

The background of the slide is a repeating pattern of avocados. Most are whole, dark green avocados, but one in the center is sliced in half, showing its light green flesh and dark pit. The avocados are set against a light beige background and cast soft, dark shadows.

# Expanding the Phytosanitary Exclusion Zone: Impacts on U.S.-Mexico Avocado Trade

---

Irvin Rojas, CIDE

K. Aleks Schaefer, Oklahoma State University

January 6, 2024

ASSA Meetings, San Antonio, TX

# Introduction

- The Uniqueness of Sanitary and Phytosanitary Standards
  - Other Measures must follow MFN Principles
  - SPS allows for (and even encourages) *prima facie* discrimination
    - Can target finite set of countries
    - An individual country
    - Specific district or province within an exporting country
  - Unequal application -> Unequal Outcomes

# The Case of Avocados

---

- Approximately 90% of avocados consumed in the U.S. are imported from Mexico.
- Prior to August 2022, U.S. only allowed imports from one Mexican state (Michoacan) due to concerns about seed weevil and fruit flies.
- Recently, U.S. authorized shipments from additional state (Jalisco).

*“Mexican organized crime has long mutated away from ‘just’ drugs trafficking. Today, the model is this: you control a given territory, and within it you exploit whichever commodity is locally available. That includes avocados . . . .”* Falko Ernst, International Crisis Group ([Dehghan, 2019](#)).

# Research Question

- We investigate the **economic impacts** of expanding the phytosanitary exclusion zone to include Jalisco:
  - **Trade Impacts:** Impacts on avocado prices and trade quantities crossing U.S.-Mexico border
  - **MX Domestic Impacts:** Impacts on avocado prices across 37 local Mexican markets.

