The Political Economy of Export Bans
and
Commodity Price Volatility:
Theory and Evidence from Agricultural Markets

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Disclaimers

Adjemian and Robe are part-time consultants to the U.S. Commodity Futures Trading Commission (CFTC). No CFTC resource or proprietary information was used for this project. **All opinions, findings, conclusions, or recommendations expressed in this presentation are those of the authors**. They do not necessarily reflect the views of the ERS, the USDA, the CFTC, the leadership teams of (or other staff at) all those institutions, or the U.S. Government.

Motivation 1

USDA United States Department of Agriculture
Foreign Agricultural Service

GAIN Global Agricultural Information Network

Voluntary Report – Voluntary - Public Distribution **Date:** May 19, 2022

Report Number: IN2022-0046

Report Name: India Bans Wheat Exports Due to Domestic Supply Concerns

Country: India

Post: New Delhi

Report Category: Grain and Feed, Agriculture in the News, Trade Policy Monitoring

Report Highlights:

On Friday, May 13, 2022, the Indian government announced a ban on wheat exports, effective immediately, citing the sudden spike in global wheat prices and the resulting food security risks to India.

Motivation 2

Prices slide as India unwinds ban on rice exports

New Delhi seeks to boost agriculture and food sales to increase earnings

A worker holds rice at a warehouse in Mumbai, India © Dhiraj Singh/Bloomberg

Andres Schipani in New Delhi, **Susannah Savage** in London and **Humza Jilani** in Islamabad

Published MAR 24 2025

India started cracking down on rice exports in 2022 amid fears of a shortfall as prices rose in the aftermath of Russia's full-scale invasion of Ukraine. Those restrictions triggered panic-buying in Asia and North America and sent the Asian benchmark rice price to its highest level since 2008.

India began easing export restrictions in September. New Delhi, which exported 14mn tonnes of rice in 2023, is expected to export a record 21.5mn metric tonnes of rice between September 2024 and October 2025, according to S&P Global.

Motivation 3

Trade Restrictions on Food Exports Due to the Coronavirus Pandemic

By Reuters

April 3, 2020

PARIS — Here is a list of countries that have applied or are considering trade restrictions on food or agricultural products due to the spread of the novel coronavirus around the world.

EURASIA

The Eurasian commission, which unites the customs zone of Russia and Kazakhstan, has decided to restrict exports of sunseeds,

Motivation

- In periods of "stress", governments may restrict staple food exports to protect domestic consumers
- However, domestic legal restrictions in turn affect world supply

$\rightarrow$ Do markets respond to politics affecting global food supplies?

Our Findings in a Nutshell

- Simple **theoretical model** of how a large producer country's staple-food export laws affects world price uncertainty.

  $\rightarrow$ We show that:
  - Before ban: market uncertainty increases with the perceived risk of a ban based on key exporters' political situation
  - Amid ban: world price uncertainty goes up *(WHY?)*

- **Empirical evidence** consistent with the model:
  - Statistically and economically significant link between export restrictions and forward-looking (option-implied) price volatility

- **Unique high-frequency dataset** of grain and oilseed export restrictions around the world, 2002-2019

Intuition: Simple Theoretical Model

- Stylized model of staple markets *(no transformation sector)*
- Weather shock boosts food prices *(pandemic? war?)*
- Single government ("Country") *vs.* other countries ("RoW")

1. **Planting**: maximum possible production level is determined
2. Exogenous shocks (Country & RoW **output shocks**) determine the actual harvest level
   - *Tractability: assume uncorrelated exogenous shocks*
3. Country observes shock then sets **export policies**:
   - "All or nothing" *(either free trade or full export ban)*
   - Politics: interests of food producers *vs.* consumers
   - Dominoes / "beggar thy neighbor": Does RoW consider bans?
4. Harvests and **international trade** occur

