Trade and Modern Slavery: Evidence from Local Exports and Labor Inspections in Brazil

Mayara Felix

Princeton / Yale

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Motivation

- **Modern slavery**: “Submission to forced labor or exhausting working hours, subjection to degrading working conditions and restrictions on workers’ mobility.” Entails work without pay. (Art 149 of Brazil’s Criminal Code).
  - Some crops are “dirtier” than others: Some production processes are more amenable to coersion (e.g., over vast land, seasonal, labor intensive, etc.)
  - Some locations are dirtier than others: Low local enforcement capacity.
- Beyond GE effects, **trade affects incidence of modern slavery by reallocating domestic production**.
  - To different crops (e.g., Corn to Soy)
  - Within crops, to different producers/locations (e.g., to more productive land).

This project: Effects of trade on modern slavery

Data

1. Inspections and worker rescues by municipality x year (2003-2019) from Ministry of Labor. Min. driving distances to local enforcement offices from Almeida and Carneiro (2012).
2. Export volumes (kg) and value (USD) by product (HS-4) x origin municipality x destination country x month (2003-2019) from Ministry of Commerce.
3. Farming production by municipality x crop/animal (1974-2019) from PPM and PAM surveys by IBGE.
4. Global prices, top crops + beef, monthly (2003-2019) from St. Louis Fed.

Empirical strategy

This project: Estimate effect of trade on modern slavery

Data

Empirical Strategy

1. Document: a) sectoral and spatial correlation in incidence, production; and exports; b) correlation between cross-muni residual variation in export prices/volumes and local enforcement and worker rescues.
2. [In progress] Estimate effect of price shocks on local exports (first stage) and incidence of modern slavery (reduced form) using:
   - Time-series variation in commodity prices for Brazil's top crops and beef; and/or
   - Changes in destination countries' exchange rates or GDP growth for destination-specific shocks.

Preliminary findings (1/2)

Highest incidence of modern slavery is in **farming-intensive municipalities**.

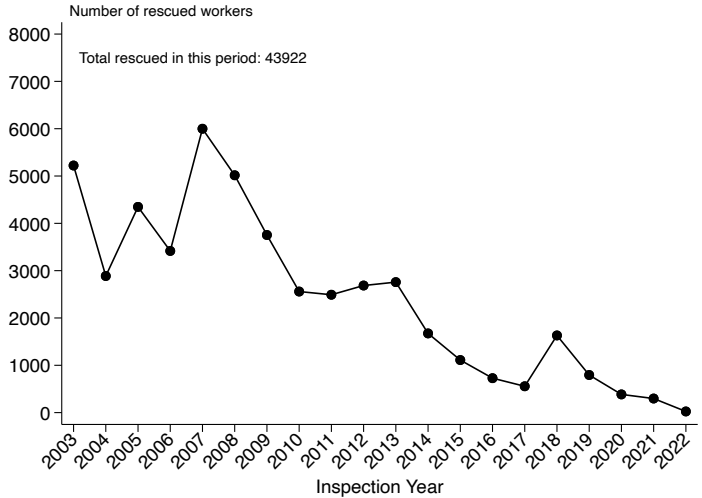
- **Dirtiest** sectors:
  - **Cattle** herding and **Corn** harvesting. Next: Sugar cane harvesting.
  - **Cleaner** crop: **Soy**.
- **Dirtiest** municipalities:
  - Far from nearest enforcement office.
  - Cattle-intensive or corn-intensive (Pará/Goiás/Minas).

Preliminary findings (2/2)

- Export **prices** for the same product x destination country x time **decrease** with origin municipality's:
  - Remoteness (e.g., min driving hours to state capital) and poverty (e.g., gdp)
  - Enforcement capacity (e.g., min driving hours to nearest enforcement office)
  - Number of rescued workers
- Export **volumes increase** in the same variables.

