A Multi-Step Evaluation of the Economic Effects of USDA's 1996 HACCP Regulation on Meat and Poultry Plants

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Presented by

Mary Muth
Shawn Karns

P.O. Box 12194 · 3040 Cornwallis Road · Research Triangle Park, NC 27709
Phone: 919-541-7289 · Fax: 919-541-6683 · muth@rti.org · www.rti.org

Overall Study Background

- FSIS was required to conduct an ex-post evaluation of the PR/HACCP regulation as stated in the final rule
- Areas covered in the broader study:
  - Foodborne illness reduction due to PR/HACCP
  - Inspection effectiveness and efficiency
  - **Domestic and international economic effects**
  - Consumer confidence in food safety
  - Animal and egg food safety production practices
- Studies were completed in October 2002 and RTI and FSIS staff briefed Garry McKee, Administrator of FSIS, on the study findings

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Domestic & International Economic Effects: Study Questions

Effects of PR/HACCP on:

- **Productivity** in U.S. meat and poultry plants
- **Rates of entry & exit** of meat and poultry plants
- **Factors affecting exit** of meat and poultry plants
- U.S. **exports** of meat and poultry
- U.S. **imports** of meat and poultry
- **Worldwide adoption** of PR and HACCP systems

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PR/HACCP Implementation Schedule

Date	Affected Plants	Requirements
January 1997	All plants	■ Sanitation standard operating procedures (SSOPs) ■ Generic *E. coli* carcass testing
January 1998	Large Plants (>500 employees)	■ HACCP ■ *Salmonella* testing on some raw products
January 1999	Small plants (10-500 employees)	■ HACCP ■ *Salmonella* testing on some raw products
January 2000	Very small plants (<10 employees & $2.5 million in annual sales)	■ HACCP ■ *Salmonella* testing on some raw products

Effect of PR/HACCP on Plant Productivity

- Purpose: Describe the effects of PR/HACCP on costs, revenues, and other productivity-related changes
- Methodology: 27 structured interviews with plant managers (9), FSIS district managers (5), university extension (6), trade associations (4), FSIS Technical Service Center staff (3)
- Key findings published in *Choices*, Summer 2002

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Key Findings: Productivity Effects

- Larger plants have made more changes in response to PR/HACCP than smaller plants
- Most changes made to address microbial (rather than physical or chemical) hazards
- Plants have many changes increasing costs of production to improve food safety
  - Installed new capital equipment
  - Increased staff for food safety activities
  - Increased training for employees
  - Increased voluntary pathogen testing
- Many plants perceive PR/HACCP to have had positive effects on their operations

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Effect of PR/HACCP on Plant Entry and Exit Rates

- Purpose: Examine changes in rates of plant entry and exit before, during, and after implementation of PR/HACCP
- Methodology: Calculation and statistical testing of changes in rates using data from the Enhanced Facilities Database (EFD)
- Findings for the implementation period published in *Journal of Agricultural & Food Industrial Organization*, 2003