Model 2: Output Shock & Volatility under Free Trade

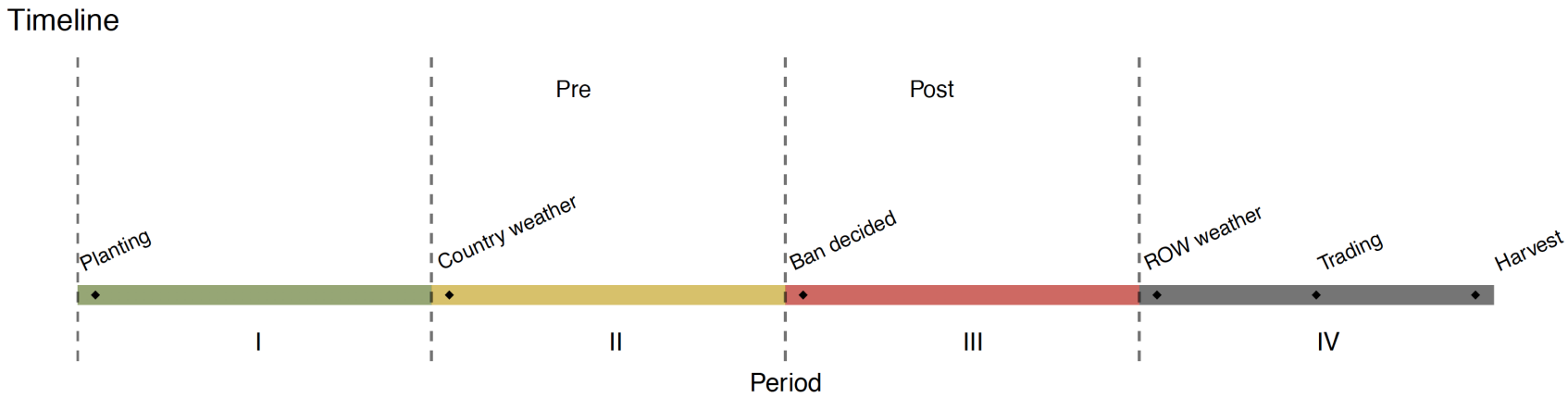


Figure: Model Timeline

Low period-2 inventories boosts period-2/3 uncertainty *(world price volatility expectations)*

- Intuition: relative importance of current-crop shocks goes up

Model 3: Trade Policy & Volatility/Uncertainty

Period 3: Export ban disconnects food prices in Country & ROW

- ROW price & uncertainty rise *post* ban *(relative to free trade)*
  - *Intuition:* **world supply is restricted further**
    $\rightarrow$ **concentration of supply available to ROW increases**
    $\rightarrow$ **volatility expectations rise**
  - This effect dominates the resolution of policy uncertainty

- The extra uncertainty depends on:
  - Price elasticity of world demand
  - Country share of world output
  - Commodity inventories