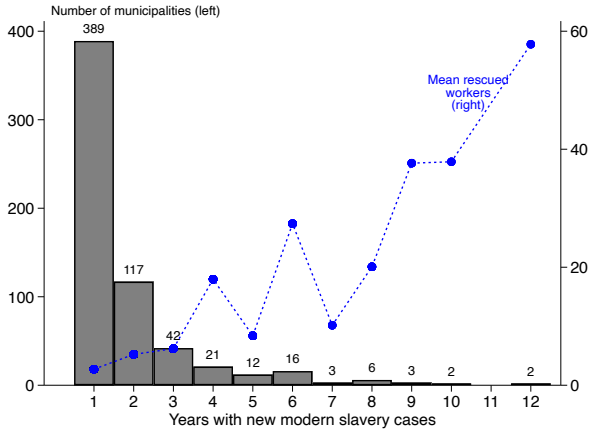
Modern slavery in Brazil:
Time-series, sectoral, and spatial patterns

Brazilian context: Workers rescued since 2003

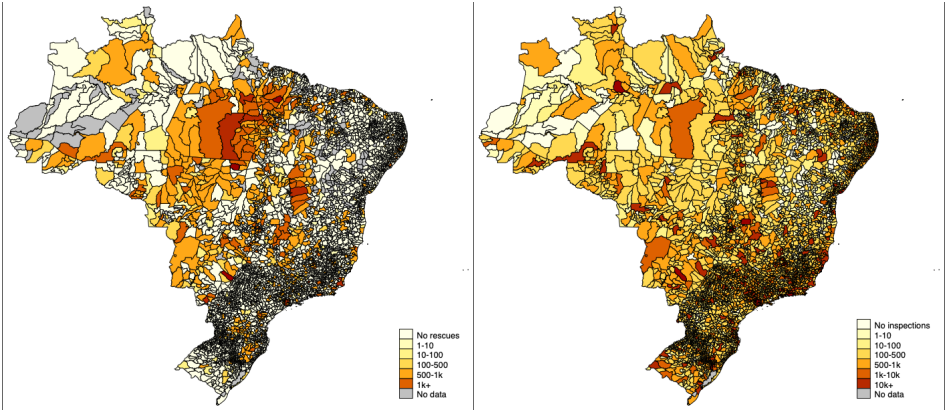


Economic forces are key: Limits to enforcement

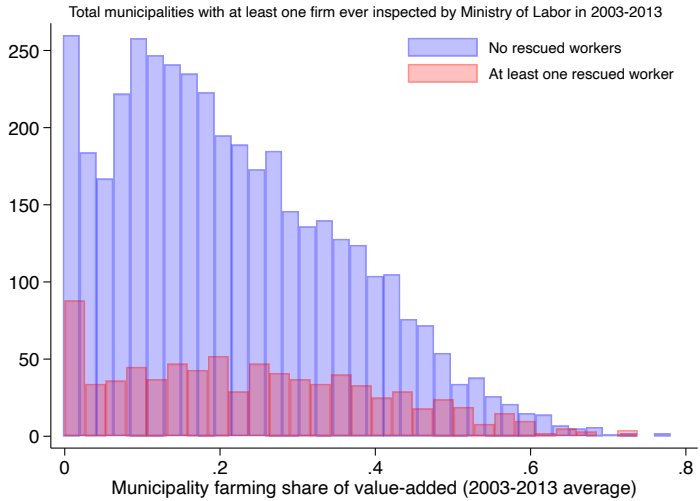
First rescue ↓ re-incidence, but most rescued are in repeat-offense municipalities.



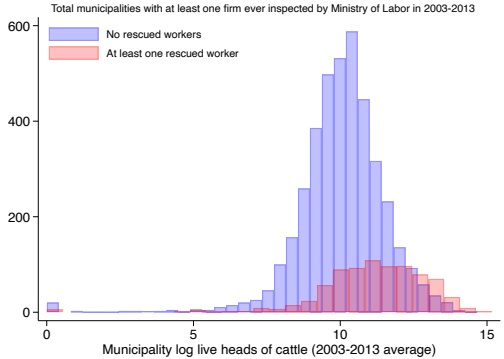
Geography of rescues (left) and inspections (right)

