

The Effects of the Chinese Ban on Brazilian Beef Exports

Margarida Aguiar
University of Nebraska-Lincoln

International Agricultural Trade Research Consortium (IATRC 2025),
Tysons, Virginia, USA.



Outline

- 1 Objective
- 2 Equilibrium Displacement Model
- 3 Changes in Endogeneous Variables
- 4 Changes in Cattle Producer Surplus
- 5 Conclusions



Objective

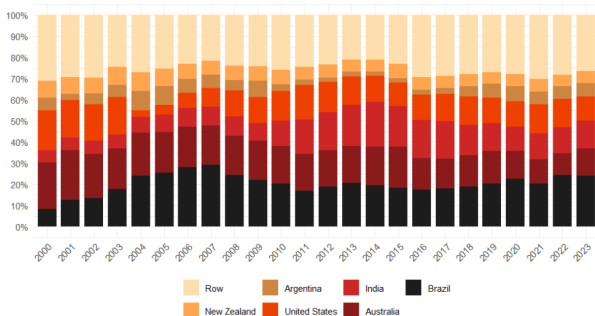


Brazilian Beef Production

Brazil is the world's second-largest beef producer, expected to produce a total of 11.5 million metric tons (USDA-FAS, 2026).

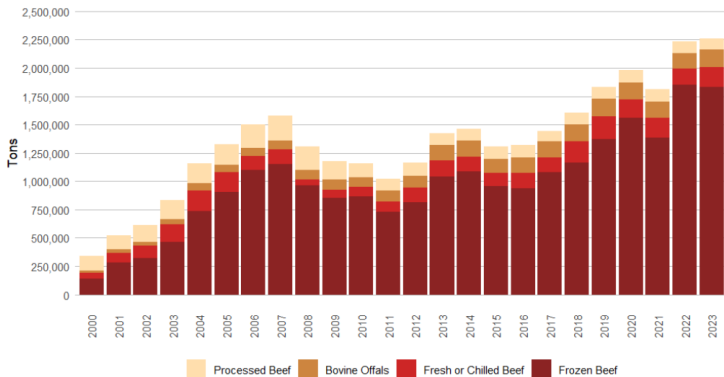
Brazil is the largest beef exporter in the world, 28 percent of all beef exports globally.

Figure 1: Share of Beef Exports, 2000-2023



Brazilian Beef Exports

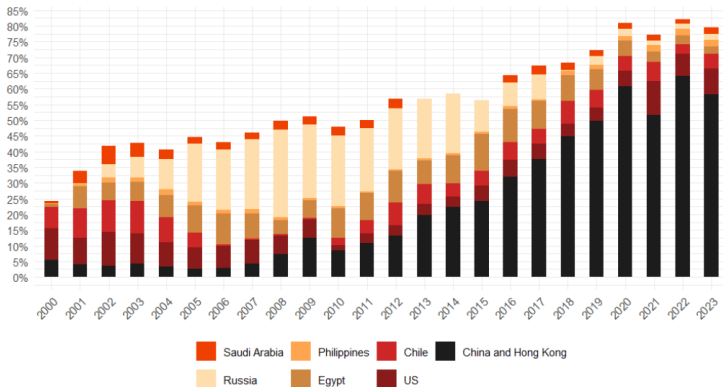
Figure 2: Brazilian Beef Exports (Tons), 2000-2023



Source: MDIC (2024)

Brazil and China

Figure 3: Share of Brazilian Beef Exports by Country (US\$), 2000-2023



Source: MDIC (2024)

Mad Cow Outbreaks

Bilateral Agreement (2015): It stipulates that Brazilian beef exports must be voluntarily suspended in the event of a confirmed case of Bovine Spongiform Encephalopathy (BSE), also known as mad cow disease (CEPEA, 2021).

Objective

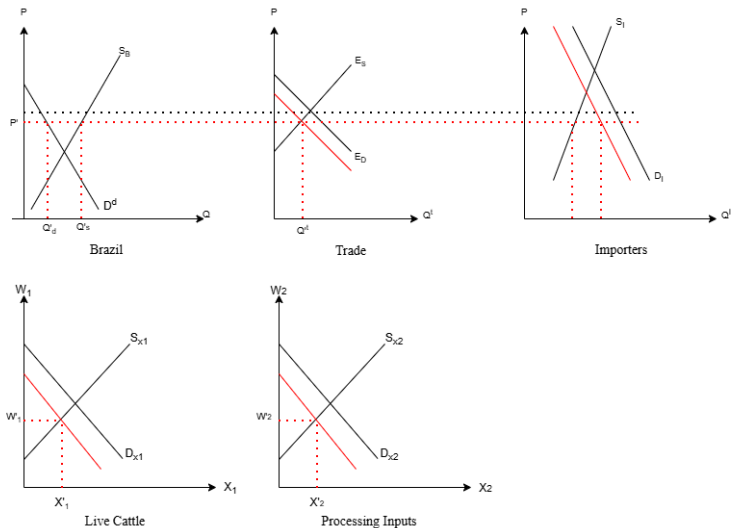
This study aims to analyze the impact of trade restrictions imposed by China, the world's largest beef importer, on Brazilian beef exports, the largest beef exporter.



