The Impacts of NAFTA on Farm Profitability and Survival

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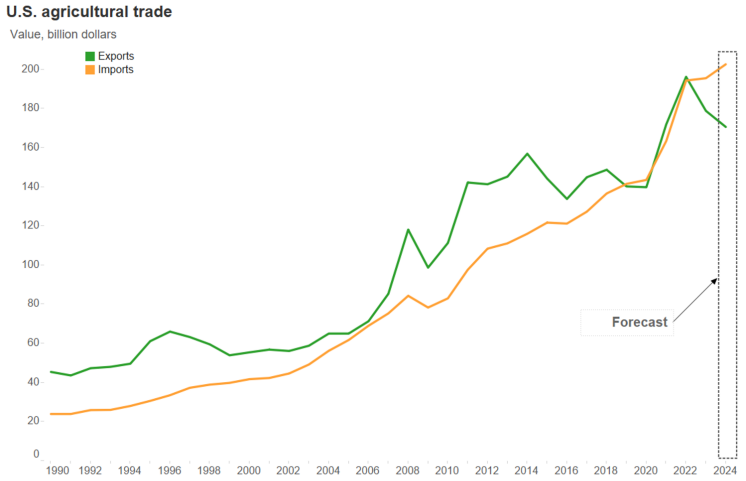
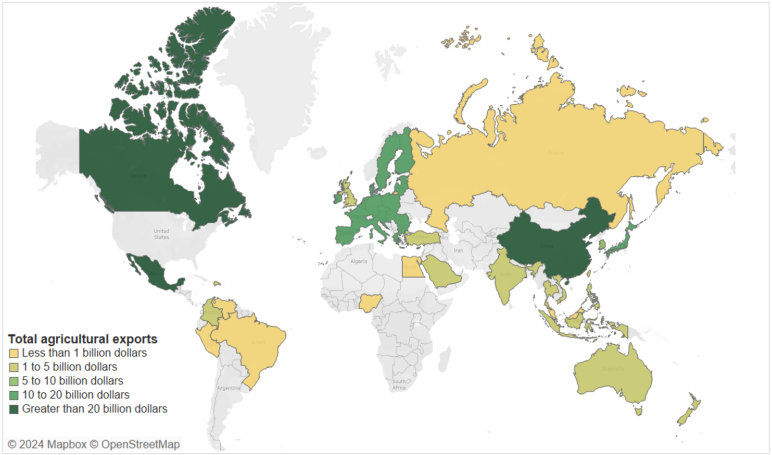
U.S. Agricultural Trade



Source: USDA, Economic Research Service and USDA, Foreign Agricultural Service analysis and forecasts using data from U.S. Department of Commerce, Bureau of the Census.

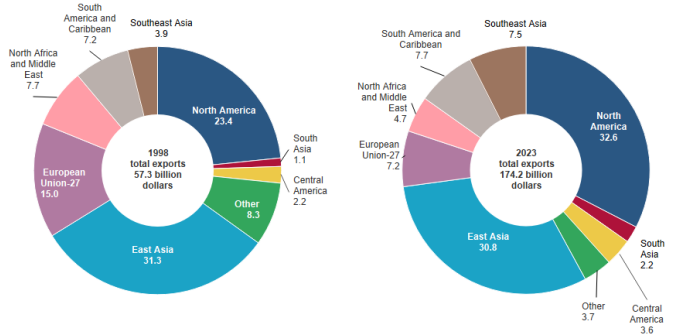
U.S. Agricultural Export Partners (billion dollars)



Note: Trade forecasts for the fiscal year (FY) are released quarterly. The previous FY 2024 forecast was released in February 2024, the FY 2024 current forecast was released in May 2024. Australia and New Zealand are combined into Oceania in this dataset.

Source: USDA, Economic Research Service and USDA, Foreign Agricultural Service analysis and forecasts using data from U.S. Department of Commerce, Bureau of the Census.

Rising North American Share in U.S. Agricultural Exports (1998 vs 2023)



Source: USDA, Economic Research Service using data from the U.S. Department of Commerce, U.S. Census Bureau.

