Self-Arming or Self-Harming Trade Policy? Assessing Trade Policies in Low- and Middle-Income Countries

Ana Margarida Fernandes
World Bank, DECRG
Devaki Ghose
World Bank, DECRG

Policy Research Talk

March 26, 2024

Recent shocks have brought trade policy back to the limelight

The New York Times

Trump Hits China With Tariffs on $200 Billion in Goods, Escalating Trade War

Sept. 17, 2018

REUTERS®

WTO head says pandemic-related trade barriers are rising

June 14, 2021

THE WALL STREET JOURNAL.

Export Curbs Spread Globally, Adding to Food-Inflation Pressures

Countries have put restrictions on products such as wheat, corn and edible oils since the start of the Ukraine war

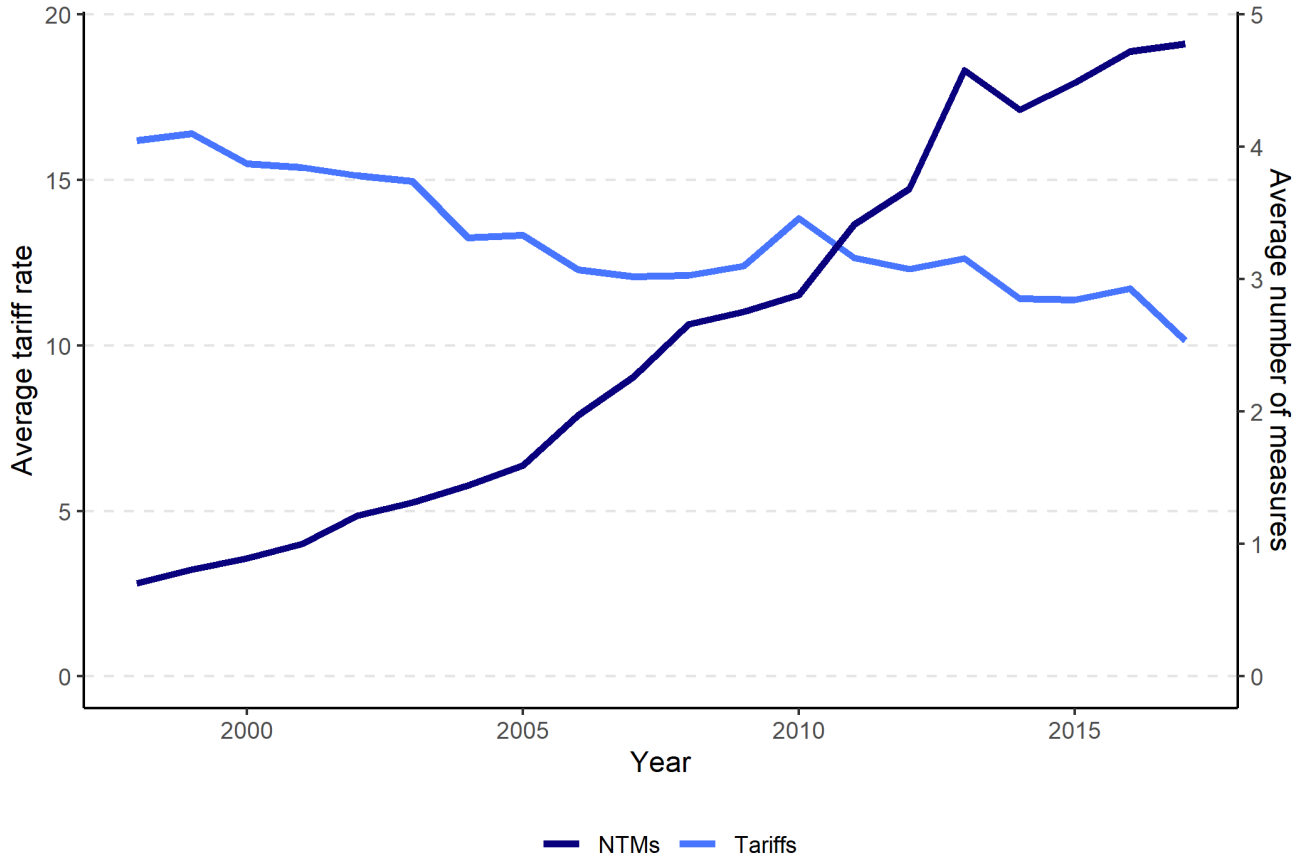
May 25, 2022

The New York Times

Climate Change May Usher in a New Era of Trade Wars

Jan. 25, 2023

A secular shift is underway from tariffs to non-tariff measures (NTMs)



Source: Zavala, Fernandes, Haygood, Reed, Reyes (2023).
Note: Light blue line shows average applied tariff rate from TRAINS database. Dark blue line shows average number of NTM measures from ALADI database. Averages are computed across HS 6-digit products and Latin American countries: Chile, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Peru, Paraguay, El Salvador and Uruguay.

