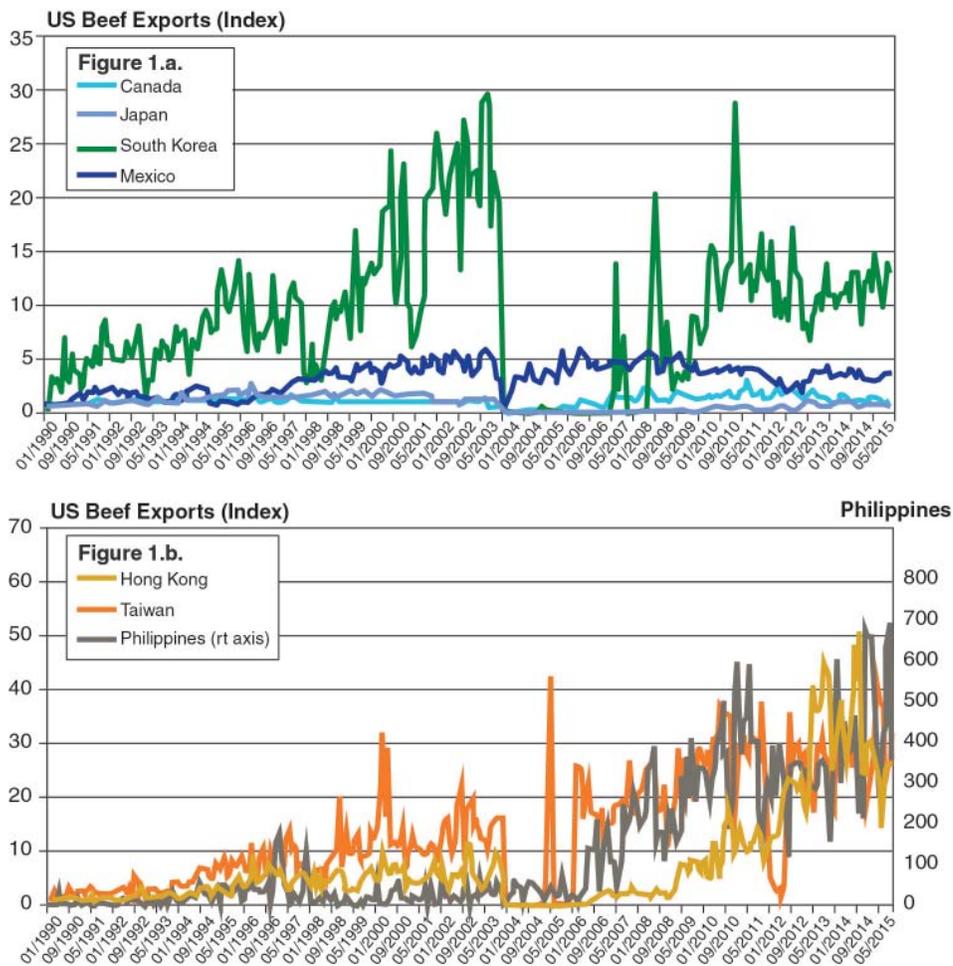
Figure 1. US Exports to Selected Nations (January 1990=1.00)

*US comparative advantage in 8 major import markets,
  + implies comparative advantage
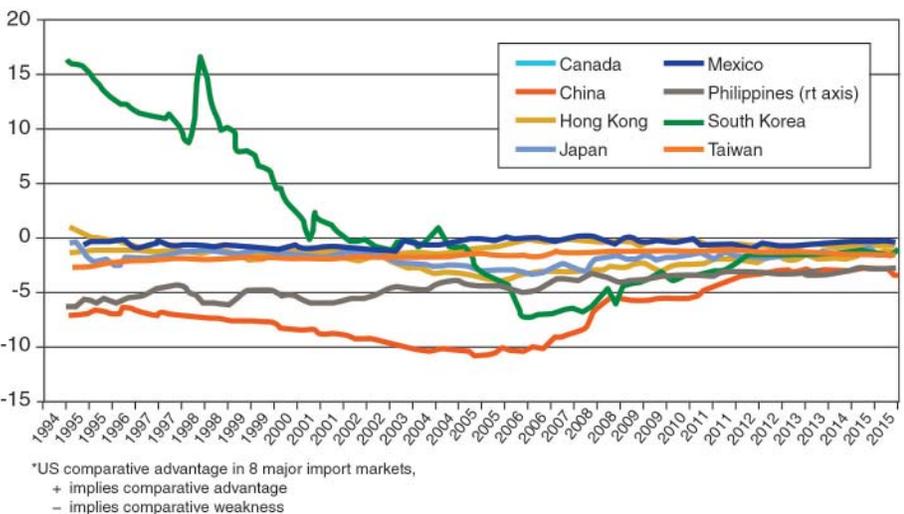 – implies comparative weakness

Figure 2. Simulated lnRCA Indices for the United States, 1994-2015

The results for US comparative advantage are shown in Figure 2. A value of zero for lnRCA (RCA = 1) suggests that a nation has no more or less of a comparative advantage than its export competitors, positive values indicate greater comparative advantage and negative values indicate comparative weakness. The average for all exporters from the models' simulations of the period from 1994 to 2015 was not significantly different from zero. This means the overall average for the 11 competitors (and the United States) shows no comparative advantage when taken all together. Looking just at the United States, Figure 2 shows that other than the South Korean import market (for which we believe the large values early in the data may be due to out-of-sample errors) the US comparative advantage is consistently near zero throughout the study. There are perturbations and ebbs and flows on one side of zero or another, but for the most part (South Korea possibly being an exception), the US comparative advantage is no greater or lesser throughout the period of study. The underlying cattle cycle did have some impact, but did not seem to change the overall results very much.

The values in Figure 3 are Lerner indices, a measure of market power, for the United States in 6 major beef import markets. The cyclical changes in some of these measures indicate that the cattle cycle had some, but very little, impact in the international export market. In this test, a Lerner value that is zero or positive means one must assume a very competitive market. Based on the analysis of the 11 major competitors, we find that although 60 percent of the indices show some market power, the overall average value is quite small (near zero) at -0.03: statistically, but not economically, significant. In particular, Figure 3 shows that most of the US indices are very close to zero and the ⇨