Background of NAFTA

- North American Free Trade Agreement (NAFTA)
  - A trilateral trade agreement between the United States, Canada, and Mexico, aimed at eliminating barriers to trade and investment.
  - Objective: To promote economic integration and increase trade and investment among the three countries by eliminating tariffs, quotas, and other trade barriers.

- Timeline
  - 1988: Canada-U.S. Free Trade Agreement (CUSFTA) signed.
  - 1991: Negotiations for NAFTA begin.
  - 1992: NAFTA signed by U.S. President George H.W. Bush, Canadian Prime Minister Brian Mulroney, and Mexican President Carlos Salinas.
  - 1994: NAFTA goes into effect.
  - 2008: Full implementation of NAFTA, with all tariffs eliminated on qualifying goods traded between the U.S., Canada, and Mexico.

Importance and Impact of NAFTA

- Importance of NAFTA
  - Canada and Mexico are the US's major agricultural trade partners.
  - It is one of the first large trade agreements for the U.S.
  - Reduced tariffs and trade barriers increased market access for U.S. agricultural products.
  - Fostered economic integration and expanded export opportunities.

- Impact on Kansas Agriculture
  - Some agricultural commodities (e.g., US exports to Mexico of corn and dry edible beans) were phased out and eliminated in 2008.
  - Kansas may benefit from increased exports of wheat, corn, and beef to Mexico and Canada.
  - Enhanced competitiveness of Kansas farmers in the North American market.

Ongoing Relevant Policy Discussion

- Key Trade Agreements
  - US-Mexico-Canada Agreement (USMCA): Replaces NAFTA, aims to strengthen North American trade.
  - Trans-Pacific Partnership (TPP): Originally a 12-nation trade agreement, the U.S. withdrew under the Trump government; ongoing discussions about a revised version.
- Trump's Trade Policy
  - Focus on renegotiating trade deals to prioritize American jobs.
  - Withdrawal from TPP, renegotiation of NAFTA into USMCA.
  - Emphasis on tariffs to protect domestic industries.
- Harris' Trade Policy
  - Advocates for trade policies that protect labor rights and environmental standards.
  - Supports fair trade and equitable growth, potentially revising trade agreements like TPP.

Motivation

- With better access to global markets, U.S. agricultural producers can either gain or lose from trade.
  - \+ Exporters who have experienced significant tariff reductions due to trade liberalization
  - – Producers who lose their comparative advantage
- Individual farms may respond differently based on the level of the changes in trade exposure that they have faced.
  - Producers may expect greater impacts on their revenue as more tariffs are reduced.
  - Change decisions on production to maximize their profit.
- Important to understand the impact of export exposure on the profitability of farms and farm survival.

Research Questions

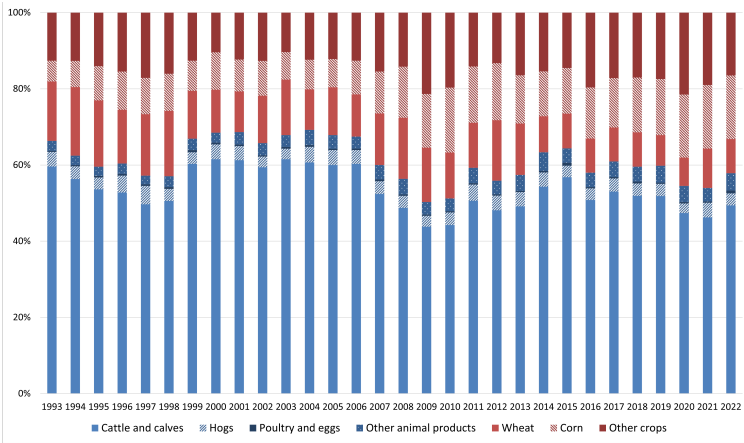
Q. How do greater export exposures from NAFTA affect the profitability of farms?