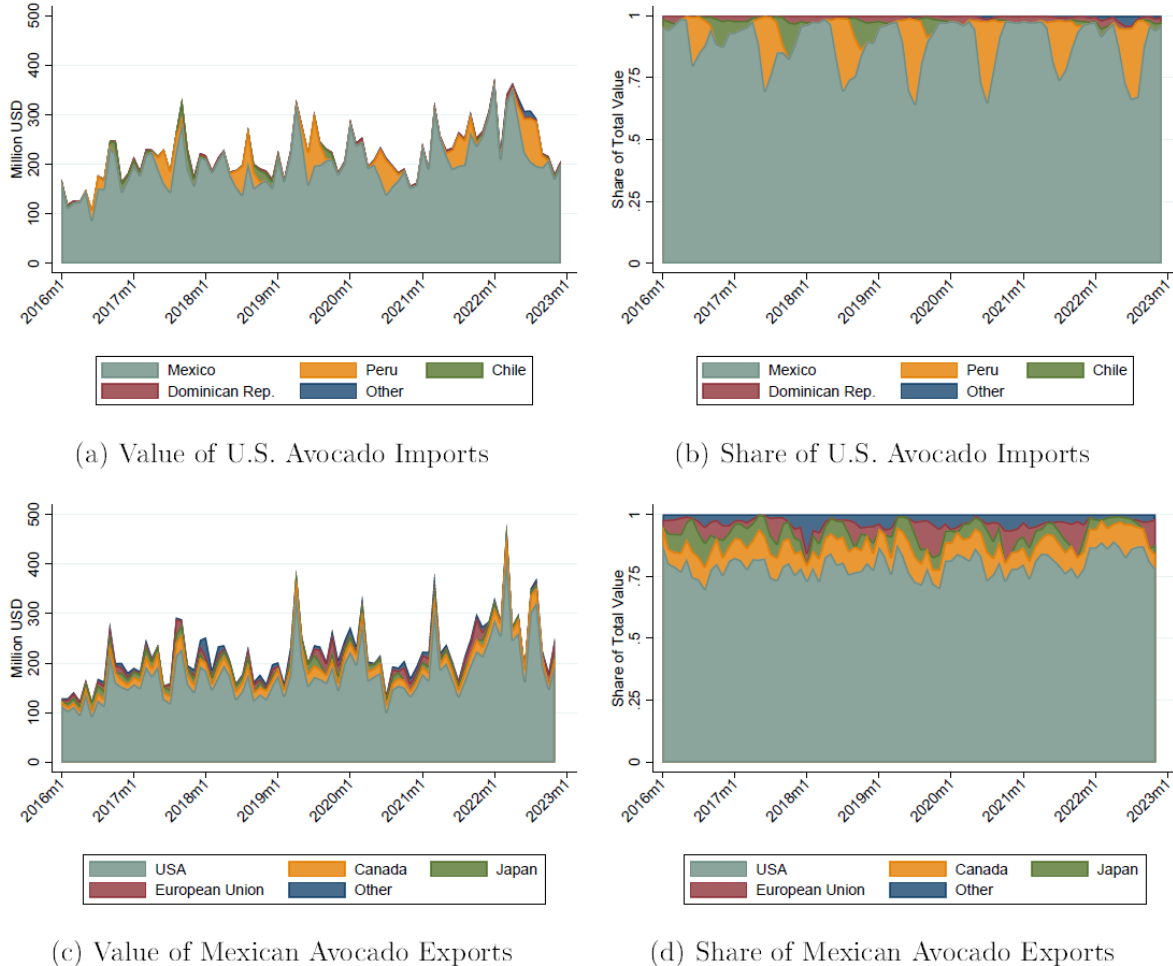
# Research Findings

- **U.S. Perspective:** Unequivocally beneficial from perspective of U.S. avocado users and consumers— economic welfare gain of approximately **\$40 million** per year.
- **Michoacan Producers:** Reduced gross receipts for Michoacan avocado producers by approximately **\$310 million per year** (6.4% of total gross receipts).
- **Jalisco Producers:** Increased gross receipts for Jalisco producers by **\$1.2 million per year** (0.33% of total gross receipts).
- **Cartel Incentives:** Uncertain how these market outcomes will affect cartel incentives to control the industry in the future.

# Background

- Economic Overview of the Industry**
  - 8.6M tonnes and growing
  - MX is largest producer and exporter
  - Production limited by climate
- Cartel Takeover of the Michoacan Industry**
  - Criminal orgs use avocado production as a means of money laundering and income diversification.
  - Threats to U.S. inspectors
  - Illegal Logging
- U.S. Phytosanitary Requirements for Mexican Avocados**
  - Import ban from 1914 to 1993.
  - Shipments from Michoacan resumed under NAFTA
  - Producers in 15 Jalisco municipalities granted access in August 2022.