- NTMs have been replacing tariffs (Kee and Xie, 2024)

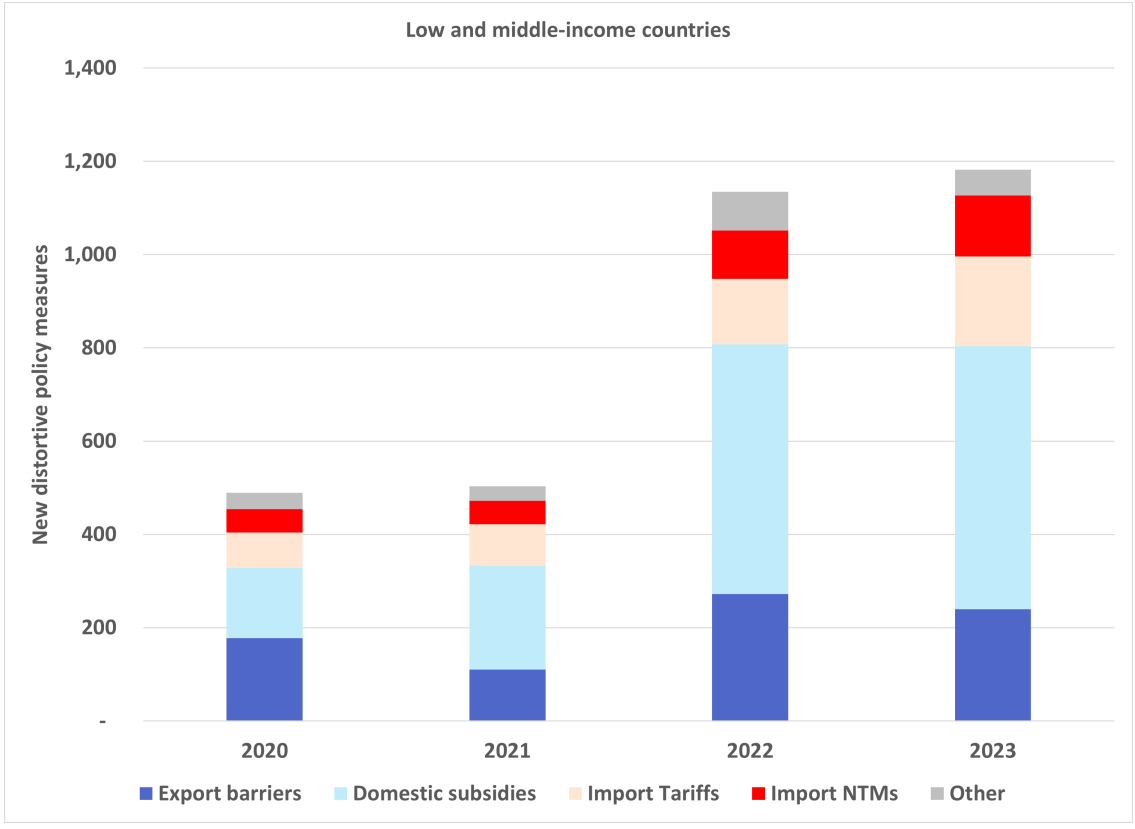
But what are non-tariff measures?

- Quotas, licenses, bans
  - Example: ban on imports of fertilizer in Sri Lanka
- Price controls and additional taxes
- Regulatory measures/technical barriers
- Pre-shipment inspections
- Restrictions on the port of entry
  - Example: imports of textiles can only enter Colombia through authorized ports