- Estimate the effects of export exposures on farm profit using farm-level panel data
  - For now, we focus on Kansas farms

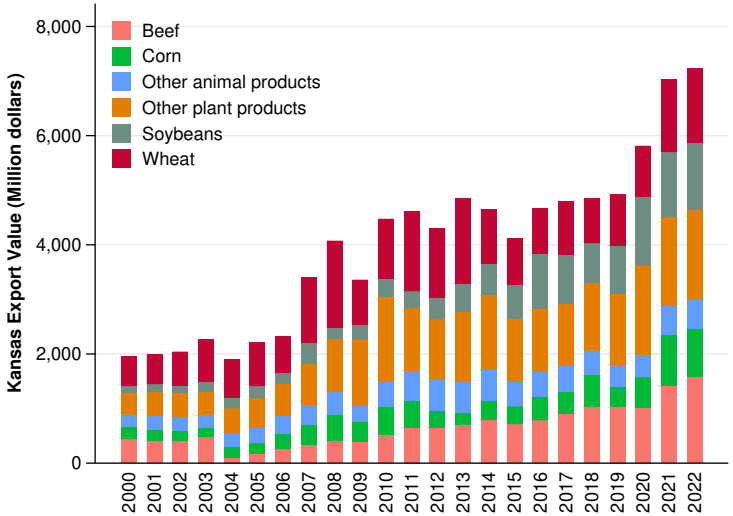
Q. How do changes in the profitability due to NAFTA affect the survival of farms?

- Estimate the effects of export exposures on farms exit using duration model

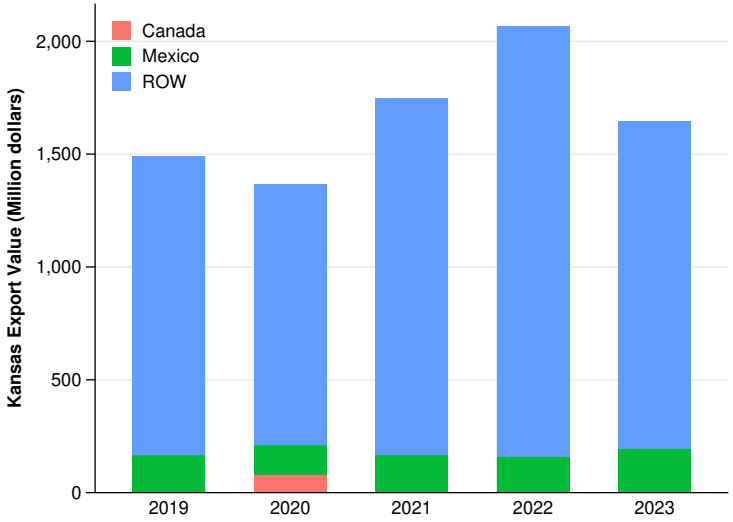
Commodity Shares of Cash Receipts in Kansas