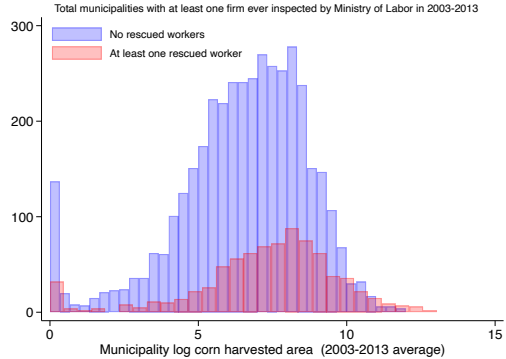


Production differences of munis with vs without rescues

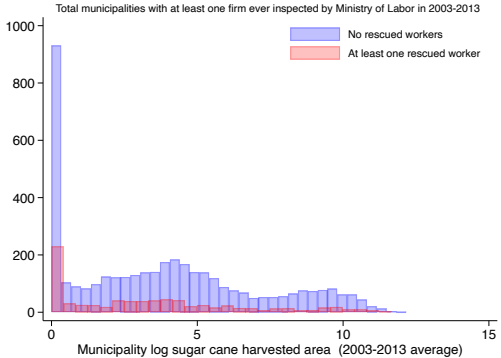


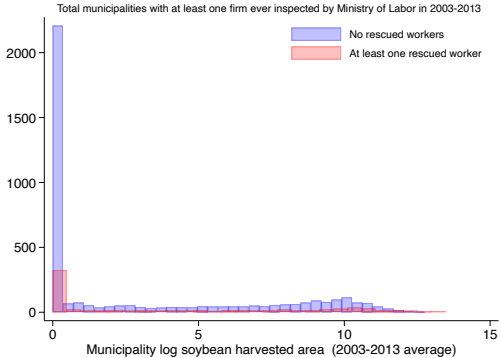
Production differences of munis with vs without rescues: Cattle and Corn