NTMs are complex and very heterogeneous

LMICs are increasing their use of NTMs targeting imports

- Choice due to fiscal pressures and WTO restrictions

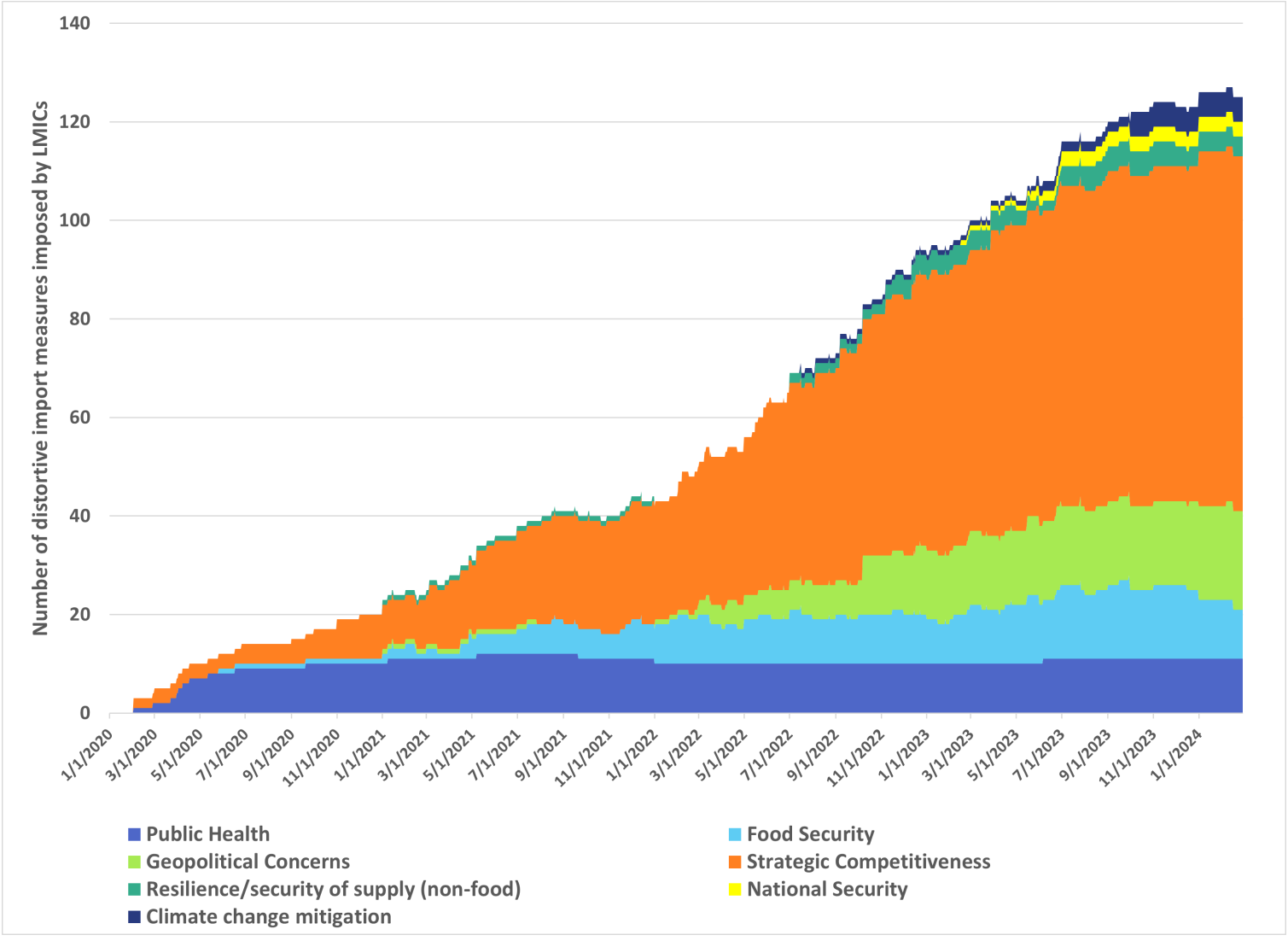


Source: World Bank EFI and Global Trade Alert trade policy monitoring in essential goods.
Note: Essential goods include medical and food products, global value chain inputs, raw materials, feed, fertiliser and fuel, critical raw materials and related downstream manufactured goods.

But are import NTMs self-arming?

- Import NTMs arm countries to achieve multiple objectives
  - Economic: help infant industries grow, improve country's terms-of-trade, respond to economic crises
  - Political: respond to lobbying pressures
  - Non-economic: protect environment, public health, safety, and well-being of consumers, and national security

LMICs are arming themselves mostly for economic motives



Source: World Bank EFI and Global Trade Alert trade policy monitoring in essential goods.
Note: Distortive trade measures refer to limits on exports and imports.

Or are import NTMs self-harming?

