USDA
United States Department of Agriculture

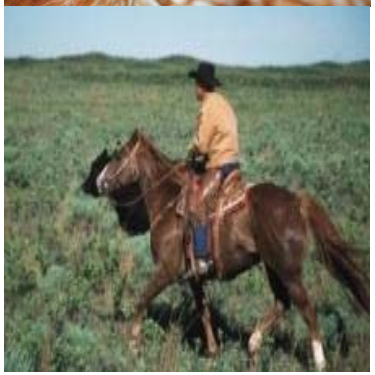


# Economic Implications of a Foot and Mouth Disease Free Latin American Beef Sector

*Countryman, A.M. and A.D. Hagerman. 2017. Forthcoming in Agribusiness: An International Journal.*

Amy Hagerman
Agricultural Economist
U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Veterinary Services
4/4/17





# Contribution

- The contribution of this research is to:
  - Examine economics implications of eradication of FMD, from a continental response perspective
    - Focus on Latin America in a year in which multiple countries experienced FMD.
  - Identify sources of economic risk exposure from animal diseases for these countries through domestic and international price and quantity responses.
  - Identify possible changes in interregional trade flows as a result of production responses and maintaining disease free status.

USDA
United States Department of Agriculture

# Economics of Foot-and-Mouth Disease (FMD)

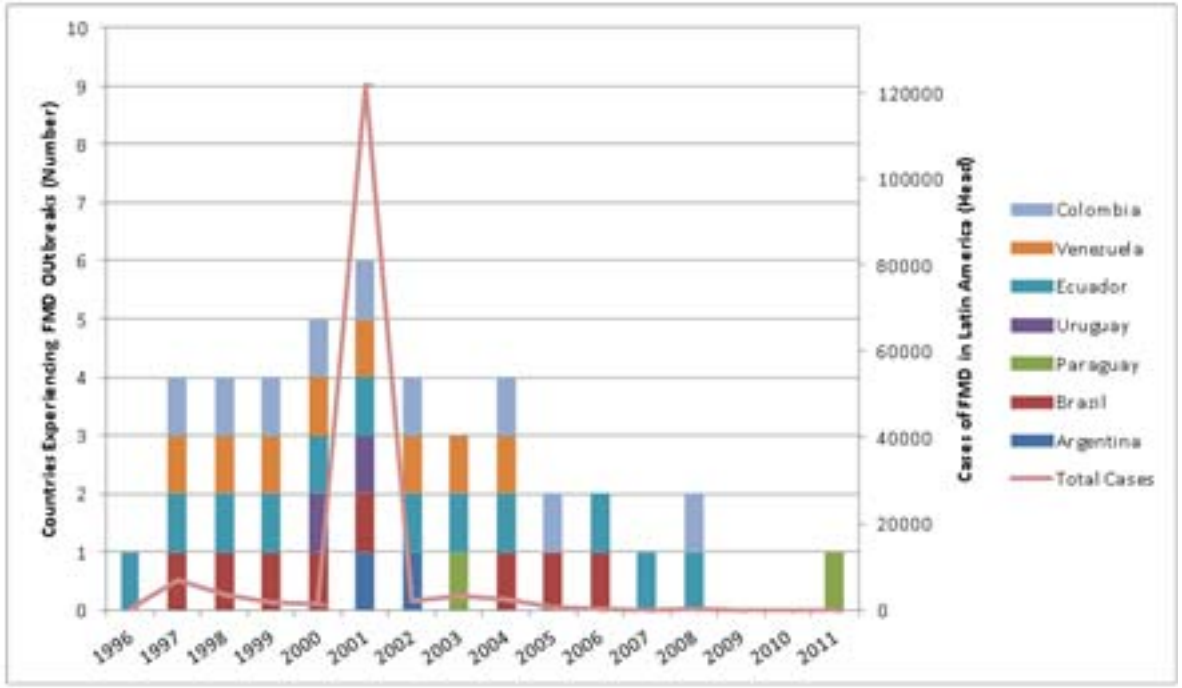
- Animal disease is a societal problem
  (Keith Howe, ISESSAH 2017)
- Highly Contagious
- Strict trade restrictions on the world market
- Historically costs of outbreaks are quite large
  - Production Losses
  - Costs of Response
  - Trade Losses

# Latin America FMD Profile (1)

- Proximity to Pacific Rim countries
- In 2016, four LA countries were among the top 10 beef and veal exporters in the world.(USDA-FAS)
- Brazil was number 1 exporter of beef and the number 3 exporter of pork in 2016.(USDA-FAS)
- Technical capability for eradication.
- Political desirability.

