Gains and Losses in the Paraguayan Beef Market After the Boom of Beef Exports

María José Patiño*, Julieta Frank*, and Manuel Ferreira**

*University of Manitoba, **Universidad Nacional de Asunción

María José Patiño
Department of Agribusiness & Agricultural Economics
University of Manitoba
353 Agriculture Building
Winnipeg, MB R3T 2N2 - Canada
E-mail: umpatinm@cc.umanitoba.ca


Copyright 2012 by María José Patiño, Julieta Frank, and Manuel Ferreira. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.
Background

Paraguayan livestock industry
- Beef exports are highly competitive due to low levels of production costs and consequent low prices in the local market. There is no consumption of imported beef and historically beef production levels satisfy the local market only [Ferreira 2006].
- During January 2003 to August 2011, the volume of exports grew at the remarkable rate of 29%. In 2011, volume of exports represented more than 700 million U.S. dollars for the livestock economy.
- The overall affects of the boom in exports on all sectors of the supply chain is not clear. Beef exports imply a supply reduction for the local market because the local production is not enough to satisfy both markets at the same time [Ferreira 2006].
- What is the impact of the large increase of Paraguayan beef exports on the different sectors of the supply chain? While producers may have benefited from the higher prices in the external market, consumers in the local market was left with only low quality and overpriced cuts. Little has been done to assess the impact of the boom in exports on the beef supply chain and consumers in Paraguay.

Paraguayan Beef Supply Chain

Objectives
- Estimate demand and supply equations for the fattening, slaughter and beef market.
- Assess welfare changes of the economic agents in the livestock supply chain due to the increased levels of beef exports.

Methods

1. Simultaneous equations
- Central Bank of Paraguay and Department of External Economics.
- A structural model for the Paraguayan beef supply chain that groups affected by the recent market changes were identified: beef producers, slaughterhouses and consumers. Estimation of supply and demand system of equations is performed using 5-stage Least Squares (using, Garcia, and Balluck 2003).

Fattening market:
- Demand: \( Q_{sl} = f(P_{sl}, \Delta P_{F}, \Delta P_{S}, \Delta P_{C}) \)
- Supply: \( Q_{sl} = g(P_{sl}, \Delta P_{F}, \Delta P_{S}, \Delta P_{C}) \)
- Market clearing: \( Q_{sl} = Q_{sl} \)

Slaughtering market:
- Demand: \( Q_{SL} = f(P_{SL}, \Delta P_{F}, \Delta P_{S}, \Delta P_{C}) \)
- Supply: \( Q_{SL} = g(P_{SL}, \Delta P_{F}, \Delta P_{S}, \Delta P_{C}) \)
- Market clearing: \( Q_{SL} = Q_{SL} \)

Beef market:
- Demand: \( Q_{BF} = f(P_{BF}, \Delta P_{F}, \Delta P_{S}, \Delta P_{C}) \)
- Supply: \( Q_{BF} = g(P_{BF}, \Delta P_{F}, \Delta P_{S}, \Delta P_{C}) \)
- Market clearing: \( Q_{BF} = Q_{BF} \)

Variable description
- Endogenous variables:
- Quantities demanded and supplied (\( Q \)) and prices (\( P \)), cattle prices and other beef prices (log per capita).
- Exogenous variables:
- \( \Delta P \): a ratio between total slaughtered animals and total herd; \( A \): cattle in livestock sector; \( F \): private livestock; \( S \): slaughterhouses, \( C \): one price, \( D \): exchange rate, \( A \) to \( C \) price, \( D \): a dummy for winter period, \( \delta \): slope of preferences; \( \alpha \): lowest price, \( \beta \): top price, \( \gamma \): an income which is an index of economic monetary activity. \( K \): capital cost and \( C \): commercial lending rates.

2. Welfare changes
- Welfare changes were measured by sequentially summing the areas between the beef demand function (consumers), input demand function (slaughterhouse and feeder) and output supply function (slaughterhouse, producer (feeder) and slaughter). We follow the method proposed by Just, Haurin and Schirmer (1982) to overcome the path-dependency problem due to multiple price changes. The areas are:

Results

Short-run elasticities
- Beef: \(-1.38, 10.21\)
- Calf: \(-1.64, 0.57\)

Welfare changes
- Consumers are worse off due to the increase of local beef prices.
- Welfare change for slaughterhouses show the highest cost from all sectors in the supply chain.
- Producer (feeders) are better off as they serve both slaughterhouses and meat processing plants.

Conclusions
- The structural change observed in Paraguay given the unprecedented increase in beef exports conveyed changes in welfare at all levels in the beef supply chain.
- Only cattle producers (feeders) show a positive welfare change while consumers, slaughterhouses and calf producers experienced a negative welfare change. Cattle producers' (feeders) positive change is large and exceed all other sectors' negative change, yielding an overall positive change for the beef supply chain.

Selected References

Acknowledgments
- This research was supported by Iglesia Bautista. Institute Economia provided important insight of the markets under study. The Central Bank of Paraguay, Department of National Wealth and the Ministry of Statistics kindly provided much of the data.