- Border NTMs are more restrictive in LMICs

Figure: Coverage ratio

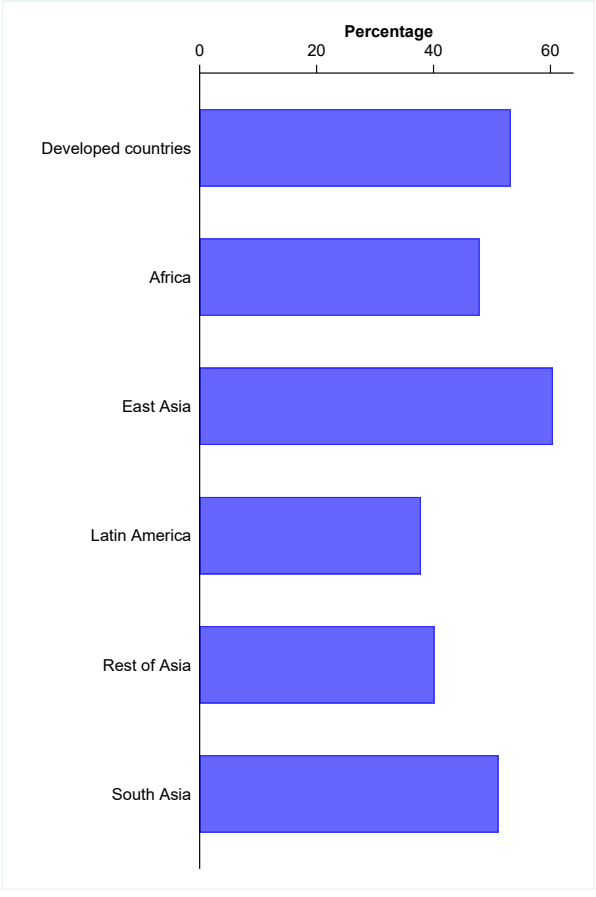
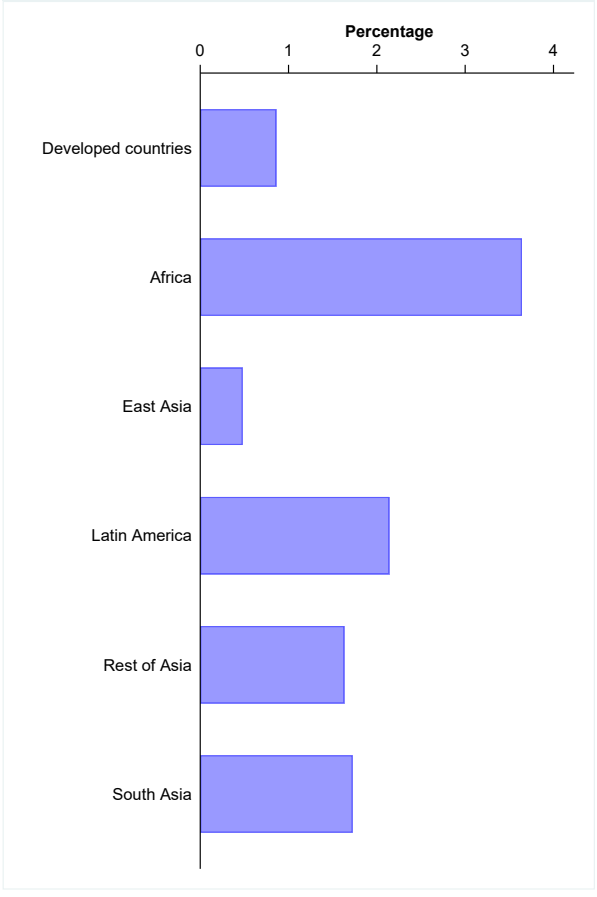