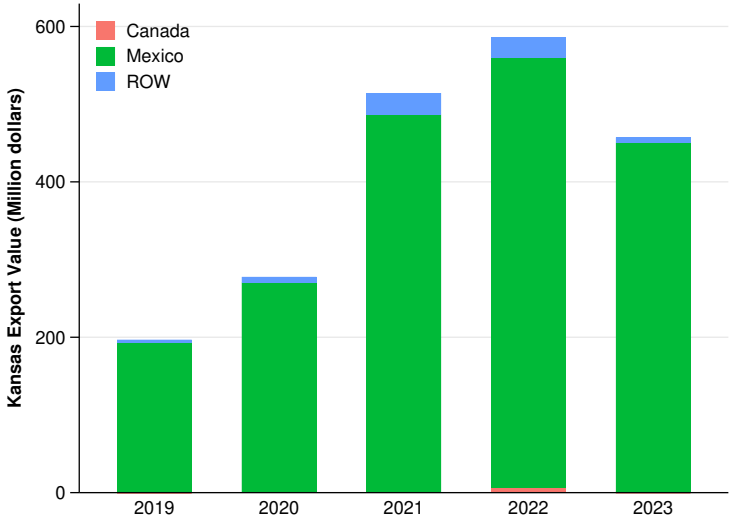
Kansas Exports, by Commodity



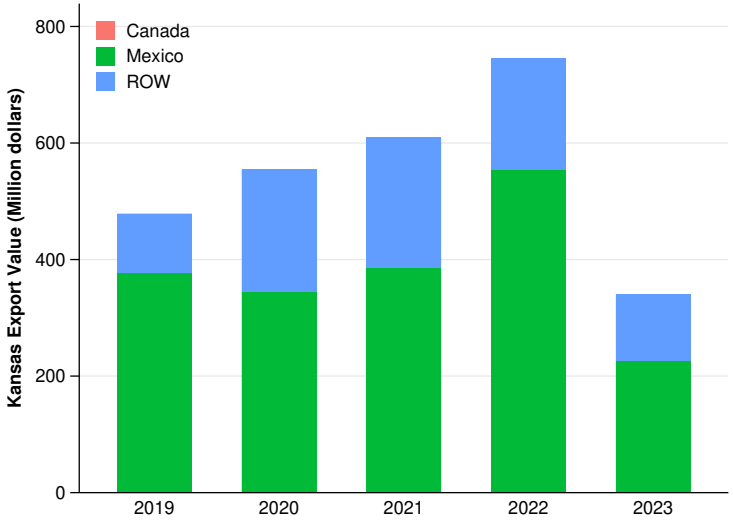
Kansas Beef and Beef Product Export, by Country of Destination



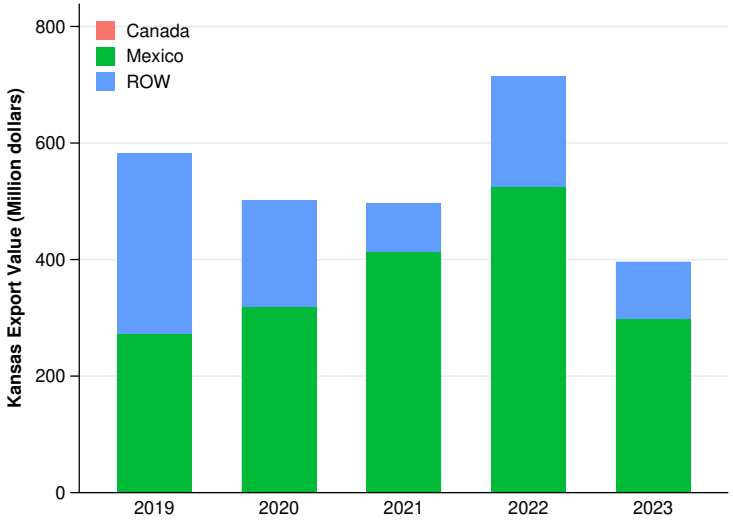
Kansas Corn Export, by Country of Destination



Kansas Soybeans Export, by Country of Destination



Kansas Wheat Export, by Country of Destination



Main Samples and Trade Data

The main samples are farms that produced major field crops (corn, wheat, soybeans) and livestock products (beef, pork, poultry) in Kansas from 1993 to 2023.

Trade data comes from UNComtrade

- Extracted trade values at 6-digit HS code
- Grouped commodities based on the 6-digit product grouping code from the USDA, Foreign Agricultural Service's Global Agricultural Trade System (GATS)
  - Major commodity: Corn, Soybeans, Wheat, Beef & Beef Products, Pork & Pork Products, Poultry Meat & Prods. (ex. eggs)
- Trade partners: Canada and Mexico

Kansas Farm Management Association (KFMA) Data

- One of the largest management programs in the U.S.
- Consist of six regional associations that maintain historical Kansas farm-level information
- Provide detailed information on farm characteristics and production
  - e.g., farm types, number of operators, number of workers, operator's age, crop and livestock production, farm income and expenses