# Latin America FMD Profile (2)

- Free of FMD in commercial production
- Intermittent outbreaks in FMD-free areas
  - Peaked in 2001, 6 countries with more than 120K cases of FMD total



# Methodology (1)

- Many studies focus on disease eradication cost (e.g., McCauley et al., 1979).
- We focus on the changes in domestic and international prices, as well as trade effects of FMD in a multi-country framework.
- Utilize historical data accounting for production losses in Latin America in tandem with a computable general equilibrium model to understand what the economic effects would have been, had FMD outbreaks in the early 2000s been prevented.
- Motivation for using differences from observed outbreak is to determine:

  (1) how much FMD presence in Latin America distorted world beef prices in an environment that controls for other events impacting world meat markets

  (2) how well a modeling framework such as this can be used to assess the value of FMD eradication in a region that may significantly impact the world beef market.

USDA
United States Department of Agriculture

# Methodology (2)

*Beef Production Shock (%)*
*ΔS to S'*

Death from FMD ($)[a]
+Depopulated ($)[a]
+Productivity Loss ($)[b]

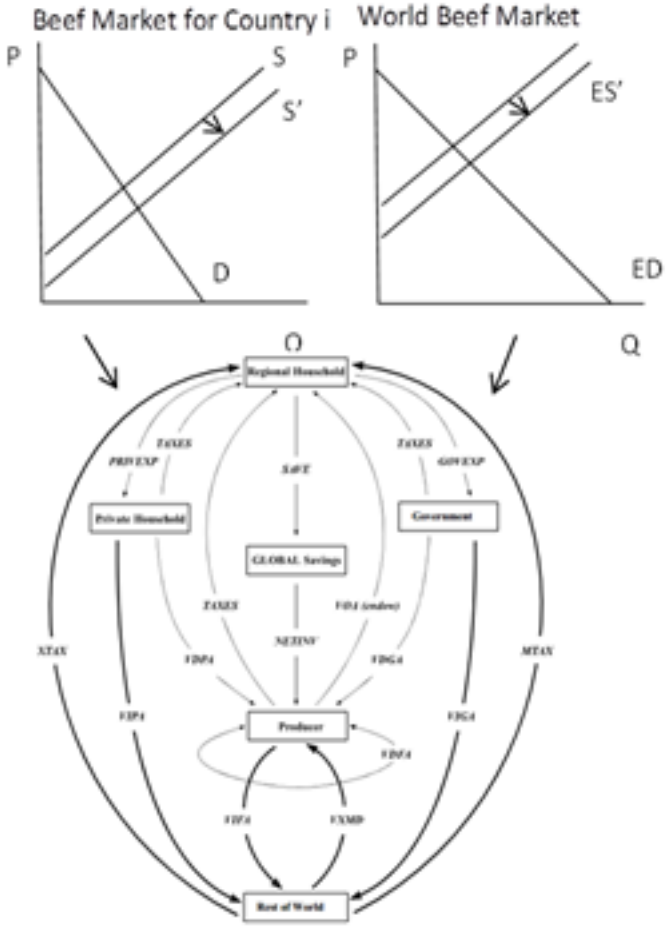
Country Value of
Beef Production Lost($)[c]

*Beef Export Enhancement Shock (%)*
*Δ ES to ES'*

Latin American Exports ($)
+Export Loss from FMD ($)[d]

Beef Trade Without FMD($)

*GTAP Framework*[e]



# Data

- GTAP 6 Database (Dimaranan, B., Ed. 2006)
  - 2001 base year corresponds with major FMD outbreaks
- World Animal Health Information Database (WAHID) archives (HandistatusII) for infections, deaths, slaughter and vaccination
- Translated into a percentage of national value of beef production lost due to FMD.
- Small (0.0001% for Colombia to almost 4% Uruguay)
- Limitation: These estimates could have been impacted by immunity in livestock population, underreporting, or the assumptions used to translate head of cattle into pounds of beef for export.