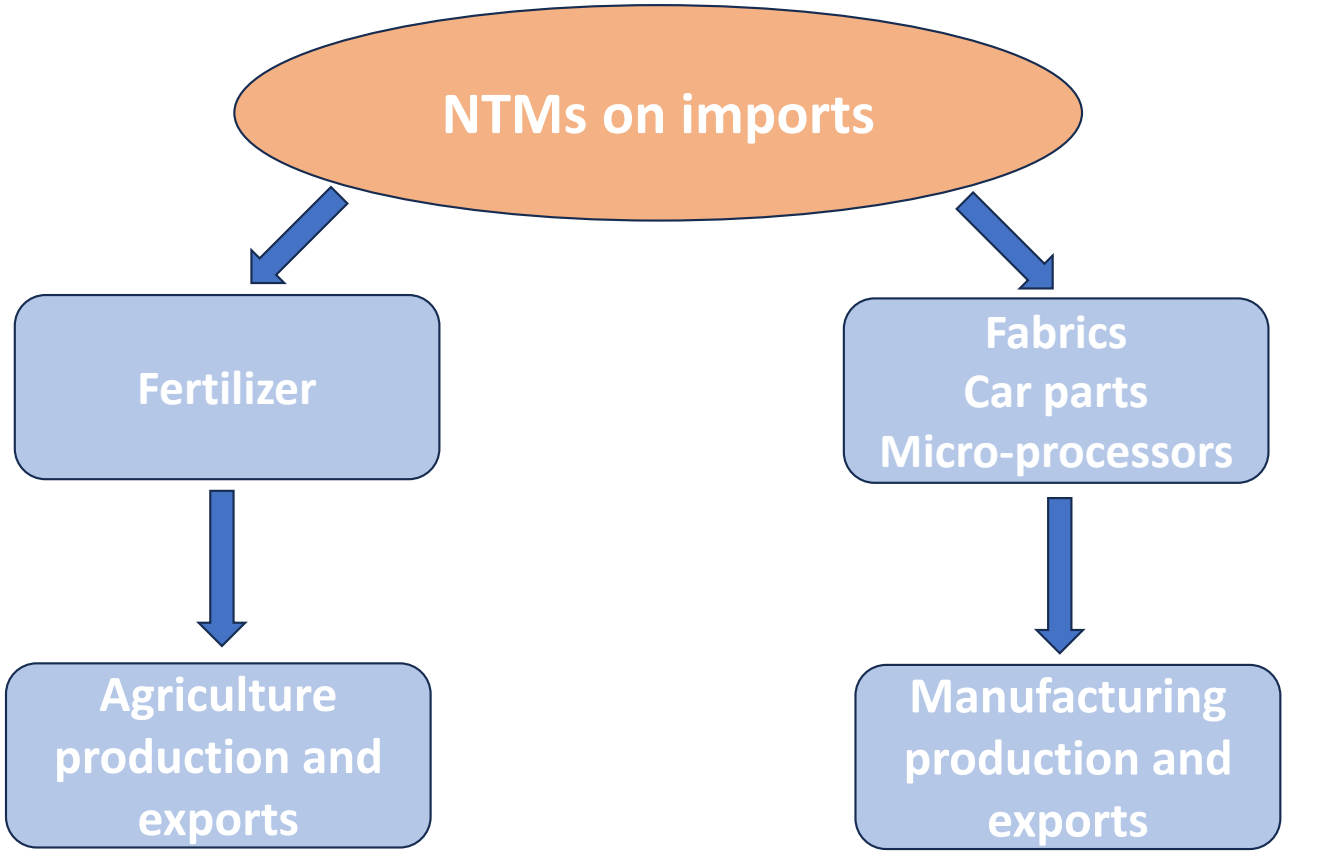
Figure: Ad-valorem equivalent



Source: UNCTAD (2023).