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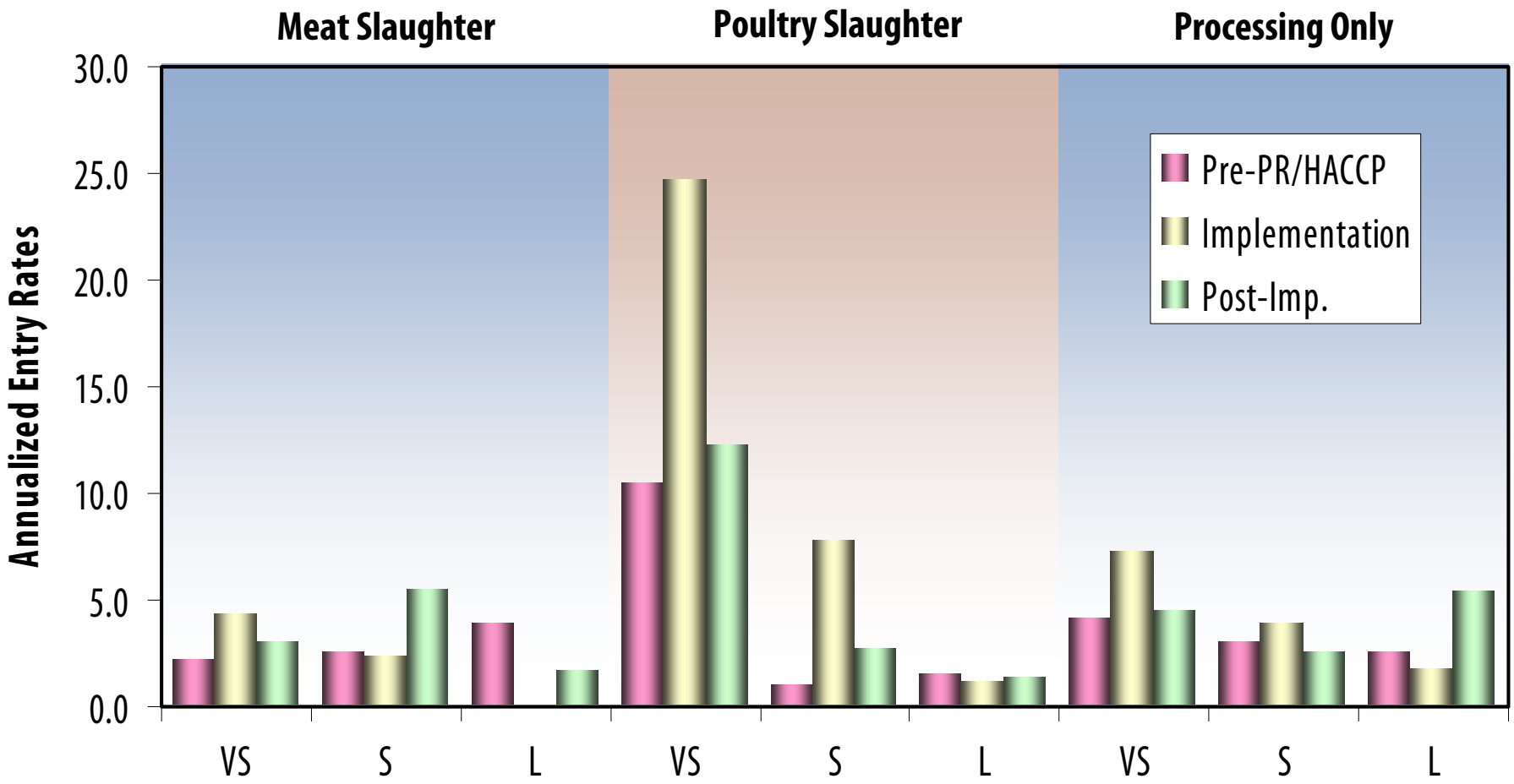
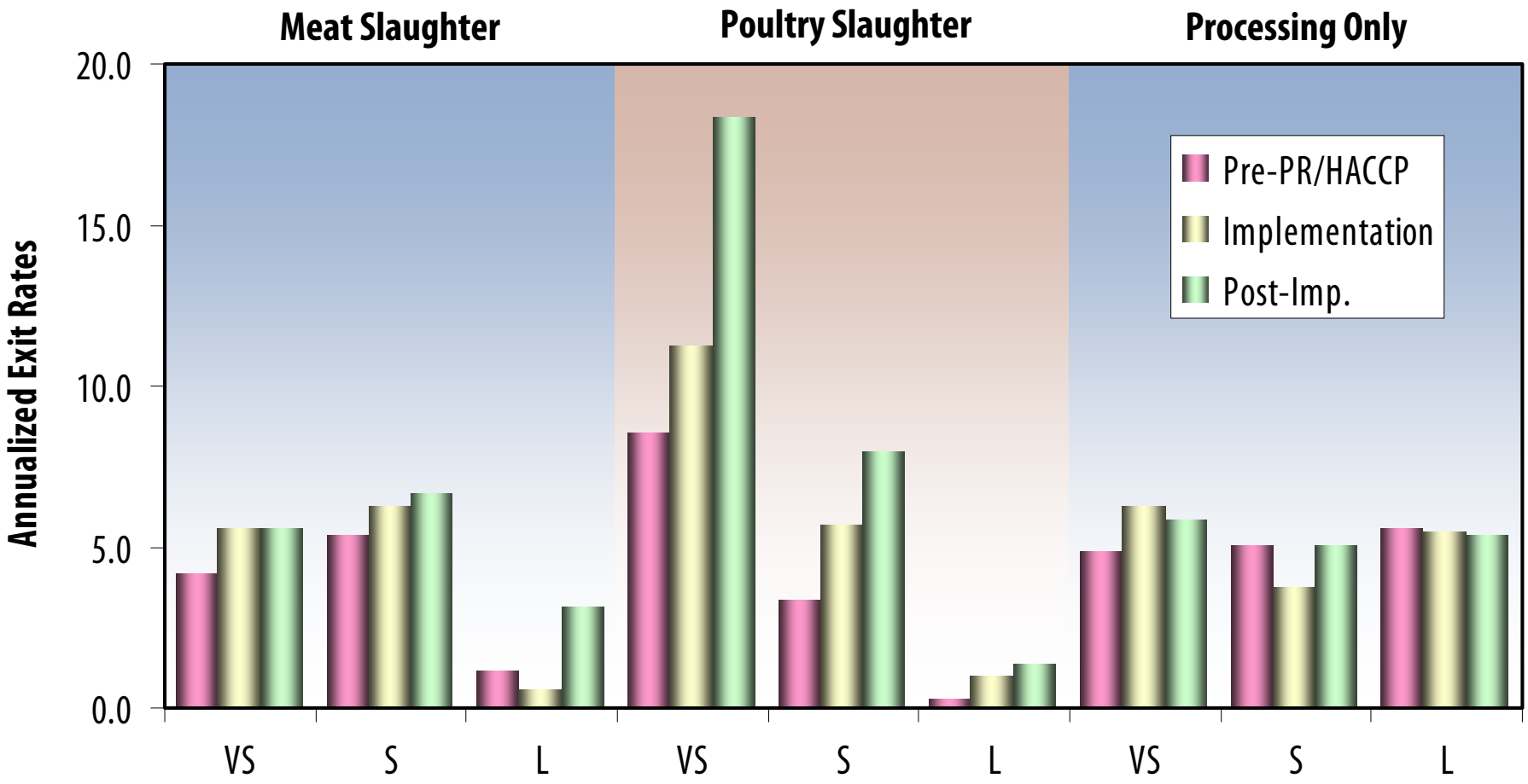
Key Findings: Rates of Entry