Individualized Trade Exposure

We define the individualized trade exposure ($Trade_{it}$) for farm i in year t as

$$Trade_{it} = \sum_j \delta_{jt} \times Production\ Share_{ijt}$$

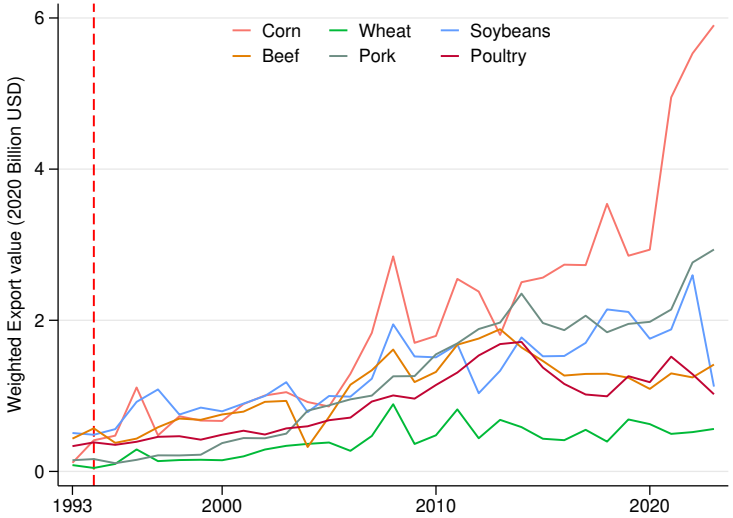
- δ_{jt}: an aggregated trade value that is US exports to CAN and MEX for commodity j in year t

$$\delta_{jt} = \sum_d Import_{jdt} \times US\ Market\ Share_{jdt}$$

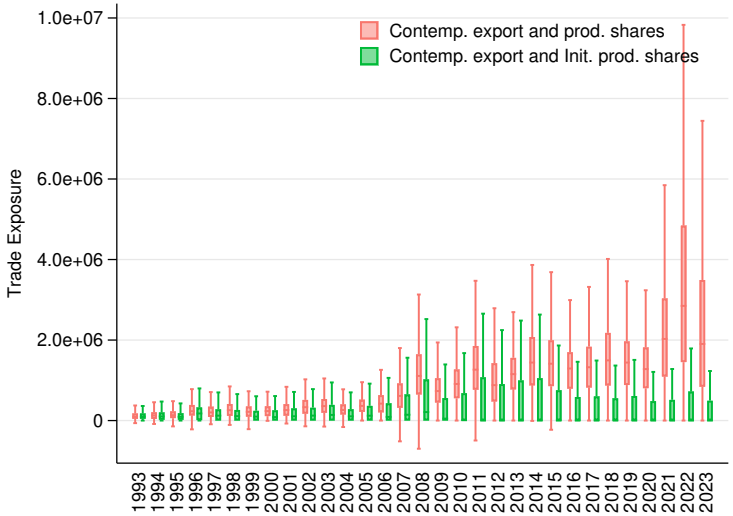
  - $Import_{jdt}$: country d's import values of commodity j from the US in year t
  - $US\ Market\ Share_{jdt}$: the US's market share in country d for commodity j in year t

- $Production\ Share_{ijt}$: the farm i's production share for commodity j in year t
  - $Production\ Share_{ijt} = Cash\ Income_{ijt} / Total\ Cash\ Income_{it}$

Weighted export value, 1993-2023



Boxplots of individualized trade exposure



Descriptive Statistics (1)

	(1)	(2)	(3)	(4)	(5)	(6)
	1993-2023		1993		2023	
VARIABLES	Mean	SD	Mean	SD	Mean	SD
Net farm income (K USD)	58.13	138.5	26.03	36.88	111.4	321.4
Share of Corn (%)	0.132	0.784	0.0914	0.185	0.205	0.262
Share of Wheat (%)	0.200	6.631	0.446	10.73	0.146	0.184
Share of Soybeans (%)	0.0399	22.75	0.122	0.237	0.229	0.223
Share of Beef (%)	0.166	0.847	0.179	0.350	0.145	0.295
Share of Pork (%)	0.0206	0.166	0.0550	0.299	0.0102	0.0751
Share of Poultry (%)	0.00528	0.0641	0.00581	0.0692	0.00420	0.0514
N	30,266		2,177		279	

Descriptive Statistics (2)

