Economic Impacts of Exports on U.S. Beef Industry

The increase in exports of U.S. beef has

♦ Raised beef and cattle prices
♦ Increased production and supported a larger industry
♦ Expanded U.S. trade opportunities

The "drivers" of export activity include

♦ Changes in feedgrain prices
♦ Changes in deflated Japanese Gross Domestic Product (GDP)
♦ Changes in deflated Mexican GDP
♦ Changes in prices of substitutes (pork and poultry)
♦ Changes in deflated South Korean GDP
♦ Changes in deflated Canadian GDP

Changes in feedgrain prices shift the supply curve for beef. The others shift demand. Changes in Japanese GDP are very important, with changes in the Mexican economy and changes in substitute prices also important.

Impact of a 1.0 percent increase in beef exports

On price of high quality beef:

0.07 to 0.15 percent increase, 0.12 percent best point estimate to use

On beef production in the U.S.:

0.05 to 0.15 percent increase, 0.10 percent best point estimate to use

Estimates of impact are generated by controlled "shocks" to a complex partial equilibrium model of the world beef market. The shocks include (1) changes in GDP in buying countries, (2) changes in feedgrain prices, and (3) changes in prices of pork and poultry as beef substitutes. The "best point estimates" for prices of high-quality beef and beef production will not always occur together in exactly those magnitudes, but increases in both prices and production were often a joint response to a positive demand shift. Increased demand raises prices, which prompt a positive supply response, and prices and production go up together over time.

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**Best Estimates of Impacts for 1998-1999: Beef Exports Up 7.2 Percent**

On price of high-quality beef:
- A .86 percent increase in price (0.12 best point estimate times 7.2)
  - $.57 per cwt. in a $66 fed cattle market
  - $6.84 per head on a 1,200 lb. steer/heifer
  - $161 million on 23.5 million fed cattle slaughter

On beef production:
- A 0.72 percent increase in production (0.10 best point estimate times 7.2)
  - 130 million-pound increase (carcass weight)
  - About 172,000 added fed steers/heifers
  - About 236,000 added beef cows
  - Some 5,900 more 40-cow beef herds

**Guides to Use of the Study Results**

- Recognize the range in the parameter estimates. Across the various controlled shocks to the model, changes in the price of high-quality beef per 1.0 percent increase in exports ranged from 0.07 to 0.15 percent. The 0.12 "best estimate" is from a range. The impacts were always positive on price of high-quality beef, but it is impossible to know the exact correct parameter. The range on beef production was 0.05 to 0.15 percent, and the same cautions are appropriate.

- Apply the results to relatively small changes if at all possible. The impact estimates are driven by elasticity (income, cross, supply, input substitution, etc.) parameters in the model. The elasticity parameters may not be as valid across big changes in exports. The 7.2 percent from 1998 to 1999 is large in this context, and the study results should never be applied to large cumulative changes in exports across years. The estimated impacts of a 1.0 to 2.0 percent change in exports are likely to be more reliable than estimated impacts of a 5.0 to 8.0 percent change.

- There is error in the estimations of impacts. The point estimate of change in high-quality beef exports in response to a 1.0 percent simultaneous increase in GDP in buying countries, in feedgrain prices, and in prices of substitutes was 1.39 percent. To test the reliability of this 1.39 estimate, all elasticity parameters were allowed to increase and/or decrease by 75 percent, and 1,000 random draws from this expanded parameter pool provided 1,000 additional point estimates. The range in the point estimates was -8.49 percent to 3.97 percent, but over 90 percent of the estimates were clustered closely around the 1.39 estimate. The estimates can be used with confidence, but there is an element of error in the complex estimation process.

- The model is a comparative static model in that it compares a new equilibrium, after a shock has been accounted for in world demand and/or supply, with the previous equilibrium. There must be enough time for this new equilibrium to be recorded. One year is probably not long enough, for example, for the big decreases in feedgrain prices from 1997 to 1998 to be fully worked into the system and show its full impact. Don't assume instantaneous impacts. Short-run supply elasticities were used, but it may take a year, sometimes two, for a particular shock to exert its complete influence.

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