VS = Very Small, S = Small, L = Large.

Key Findings: Rates of Exit



VS = Very Small, S = Small, L = Large.

Effect of PR/HACCP on Plant Exit Factors

- Purpose: Determine which factors explain the probability of exit over time and whether the probability of exit changed because of PR/HACCP
- Methodology: Estimate probit models using cross-section data sets (1993, 1996, early 2000, early 2002) with binary dependent variable indicating whether plant closed
- Results for implementation period published in *JARE*, 2002, and *JAFIO*, 2003
- New results using panel data set not yet published

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Key Results: Probit Models of Plant Exit (I)

Plant Size and Type	Implementation vs. Pre-PR/HACCP	Post-implementation vs. Pre-PR/HACCP
Meat Slaughter Plants		
Very Small	Increased 8.9% (p=0.03)	NS
Small	Increased 7.2% (p=0.04)	NS
Large	NS	NS
Poultry Slaughter Plants		
Very Small	NS	Increased 9.4% (p=0.06)
Small	Increased 5.8% (p=0.06)	Increased 5.6% (p=0.04)
Large	NS	NS

NS = not statistically significant at the 10 percent level.

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Key Results: Probit Models of Plant Exit (II)

Variables	Effect on Exit
Meat Slaughter Plants	
Plant age	Each additional year of age decreases the probability of exit until 32 years of age
Slaughter volume	Each additional million head slaughtered decreases the probability of exit up to 5.4 million head
Cattle species	Plants that slaughter cattle have a lower probability of exit
Regional competitiveness	Smaller plants in regions with higher market concentration have a higher probability of exit
Cattle prices	Plants in states with higher live cattle prices have a higher probability of exit
Poultry Slaughter Plants	
Slaughter volume	Each additional million birds slaughtered decreases the probability of exit up to 72 million birds
Turkey species	Plants that slaughter turkeys have a lower probability of exit
Wage rates	Plants in states with higher wage rates have a lower probability of exit

Note: Only statistically significant variables are listed.

Effects of PR/HACCP on International Trade

- Purpose: Examine whether PR/HACCP affected meat and poultry imports and exports and adoption of PR and/or HACCP worldwide
- Methodologies:
  - Analysis of meat and poultry trade data from the International Trade Commission
  - Interviews with trade associations, importers, and International Policy and Technical Service Center staff
  - Review of equivalency documents
  - Analysis of results from survey of international trade authorities

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Key Findings: International Trade

- International trade in meat and poultry is volatile thus difficult to identify clear effect of PR/HACCP
- Because of PR/HACCP, fewer countries are authorized to export meat and poultry to the U.S., but negligible effect on import volumes
  - Note: Countries must have equivalent PR and HACCP systems in place to export to the U.S.
- PR/HACCP has not really affected exports—U.S. products were already considered to be high quality.
- Many other countries are adopting PR and/or HACCP requirements even if they are not exporting to the U.S.

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Final evaluation briefing papers to be posted at:

http://www.fsis.usda.gov/OPPDE/ peis/FinReps.htm

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