	(1)	(2)	(3)	(4)	(5)	(6)
	1993-2023		1993		2023	
VARIABLES	Mean	SD	Mean	SD	Mean	SD
Total crop acres (ha)	1,172	998.3	983.8	808.6	1,488	1,306
Total farm capital (M USD)	2.183	3.507	0.666	0.467	10.88	8.944
Value of farm production (K USD)	288.8	433.5	129.0	122.0	1,102	1,072
Operator age	57.18	12.87	49.86	13.49	69.55	8.981
Number of operators	1.006	0.459	1.047	0.436	0.983	0.570
Number of workers	1.482	1.179	1.499	1.100	1.621	1.467
Number of family dependents	2.672	1.481	2.996	1.611	2.125	0.837
Machinery and equipment value (K USD)	177.1	306.2	48.76	46.15	851.4	923.0
Crop labor fraction (%)	0.757	0.270	0.701	0.291	0.820	0.238
Owned land/Total land operated (%)	0.414	0.334	0.382	0.340	0.443	0.306
N	30,266		2,177		279	

Base Model

To identify the impact of trade exposure on farm profit, we consider following model:

$$Profit_{it} = \alpha_0 + \alpha_1 Trade_{it} + BX_{it} + u_i + \gamma_t + \epsilon_{it}$$

where

- $Profit_{it} = Farm\ Production_{it} - Cash\ Operating\ Expenses_{it} - Depreciation_{it} - Accrued\ Income\ Expense_{it}$
- $Trade_{it}$: trade exposure from NAFTA for farm i
- X_{it}: the vector of covariates (e.g., # of operators, operator's age, etc.)
- u_i, γ_t: FEs

Empirical Specification: Shift-share Design

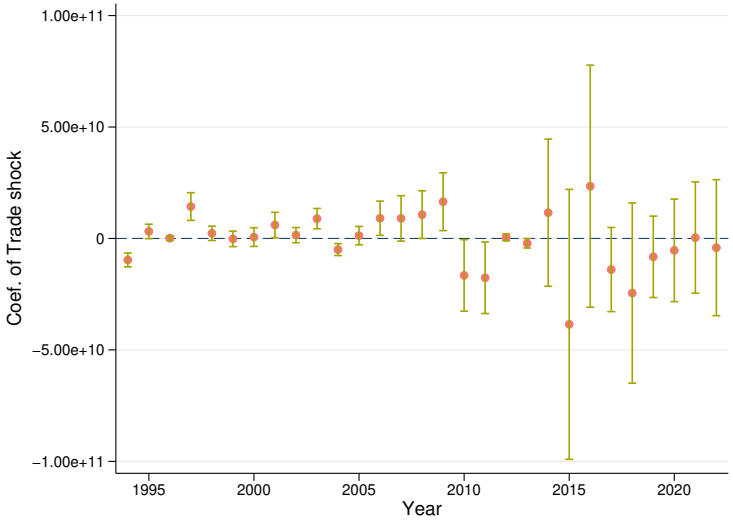
This study utilizes "shift-share" specifications, motivated by literature (e.g., Bartik, 1991; Autor et al., 2013). The estimation model is as follows:

$$\Delta Profit_{it} = \alpha_0 + \alpha_1 \Delta Trade_{it} + B\Delta X_{it} + u_c + \epsilon_{it}$$