Figure 1: Evolution of Avocado Trade in the U.S. and Mexico

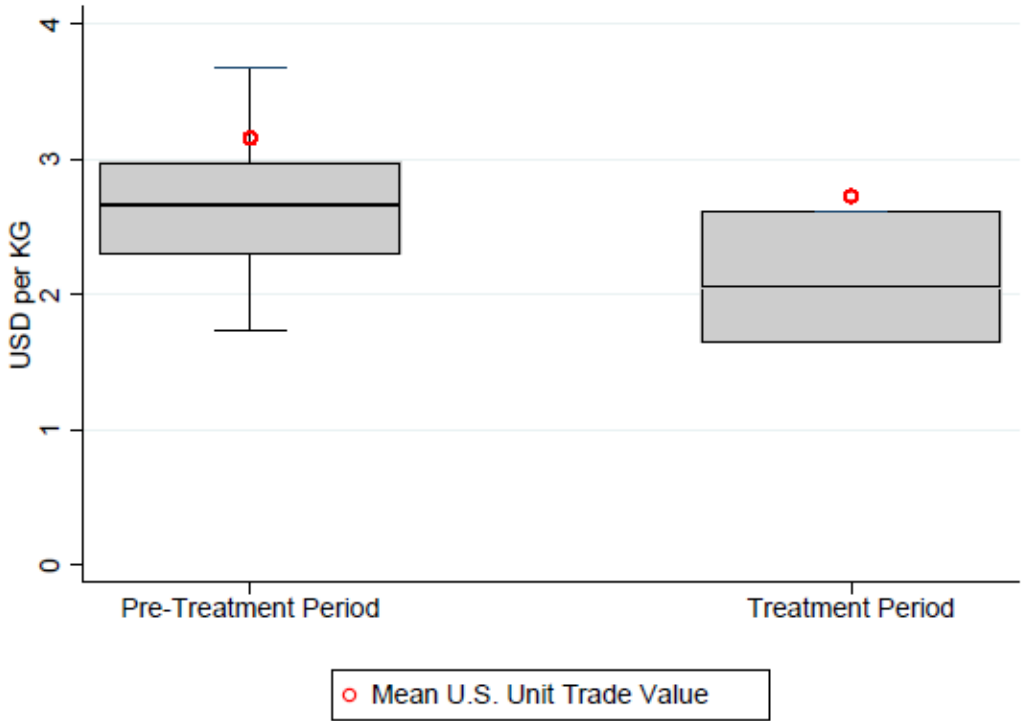


# Methodology

- We construct a series of econometric models to analyze market effects in two dimensions:
  - **Bilateral Trade Effects:** How regulatory change affected avocado prices and trade quantities at U.S.-Mexico border.
  - **Mexican Domestic Market Effects:** How the change affected prices in the Mexican domestic market.
- **Sample period:** For both analysis, we use data from Jan-2021 to Dec-2022.

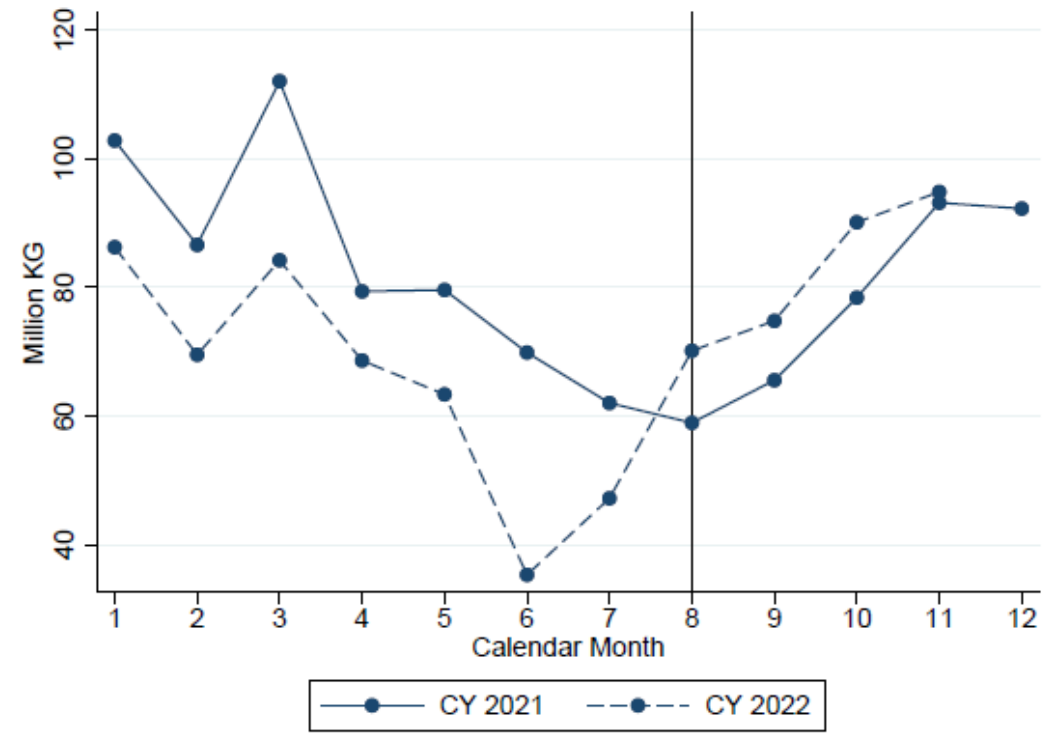
# Bilateral Trade Effects—Natural Experiment Design