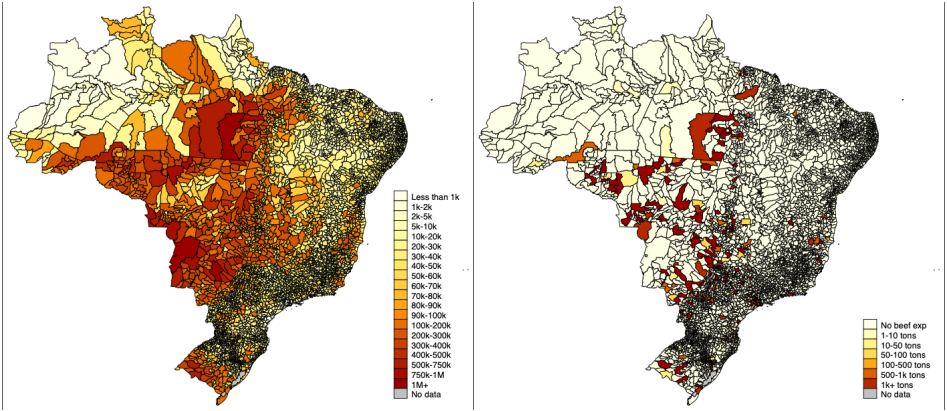


Production differences of munis with vs without rescues: Sugar and Soy

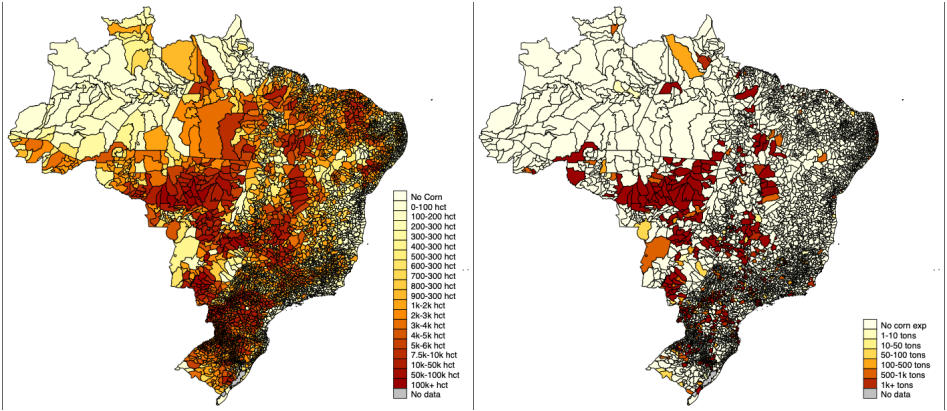




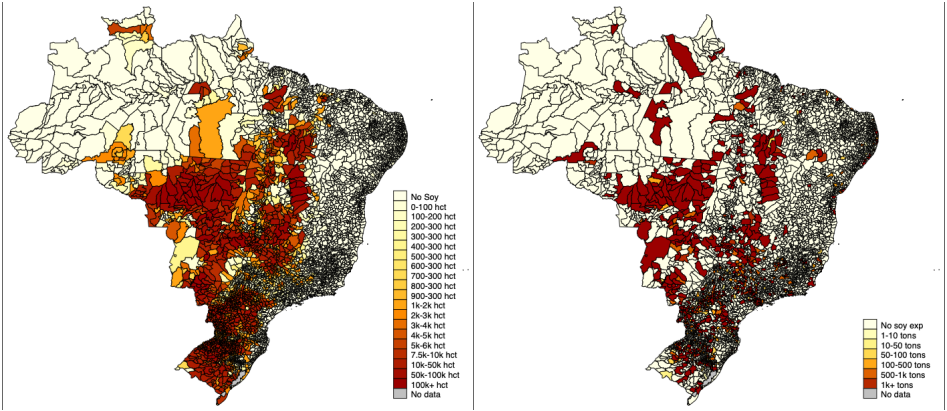
Geography of production (left) and exports (right) - Beef



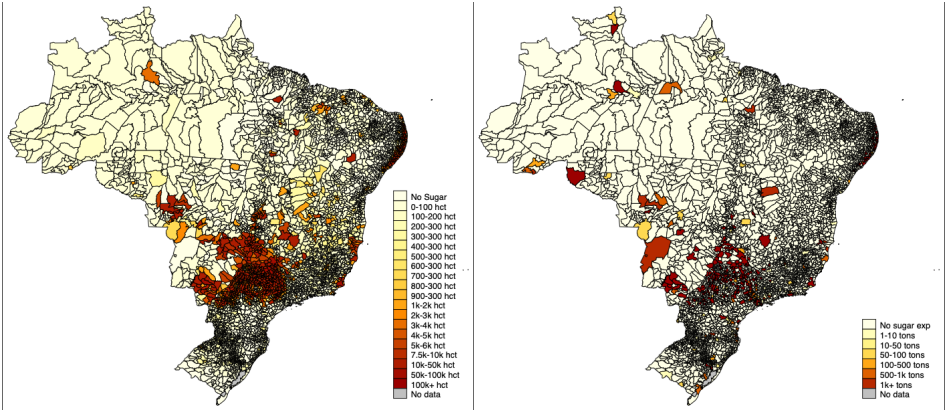
Geography of production (left) and exports (right) - Corn



Geography of production (left) & exp (right) - Soy

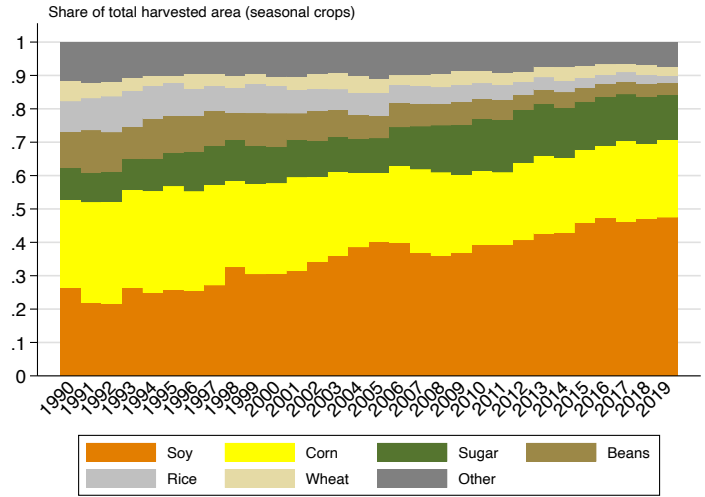


Geography of production (left) & exp (right) - Sugar

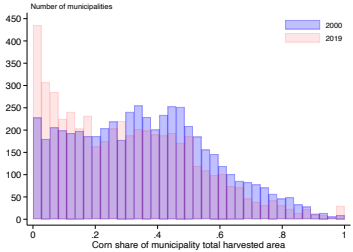


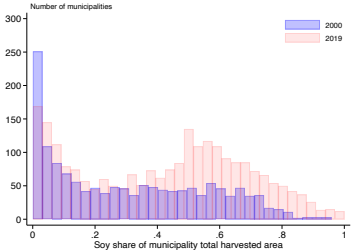
Cross-crop production and export reallocation: Time series and cross-municipality