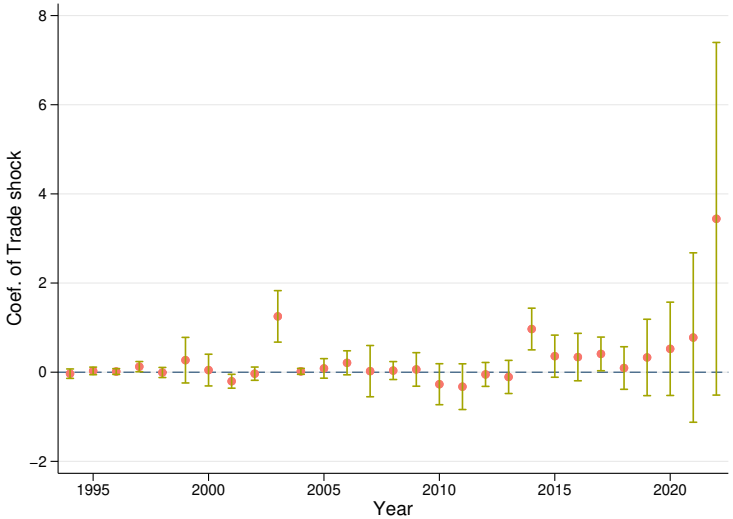
where

- $\Delta Profit_{it} = Profit_{it} - \overline{Profit_{i0}}$; the change in average profit in the pre-NAFTA (1990–1993)
- $\Delta Trade_{it}$: the trade shocks for farm i
  - $\Delta Trade_{it} = \sum_j \left(\sum_d Import_{jd0} \times (US\ Market\ Share_{jdt} - US\ Market\ Share_{jd0})\right) \times Production\ Share_{ij0}$
- ΔX_{it}: the vector of changes in average covariates in pre-NAFTA
- u_c: county FE

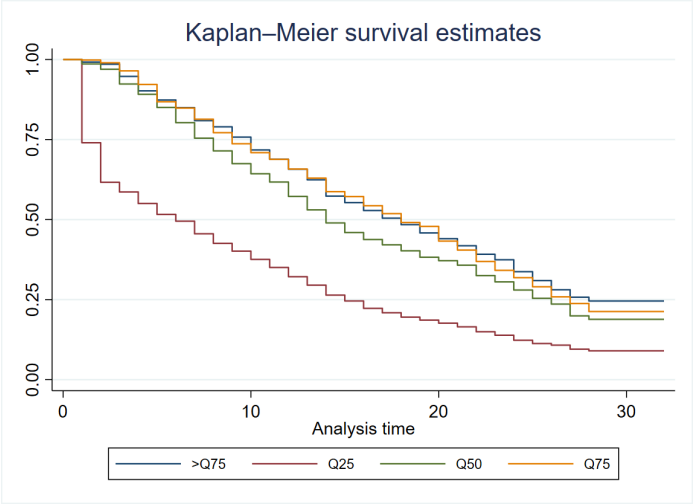
Effects of Trade Shock on Farm Profit (by year, focusing on field crop)



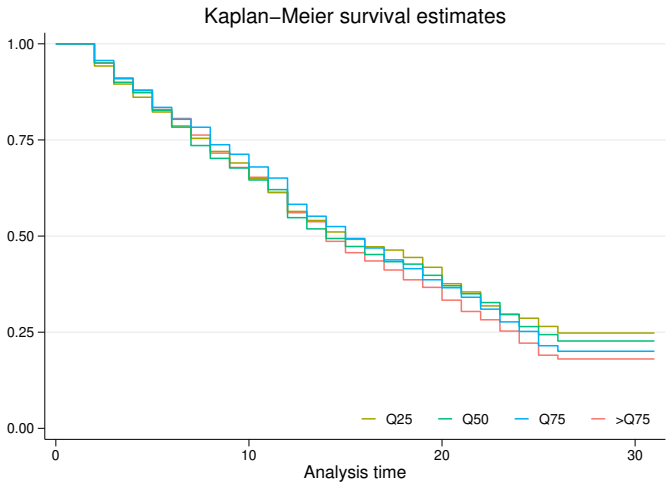
Effects of Trade Shock (by year, focusing on field crop & livestock)



Kaplan–Meier survival curves by quartiles of trade shock



K–M survival curves (focusing on field crop & livestock)



Concluding Remarks

- Limitations and Remarks
  - We restricted samples to the farms in Kansas.
  - We find the immediate effects of trade exposure are positive on farm profit, but the long-term effects are influenced by other than trade values.
  - Impacts of trade exposure are mixed – needs more robustness check.
- Further direction
  - Including trades with the rest of the world
  - Expanding samples to overall US farms

Some Open Questions

1. How do you think the changes brought by NAFTA have affected your farm's profitability and long-term sustainability?
2. What policy changes do you believe are necessary to better support farmers in the context of trade agreements like NAFTA?
3. What are your thoughts on the future of trade agreements and their impact on small vs. large farms?

References

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