## Trade Prices (Unit Values):



(b) Distribution of Unit Values in Levels

## Export Quantities:



(c) Monthly Exports to U.S., CY2021–2022



# Mexican Domestic Market Effects

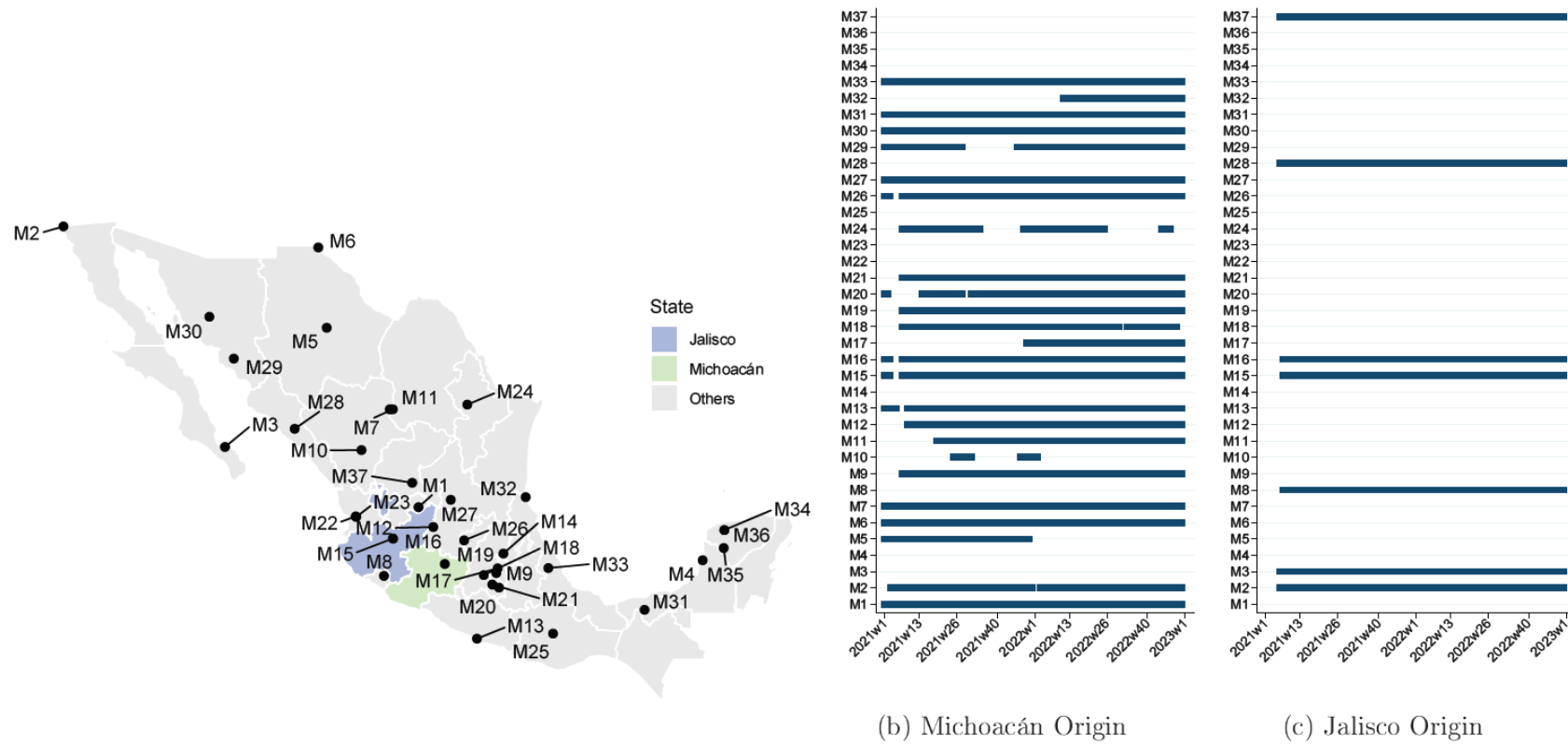
- **Two-Step Applied Time Series Approach:**
  - **Jalisco Relative Price Effects:** We first assess whether domestic prices for avocados originating from Jalisco changed relative to prices originating from Michoacan.
  - **Michoacan Absolute Price Effects:** When then assess whether regulatory change coincided with observed deviation in historical co-movement between Michoacan prices and various indices designed to capture shifts in demand and supply.

# Mexican Domestic Market Effects

- **Data:** We collect **weekly, wholesale** avocado prices across **37 local Mexican markets** from National Service for Information and Market Integration (SNIIM) in Mexico.
- **Data Description:** For each terminal market, data include:
  - Minimum, “Average”, and Maximum Reported Price per KG
  - Disaggregated by State of Origin (i.e., Michoacan vs. Jalisco)
  - Volumetric Packaging (e.g., 10-KG box vs. sold by KG).