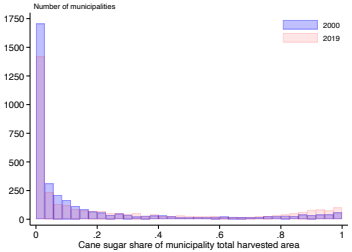
Cross-product shifts. ↑ soy, sugar; ↓ corn, beans, rice



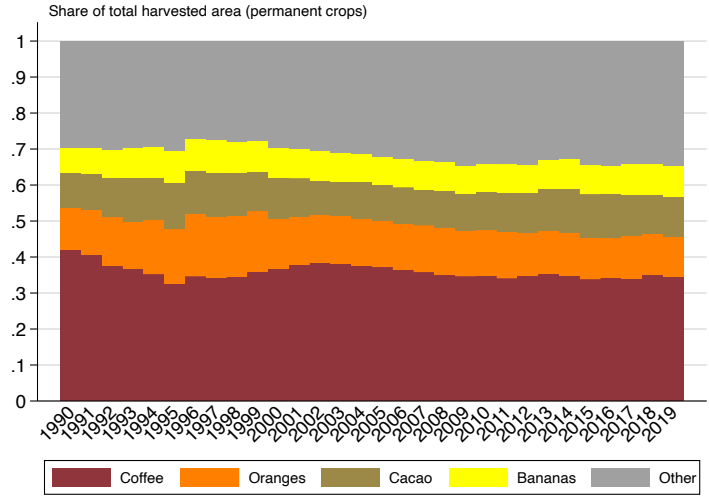
Cross-product shifts: Corn to Soy is biggest move