USDA United States Department of Agriculture

# Results from Production Responses

## ARGENTINA

- Domestic price declines
  - Very small, 0.05%
- Export quantity increases 4.13%

## URUGUAY

- Largest impacts resulting from the largest proportion of depopulation.
- Domestic price decline of 2.13%
- Export quantity increases 22.49%

## BRAZIL

- Domestic price declines
  - Small, 0.29%
- Export quantity and value increases
  - Quantity 6.11%

## COLOMBIA & VENEZUELA

- No significant change in domestic price.
- Slight increase in exports
  - 3.47% and 3.89% respectively

USDA United States Department of Agriculture

# Changes in Regional Bilateral Latin American Beef Exports (percentage points)

| | Exporting Regions | | | | | |
|---|---|---|---|---|---|---|
| **Importing Regions** | Argentina | Brazil | Uruguay | Venezuela | Colombia | Rest of Latin America |
| **Colombia** | 5.17 | 7.22 | 25.54 | 4.12 | 4.50 | -0.24 |
| **Venezuela** | 3.81 | 5.74 | 22.86 | 2.77 | 3.14 | -1.54 |
| **Argentina** | -1.21 | 0.65 | 17.13 | -2.22 | -1.87 | -6.32 |
| **Brazil** | -1.40 | 0.59 | 16.91 | -2.39 | -2.03 | -6.48 |
| **Uruguay** | -3.67 | -1.85 | 15.31 | -4.64 | -4.30 | -8.64 |

Important to keep in mind the relative export volumes of these countries! A small percentage change in Brazil can be large in real export volume.

# Results from Production Responses

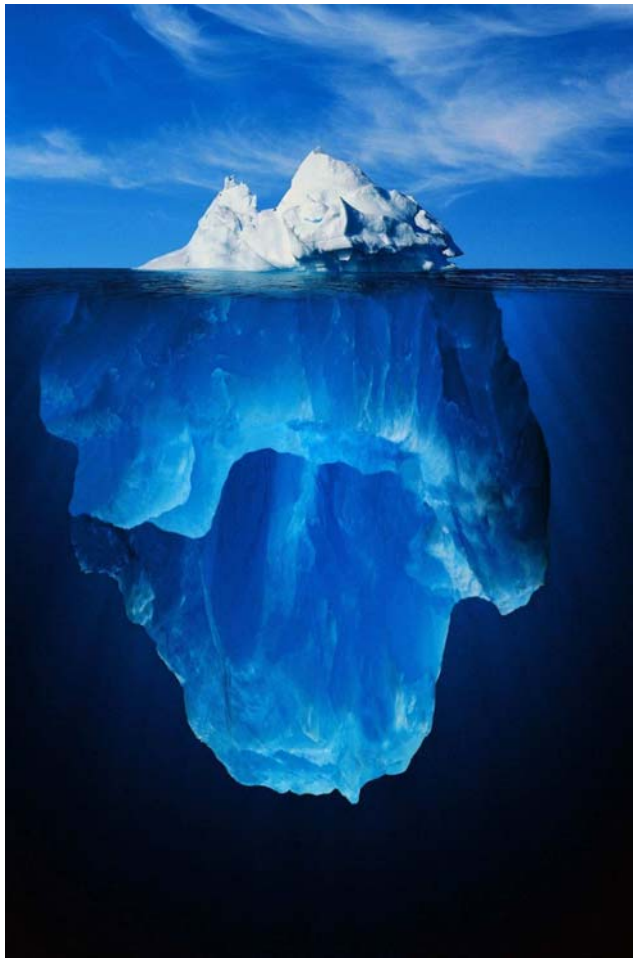
- Beef prices decline
- Increased opportunities to trade for Argentina, Brazil and Uruguay
- World beef price declines (0.03%) due to increased Latin American beef exports to the world (0.17%)
- Uruguay showed the most benefit from simultaneous eradication in 2001 of FMD
  - Uruguay increasing exports, particularly to other Latin American countries.
- Examine this more closely, looked at changes in bilateral beef exports

# Conclusions from Production Responses

- Understanding the impacts of FMD on interregional trade flows, particularly with close trading partners, is an important extension in assessing the vulnerability of FMD resurgence in Latin America.
- Response program selection in 2001 focused on vaccination and movement restrictions, as a result production losses were relatively small.
- If FMD could have been prevented in 2001, domestic prices may have declined everywhere but Colombia.
- Uruguay in particular may have benefited from increased exports.

# Back to the big picture

- Regional relationships and bilateral trade partnerships are crucial not only to collaborative response, but also to economic recovery.
- Vaccination and its role in trade recovery should be examined more extensively.
- Beyond economics, other branches of social sciences have much to offer on understanding farmer behavior and incentives for cooperation.
- **Much analytical work still needs to be done!**



# Questions?