Model 4: Politics

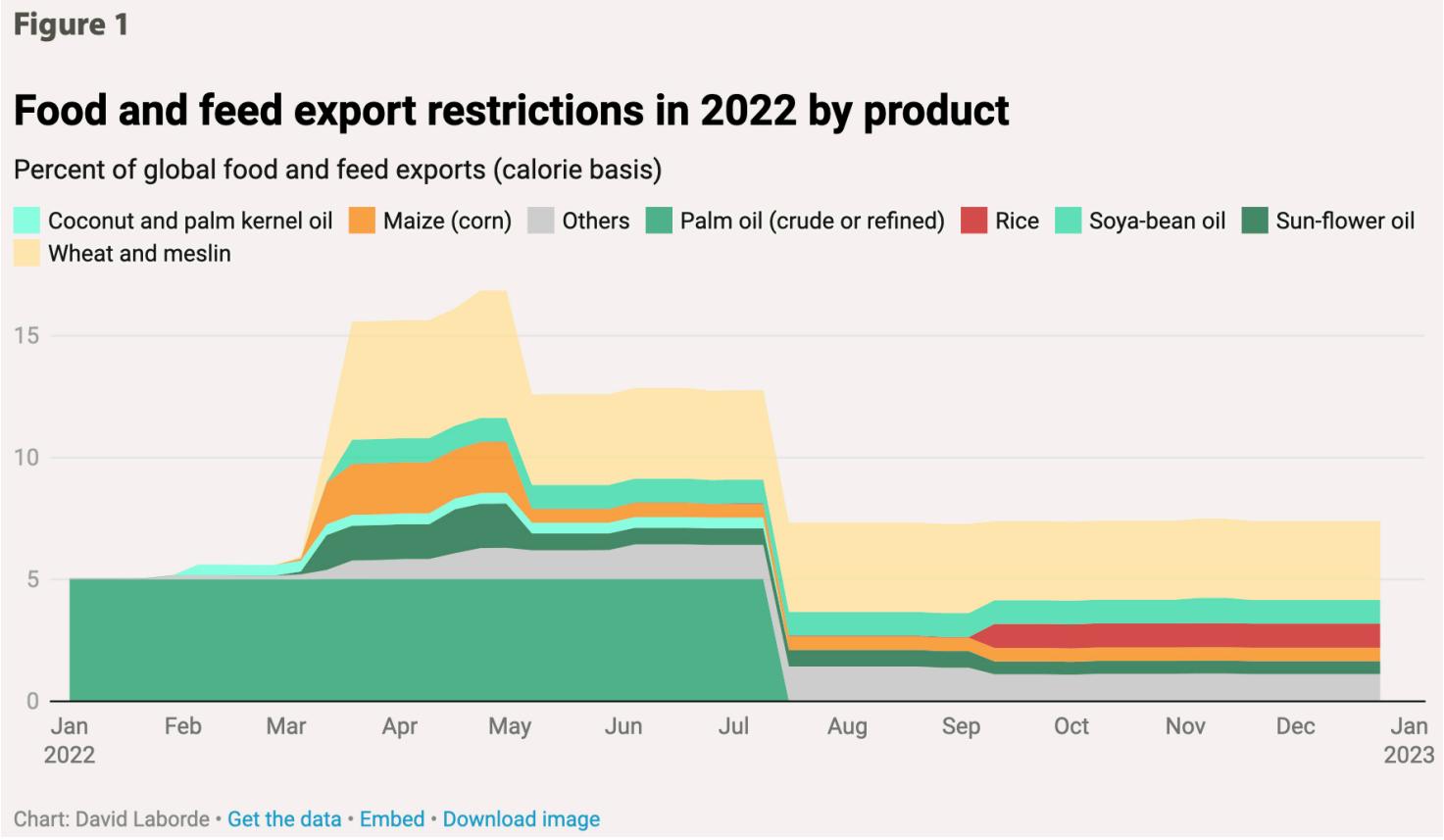
- **Period 2:** if market assigns probability β to a ban after a bad shock, then world price volatility/uncertainty increases with β
- **Question:** What factors correlate with **ban probability** β?
- **Answer:** Price and politics
  - Grossman-Helpman lobbying competition (2 constituencies)
  - We show $\exists$ world price level P^* above which the Country's government always imposes a ban
    - P^* depends on gvt concern for consumer *vs.* producer welfare
  - The Country's government knows P^* with certainty, but the market can only guesstimate P^* (based on Country's politics)
- We show that β **is increasing in the pre-ban world price** P

Simple Model is Robust: Domino Effects

- So far:
  - Single government ("Country") *vs.* other countries ("RoW")
  - ROW does not react to Country's export ban
- Should Country worry about the possibility of **retaliation**?
  No: Country has already insulated its domestic market
  $\rightarrow$ does not matter if ROW risk is exogenous or political
- Is there a possibility of a **domino effect**?
  Yes! Think of the Country as the gvt with the lowest P^*
  $\rightarrow$ as the Country imposes the ban, world prices rise
  $\rightarrow$ another government in the ROW may hit its own P^*

  but "domino" simply reinforces the effect of the first ban
  $\rightarrow$ 2^{nd} country's export ban further concentrates ROW output

Empirics: Which Agricultural Commodities Matter?