Equilibrium Displacement Model



Framework



Equilibrium Displacement Model

The equilibrium displacement model is characterized by the following system of equations:

$$\text{Export demand: } E(q^E) = \eta^E E(p)$$

$$\text{Inverse supply: } E(p) = K_1 E(w_1) + K_2 E(w_2)$$

$$\text{Input demand (input 1): } E(x_1) = E(q^S) + K_1 \sigma_{11} E(w_1) + K_2 \sigma_{12} E(w_2)$$

$$\text{Input demand (input 2): } E(x_2) = E(q^S) + K_1 \sigma_{21} E(w_1) + K_2 \sigma_{22} E(w_2)$$

$$\text{Input supply (input 1): } E(x_1) = \epsilon_1 E(w_1)$$

$$\text{Input supply (input 2): } E(x_2) = \epsilon_2 E(w_2)$$

$$\text{Output supply aggregation: } E(q^S) = R_D E(q^D) + R_E E(q^E)$$



Equilibrium Displacement Model

The system of equations can be represented in linear algebra as:

$$Ay = b \quad (1)$$

where A is a 8×8 matrix of parameters, y is a 8×1 vector of endogenous variables, and b is a 8×1 vector of exogenous shocks.

The endogenous responses to exogenous shocks can be obtained by:

$$y = A^{-1}b \quad (2)$$



Parameterizing matrix A

Table 1: Elasticity and Cost Share Parameters

Variable	Description	Value	Source
η^D	Own-price elasticity of demand for domestic beef	-0.986	Coelho, Aguiar and Eales (2010)
η^E	Own-price elasticity for beef exports	-4.76	Hejazi et al. (2019)
K_1	Live cattle cost share	0.85	JBS (2023)
$\sigma_{12} = \sigma_{21}$	Elasticity of substitution between inputs	0.72	Wohlgenant (1989)
ϵ_1	Own-price elasticity of supply of live cattle	0.22	Barrozo (2023)
ϵ_2	Own-price elasticity of supply of all other processing inputs	1	Assumed
R_E	Proportional quantity weight of Brazilian beef exports	0.2	USDA-FASb (2024)
R_D	Proportional quantity weight of domestic consumption	0.8	USDA-FASb (2024)

Changes in Endogeneous Variables



Changes in Endogenous Variables

Table 2: Percentage change in endogenous variables under alternative scenarios

Variable	Scenario I 50% reduction in Q^E	Scenario II 50% reduction Q^E + 5% reduction in Q^D
Beef price $E(p)$	-5.2%	-7.2%
Domestic beef demand $E(q^D)$	5.1%	2.1%
Foreign beef demand $E(q^E)$	-26.3%	-16.8%
Brazilian beef production $E(q^S)$	-1.2%	-1.7%
Live cattle production $E(x_1)$	-1.2%	-1.7%
Live cattle price $E(w_1)$	-5.6%	-7.8%



Changes in Cattle Producer Surplus



Changes in Producer Surplus

Table 3: Value at Calibration

Variable	Description	Value	Source
$X_1 \times W_1$	Total farm revenue	31,925.5 million US\$	CEPEA (2024), IBGE (2024)

Δ Cattle Producer Surplus:

$$\Delta PS_{x_1} = E(w_1) \left(1 + \frac{1}{2} E(x_1) \right) w_1 x_1 \quad (3)$$

Table 4: Change in producer surplus for live cattle producers

Scenario	ΔPS_{x_1} (million US\$)
Scenario I	-1,777.1 (-5.57%)
Scenario II	-2,469.0 (-7.73%)

Conclusions



Conclusions

- Domestic demand increases but does not offset export losses.
- Live cattle prices drive most of the producer surplus decline.
- Producer surplus falls by **5.6%–7.7%** across scenarios.



Thank You!

Questions and/or suggestions?