# Mexican Domestic Market Effects

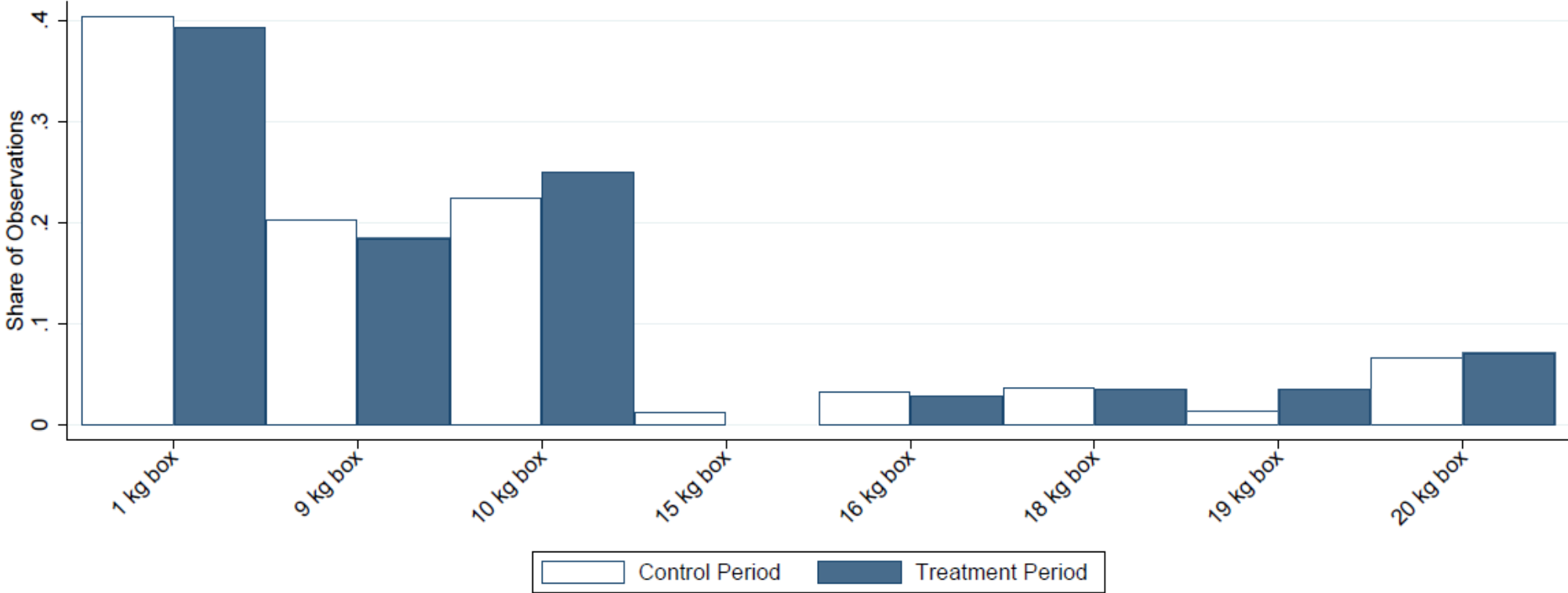
Figure 4: Location and Availability of Price Data by Origin and Destination Market



