

# Determinants of Export Duration

## A Survival Analysis of Livestock Product Imports into the United States

Hanifi Otgun, Elliott Dennis

University of Nebraska–Lincoln

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## Motivation and Background

- ▶ International trade relationships are highly dynamic, with frequent entry and exit.
- ▶ Trade theory emphasizes export entry, often assuming no additional costs to remain.
- ▶ Empirical evidence shows many trade relationships fail quickly.
- ▶ Median export duration is often only one year in disaggregated data.

**Key question:** What determines export survival of livestock products in the US?

# Literature

- ▶ Key contributions in agri-food trade:
  - ▶ Peterson et al. AJAE 2018: SPS regulations and export duration
  - ▶ Engemann et al. JAE 2022: Institutional quality and trade survival
  - ▶ Zongo et al. AJAE 2022: Export duration puzzles and tariffs
- ▶ Trade costs, uncertainty, and regulation play central roles in export survival.

## Why Livestock Products?

- ▶ Livestock products face stringent food safety and regulatory requirements.
- ▶ Compliance with SPS and MRL regulations is destination-specific and costly.
- ▶ The U.S. livestock market is large, lucrative, and highly regulated.
- ▶ Survival is a critical outcome for exporters.

## Modeling Approach

- ▶ We use the Hess and Persson (2012) approach to discrete-time duration model to estimate the impact of specific trade costs on trade spells (uninterrupted time periods) in bilateral trade.
- ▶ Hazard rate:

$$\text{Hazard rate} = \Pr(\text{exit in } t + 1 \mid \text{active in } t)$$

## Modeling Approach

- ▶ Let  $T_i$  denote the survival time of a trade relationship.
- ▶ Define discrete time intervals  $[t_1, t_2, t_3, \dots, t_n]$
- ▶ We look at the conditional probability of ending during period  $t + 1$ , conditioned on being alive at the beginning of time  $t$ :

$$\begin{aligned}h_{it} &= P(T_i < t_{t+1} | T_i > t_t, x_{it}) \\ &= G(x'_{it}\beta + \gamma_t)\end{aligned}\tag{1}$$

- ▶ This is the discrete-time hazard rate  $h_{it}$  determined by covariates  $x_{it}$

## Modeling Approach

$$y_{it} = \begin{cases} 1 & \text{if spell ends during } t \\ 0 & \text{otherwise} \end{cases}$$

- ▶ Binary panel regression log-likelihood function is:

$$\mathcal{L} = \sum_i \sum_t [y_{it} \ln(h_{it}) + (1 - y_{it}) \ln(1 - h_{it})] \quad (2)$$

- ▶ Hazard function  $h$  can be assumed normal, logistic, or extreme value function to get probit, logit or complementary log-log estimator

## Model Covariates

$$y_{okt} = f(S_{okt}, D_{okt}, S_{kt}^{US}, D_{kt}^{US}, TC_{okt}, EXP_{okt}, MC_{ot})$$

- ▶  $TC_{okt}$ : distance, tariffs, FTAs, SPS/MRL measures
- ▶  $EXP_{okt}$ : spell duration and re-entry experience
- ▶  $MC_{ot}$ : GDP and exchange rate conditions
- ▶ **Next step:** Define final empirical specification, estimate using probit, logit and complementary log-log with year and product fixed effects.

*Thank You*