→ Focus on wheat and corn (maize) due to relevance & HF data

Empirics: Data

- **LHS**: IVol = Daily option-implied volatilities for near-dated (most liquid) options on commodity futures constructed from CBOT settlement prices, 2002-2019 *(Source: Bloomberg)*

  $\rightarrow$ captures commodity market uncertainty & sentiment

- **RHS**:

  1. **Non-political variables**: Adjemian, Bruno & Robe (2017)
     - VIX *(global demand uncertainty / sentiment)*
     - Cost of carry *(pre-ban market "tightness")*
     - Other controls: Samuelson effect, financial speculation
  2. **Export bans:** hand-collected data

Data: **Novel Dataset** on Export Bans

- Focus: News *(release $\neq$ implementation $\neq$ adoption)*
- Hand-collect daily info restrictive grain export measures:
  - Wheat
  - Corn/maize
  - Soybeans? Rice?
- Criteria: Restrictive quotas, large export duties (40%+), official & unofficial bans (port blockades, licensing refusals,...)
- We also keep track of all news (in English and Russian) about *prospective* export restrictions (rumors, legal challenges,...)
- Sample period: 2002 through 2019 *(pre-COVID)*

How Do we Identify Major Export Bans?

Date	Event	Ban
September 19	Ag Ministry reports that "the price situation on the grain market is favorable for farmers."	0
September 20	State Reserve Committee reportedly buying up grain.	0
September 28	Reported conflict between the Agrarian Policy Ministry and the Justice Ministry on registration of "domestic and export grain contracts." Government spokesperson denies quotas will be introduced, but Cabinet introduces export licensing scheme; in coming days, reports that no licenses are actually granted. At least one source reported this as an "unexpected move."	1