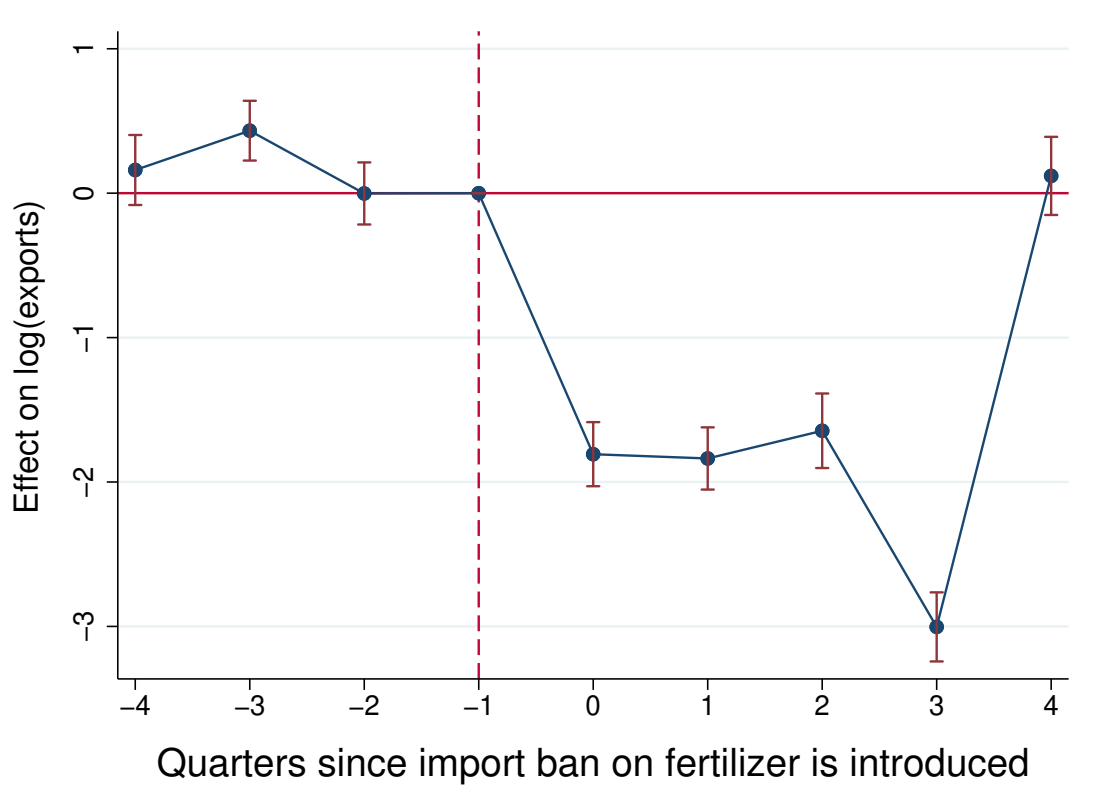
Notes: Border NTMs are defined as in Ederington and Ruta (2016). Ad-valorem equivalent to NTMs estimated following Kee and Nicita (2022).

Given input-output linkages, NTMs can be especially harmful



Harmful import ban: fertilizer-intensive agricultural exports decline by 33% in Sri Lanka

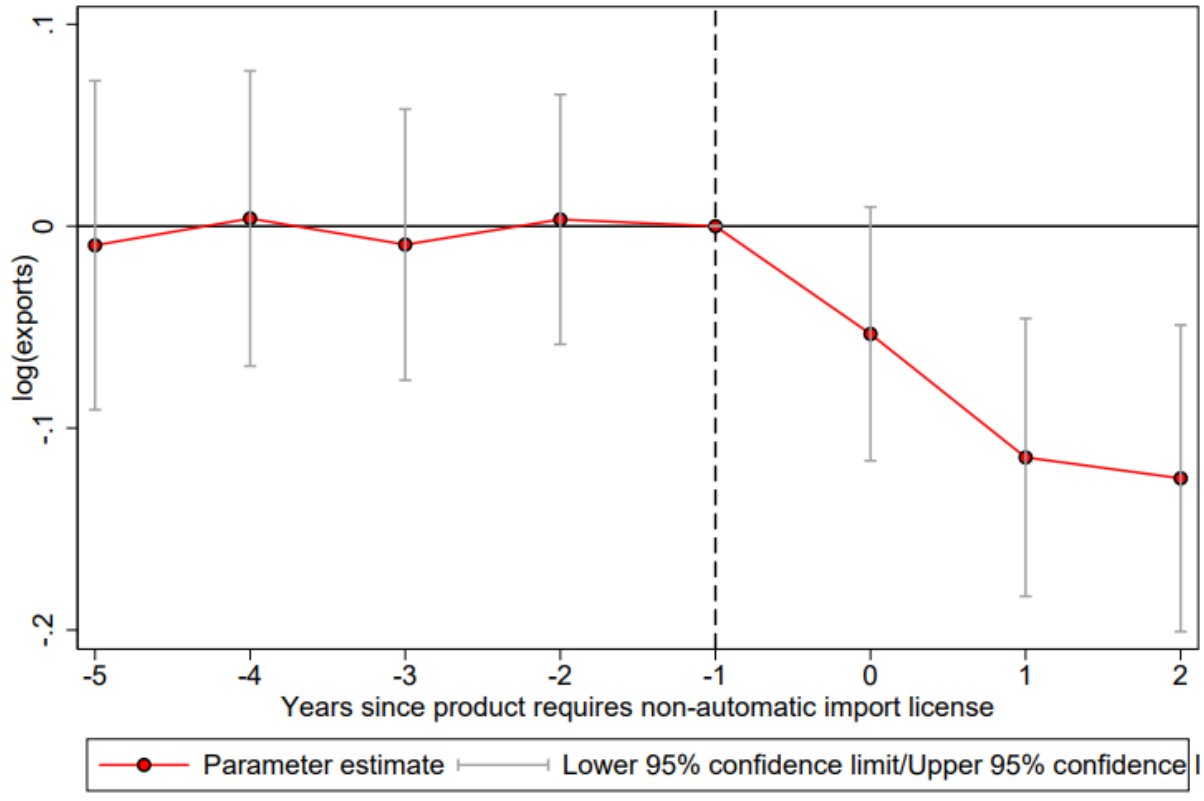
- Exposure to import ban depends on use of fertilizer in agricultural production