(a) Location of Origin and Destination Markets

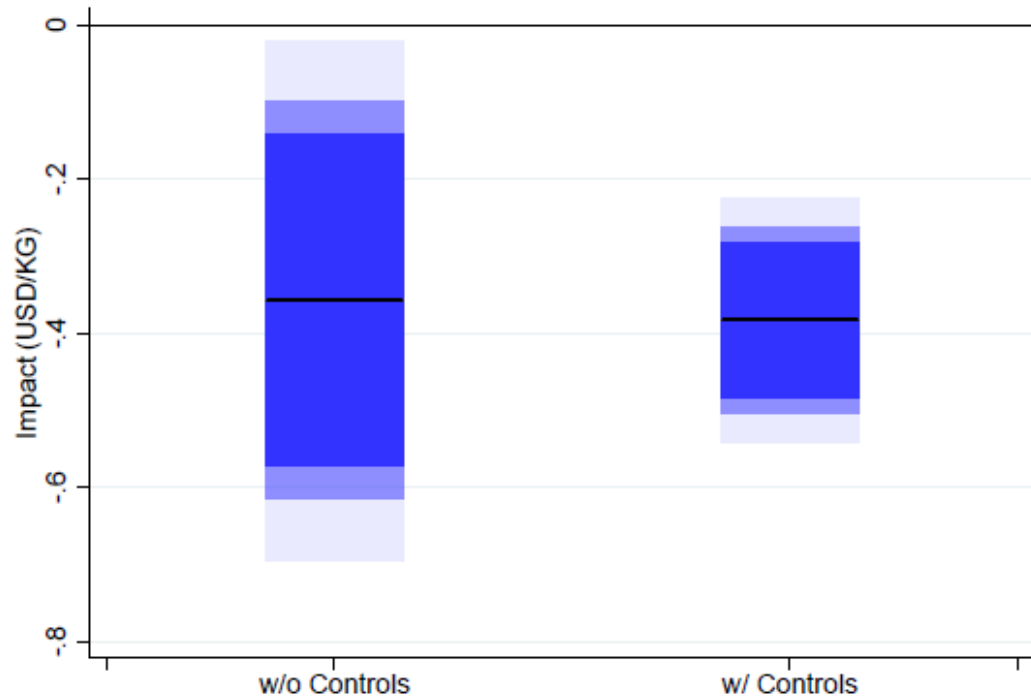
# Mexican Domestic Market Effects

Figure 5: Share of Observations by Volumetric Packaging



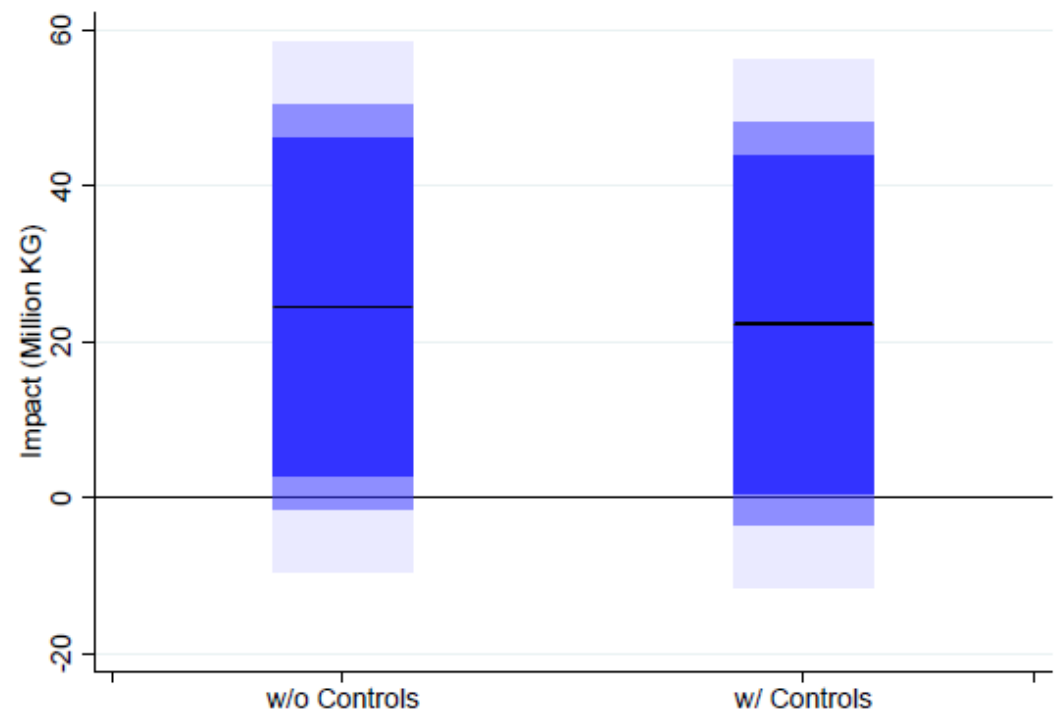
# Results—Bilateral Trade Effects

**Trade Prices (Unit Values):**



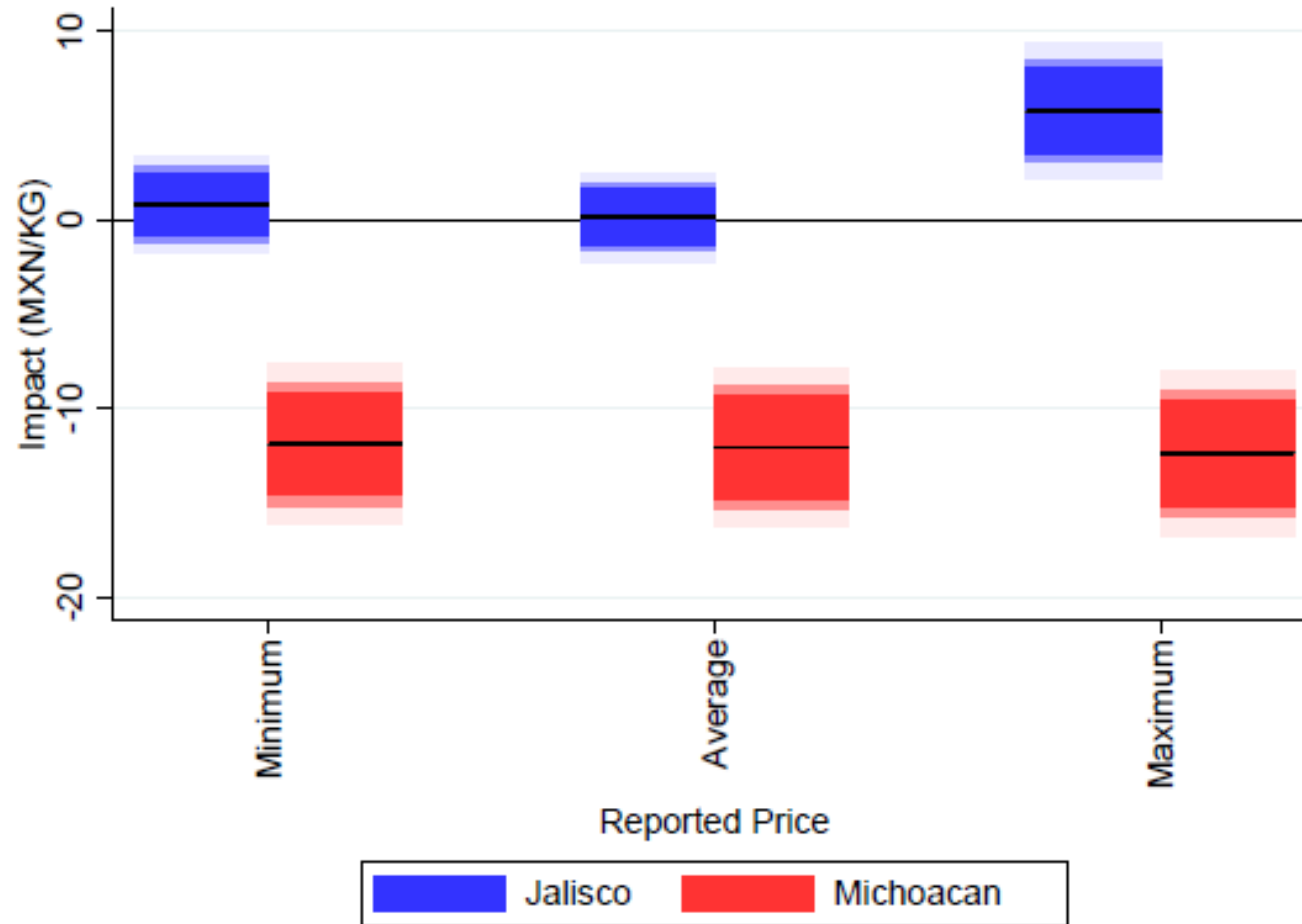
(b) Levels Estimation

**Export Quantities:**



(d) U.S.-only Levels Estimation

# Results—Mexican Domestic Market Effects



(b) Levels Estimation

# Welfare Impacts

## Economic Returns

	Actual	CF	$\Delta$	%
	<i>(US\$ Billions)</i>			
Michoacán Producers	4.44	4.74	-0.31	-6.4%
Jalisco Producers	0.35	0.35	0.001	0.3%
U.S. Avocado Users	2.68	2.64	0.04	1.5%
Mexico Avocado Users	2.12	2.46	-0.34	-13.9%

# Policy Implications and Conclusion

- These market impacts will change incentive structures within (and outside) Mexican avocado industry.
- May affect underlying motivation for cartel control of the industry.
  - Cartel actors could relinquish commands of Michoacan industry as a result of the economic losses generated by the policy change.
  - Minimal welfare gains in Jalisco could mitigate concerns of cartel actors wresting control of industry in that region.
  - Could increase or decrease violence in these regions.
- However, estimates are “short run” in nature.
  - Longer run: Price impacts (and associated welfare outcomes) may diminish.
  - Increased potential for pest and disease risks in U.S.?