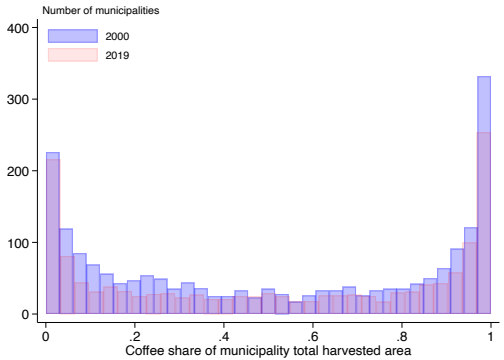


Cross-product shifts. ↓ Coffee; ↑ Other

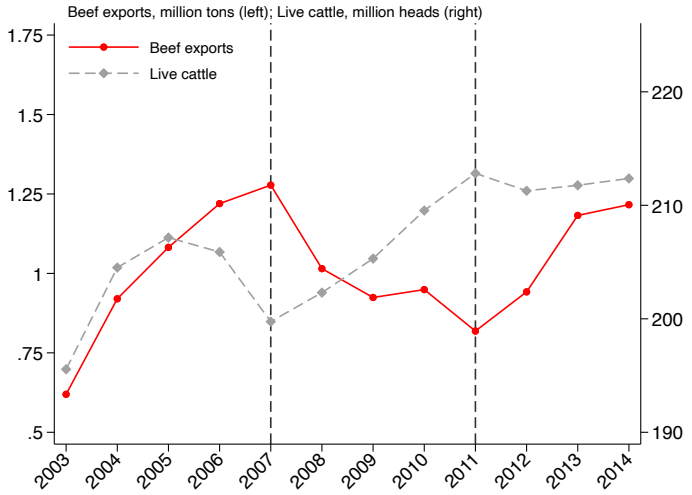


Cross-product shifts: Coffee ↓ everywhere

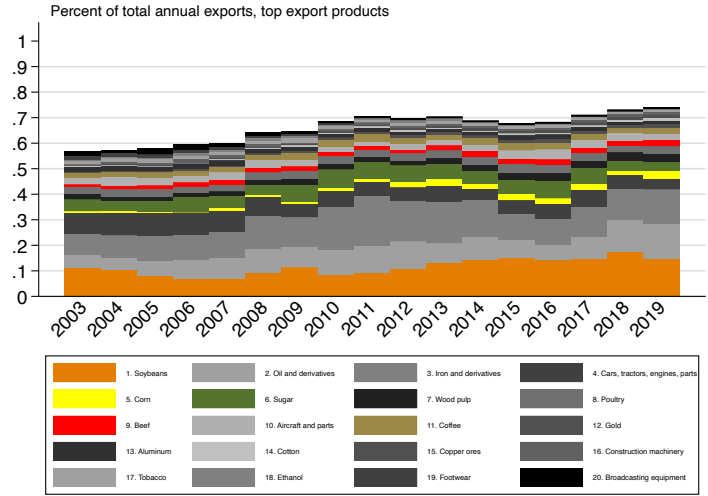
Harvest areas expanded, but coffee areas did not accompany the growth.



Cattle stock vs. Beef exports



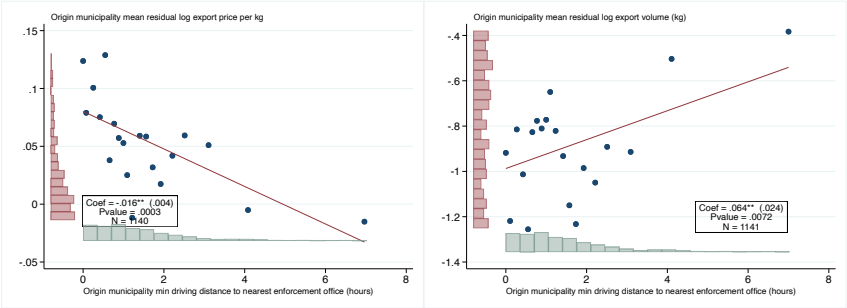
Top exports (HS-4 with least 1% export of tot exports)



Within-product cross-municipality export prices and volumes as function of local enforcement and worker rescues

Within-product cross-muni export differences

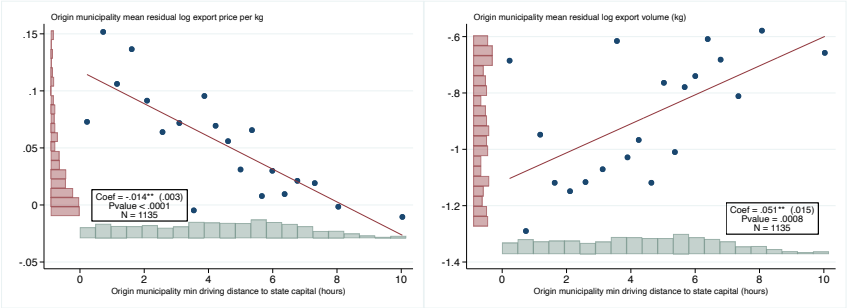
Cheaper prices, **Higher volume** from low enforcement capacity municipalities



Note: Y-axis plots mean origin municipality residual from regression of export price (top) or volume (bottom) of product *i* from origin municipality *o* to destination country *d* at year-month *t*) on product x destination country x time FEs. Products based on HS-4-digit codes for Beef, Sugar, Corn, Coffee, and Soy. Period includes years 2003-2019.

Within-product cross-muni export differences

Cheaper prices, **Higher volume** from remote municipalities



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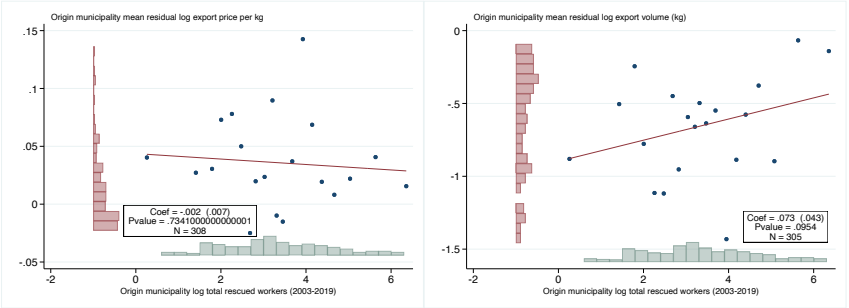
Within-product cross-muni export differences