Source: Ghose, Fraga, Fernandes (2024).

Harmful import licenses: downstream exporters' sales decline in Argentina

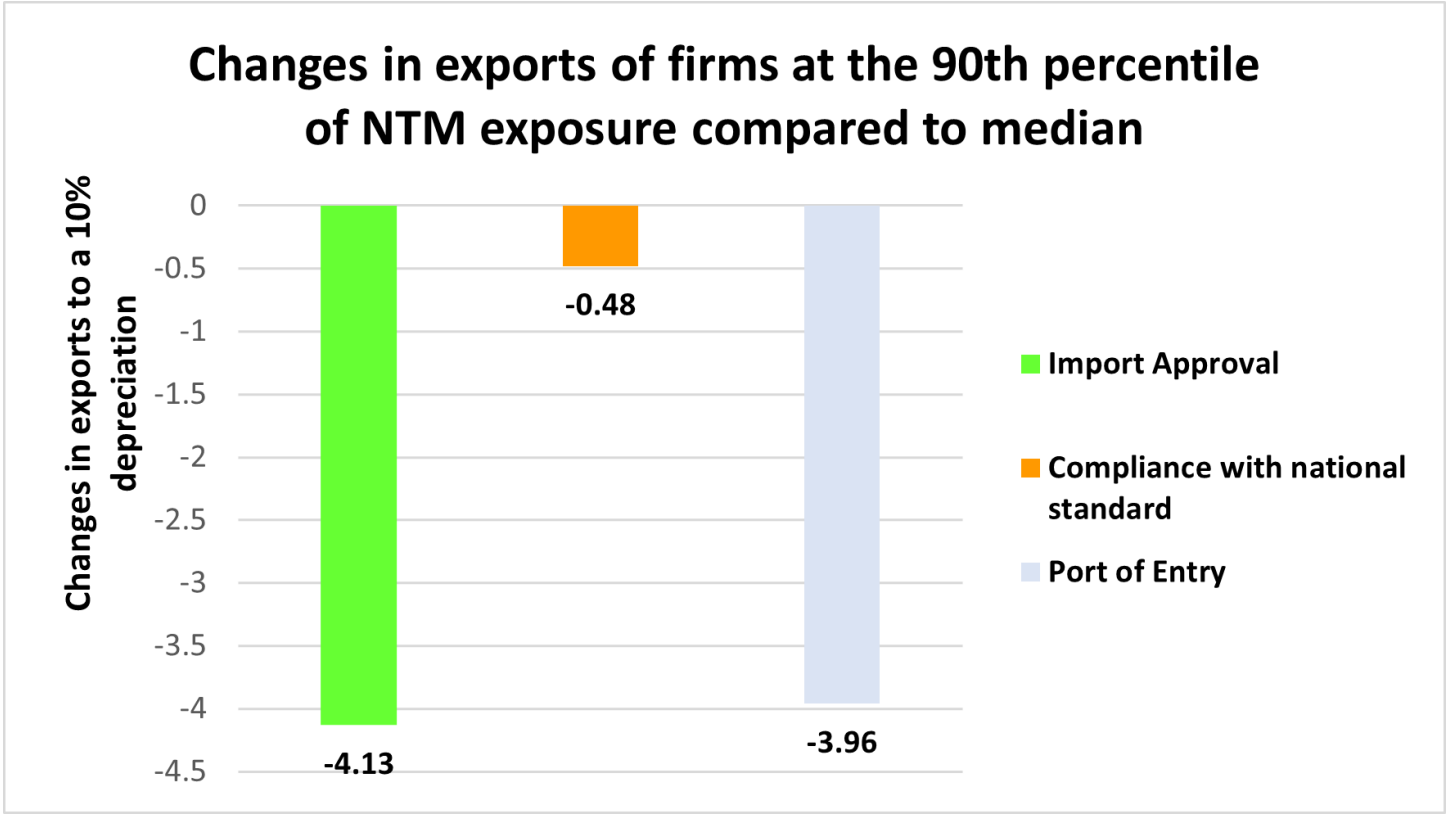
- Exposure of exporters to import licenses depends on their use of imported inputs



Source: Bernini and García-Lembergman (2022).