Export Bans & Commodity IVols: Visual Evidence

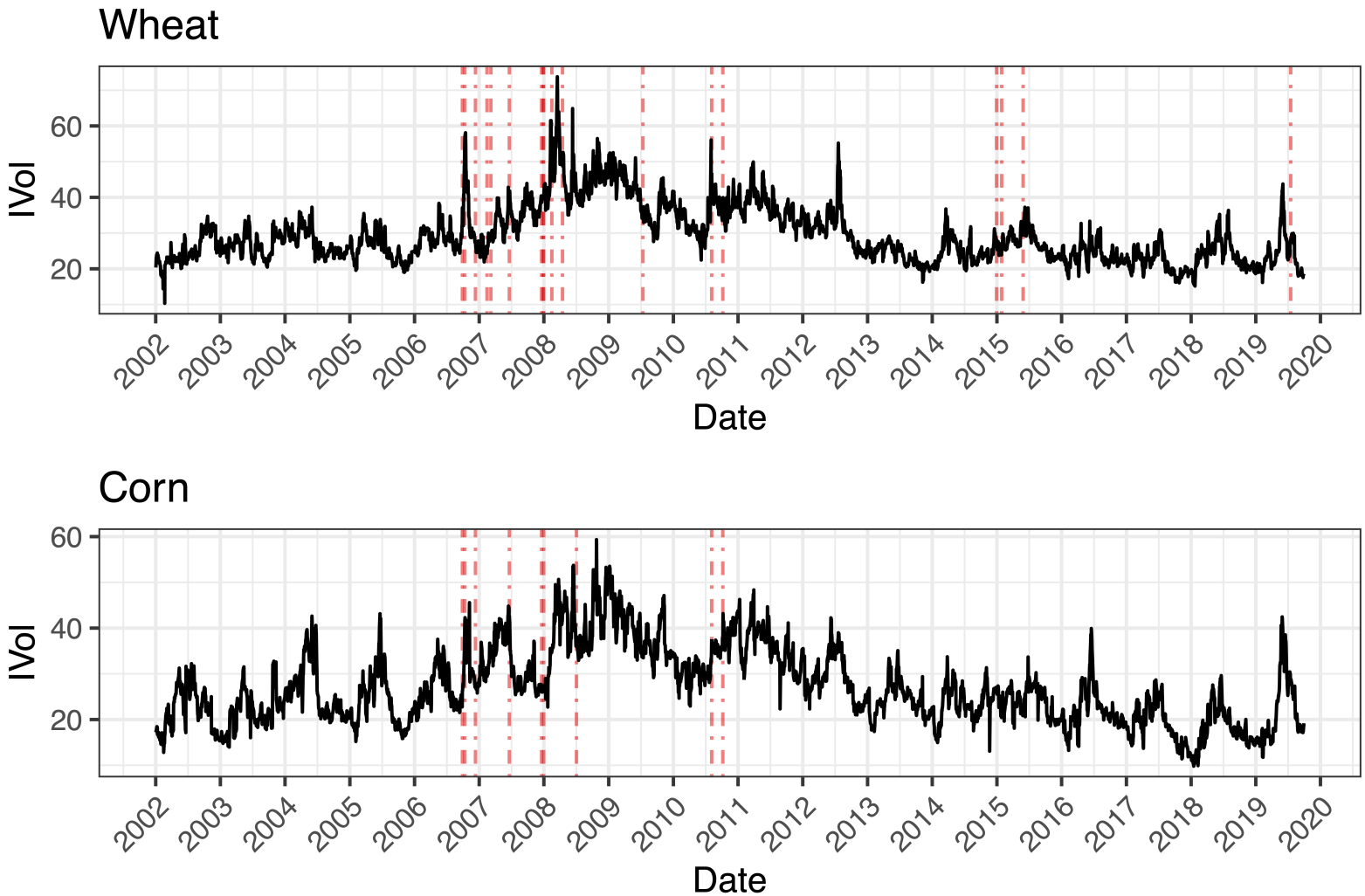


Figure: 5

Empirical Specifications

1. For effect of restriction onset, 0-1 dummy for day the ban starts

$$IVol_i = \alpha + \beta_0 \mathbf{1}restriction_{onset,i} + controls + \epsilon_i$$

2. For effect of restriction duration, 0-1 dummy for all ban days

$$IVol_i = \alpha + \beta_0 \mathbf{1}restriction_{duration,i} + controls + \mathbf{X}\beta + \epsilon_i$$

Controls: VIX, pre-ban market tightness, speculation index, TTM

ROBUST: Daily/weekly, robust SE, production-weighted variables
$\rightarrow$ qualitatively similar results.

Results Overview: Bans Matter!

Implied volatilities are economically and statistically higher on days when export bans are imposed *or* maintained

- *Controlling for exogenous fundamentals*:
  - grain IVols ↑ 1.2-2.2pp on export-ban day
    (= 4-7.5% of sample average)
  - & remain higher while ban in place
- *Big picture*:
  - grain IVols = 2x sample average when ban is first imposed
  - & remain 80% significantly higher while ban is in effect
- Results similar for daily and weekly data
  (weekly, we can control for speculation and US crop progress)

Causality?

- Though we control for exogenous market fundamentals up to the day before the ban, association is not causation
- Could an uncertainty increase across *all* commodities be what's driving the "ban-related" grain IVol jump?

→ we run a **placebo** analysis for coffee, with null results

- Why coffee?
- **Q:** What matters for coffee IVols (Covindassamy *al.*, 2016)?
- **A:** Brazil weather (frosts, droughts), coffee bean inventories

→ *Grain* export bans should not matter in the coffee space

Conclusions

- Implied volatilities are economically and statistically higher on days when export bans are imposed *or* maintained

- Limitations of current approach:

  1. We do not separate effects of initial ban *vs.* **dominoes**
  $\rightarrow$ Not critical *(the bottom line is what matters)*

  2. We do not account for news leakage
     - Don't worry! This **biases against our finding anything**
     $\rightarrow$ early trading may $\downarrow$ magnitude of announcement-day effect
     - However, this unobserved variation could be interesting:
       - when does market react to rumors *vs.* actual announcements?
       - might reveal information about government's credibility (example: Russia *vs.* Ukraine in 2007-2011)

Further Work and Policy Implications

+ First theoretical and empirical investigations of export bans' impact on world commodity price uncertainty

→ **Policy implication 1**: governments partly to blame for pushing up volatility/hedging costs

→ **Policy implication 2**: incentives to trade on ban info is large, monitor for news leakage!

+ Further work:

- **Theory:** add **intermediate goods** export sector
- **Empirics**: news *vs.* implementation?
- **Empirics**: informed trading? → test with regulatory data