Cheaper prices, **Higher volume** from where more workers were rescued



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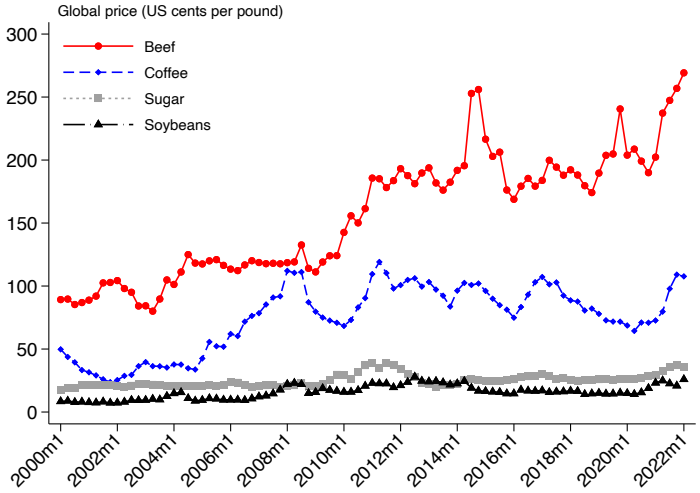
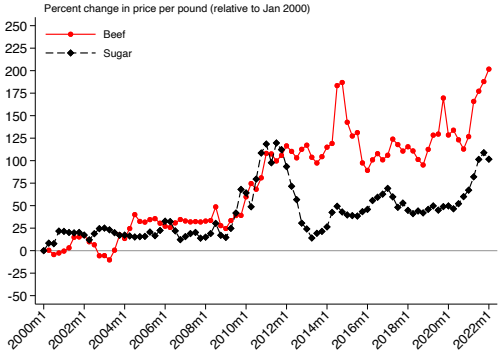
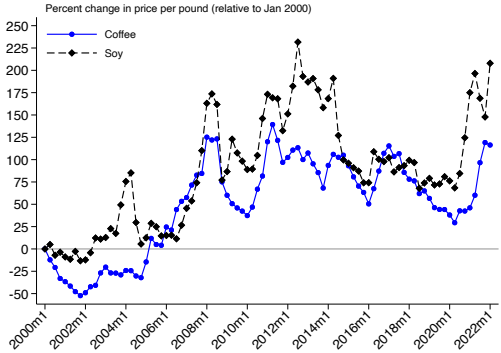
Variation in global prices for top crops and beef

Global prices: Raw data (Corn to be added)



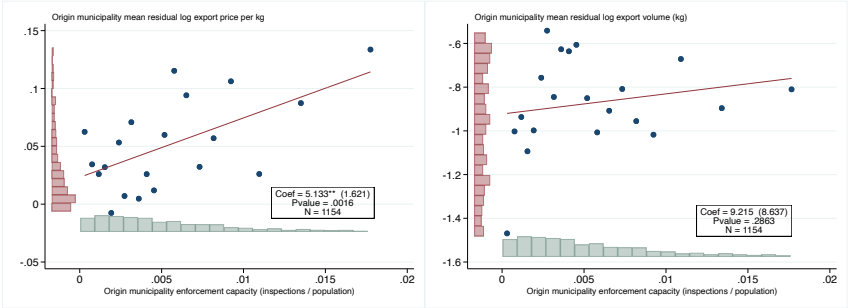
Global prices: Percent changes (Corn to be added)





Within-product cross-muni export price differences

Cheaper prices, **Higher volume** from low enforcement capacity municipalities



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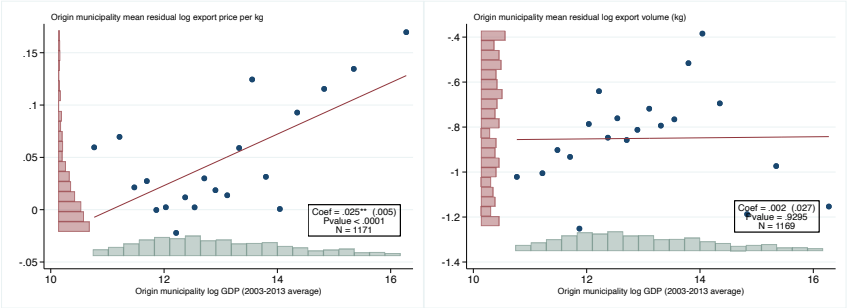
Within-product cross-muni export price differences

Cheaper prices, **Higher volume** from poorer municipalities



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