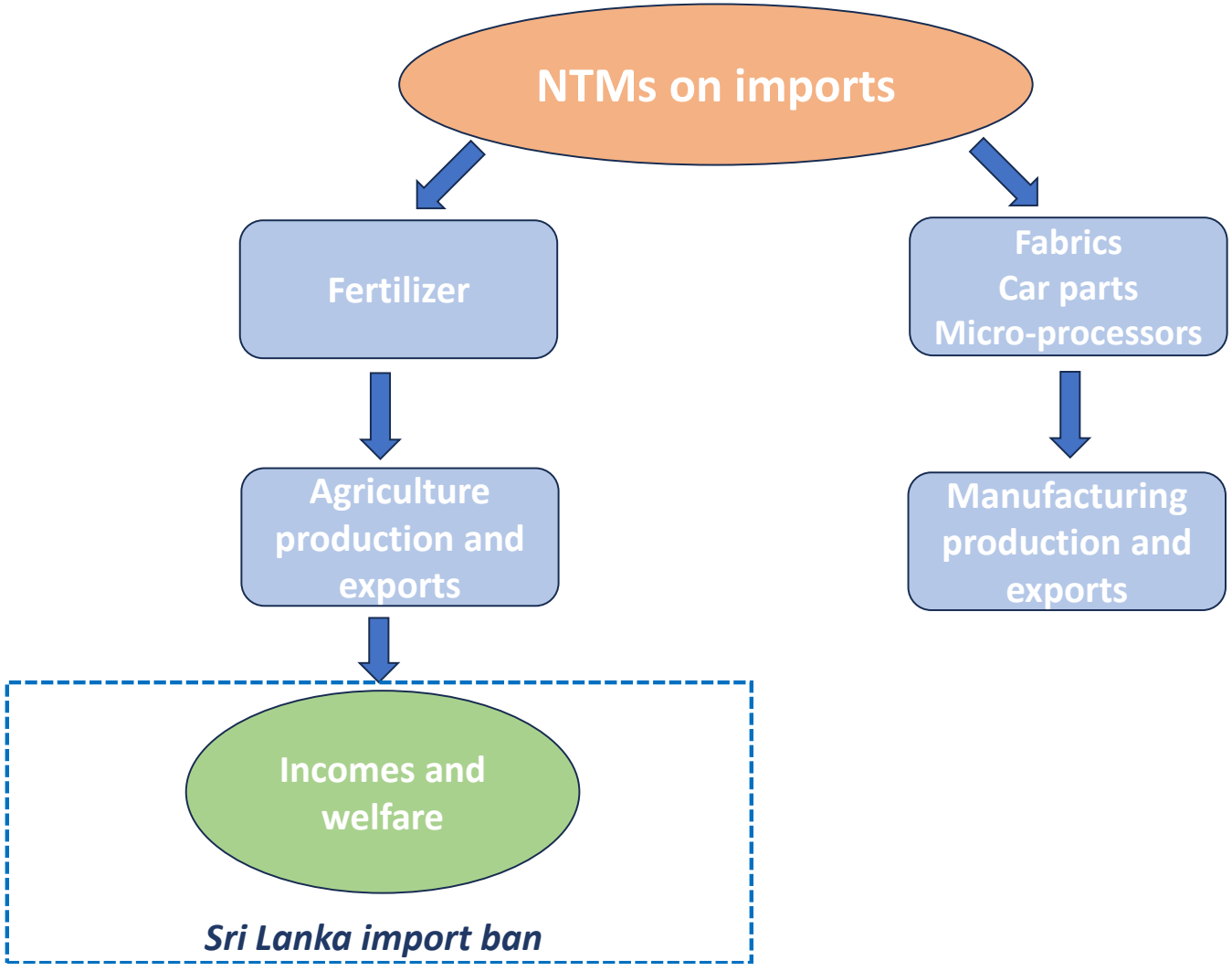
Harmful input NTMs: reduce exporters' ability to respond to shocks in Indonesia

- Firms facing NTMs on inputs less able to respond to sudden changes in export demand



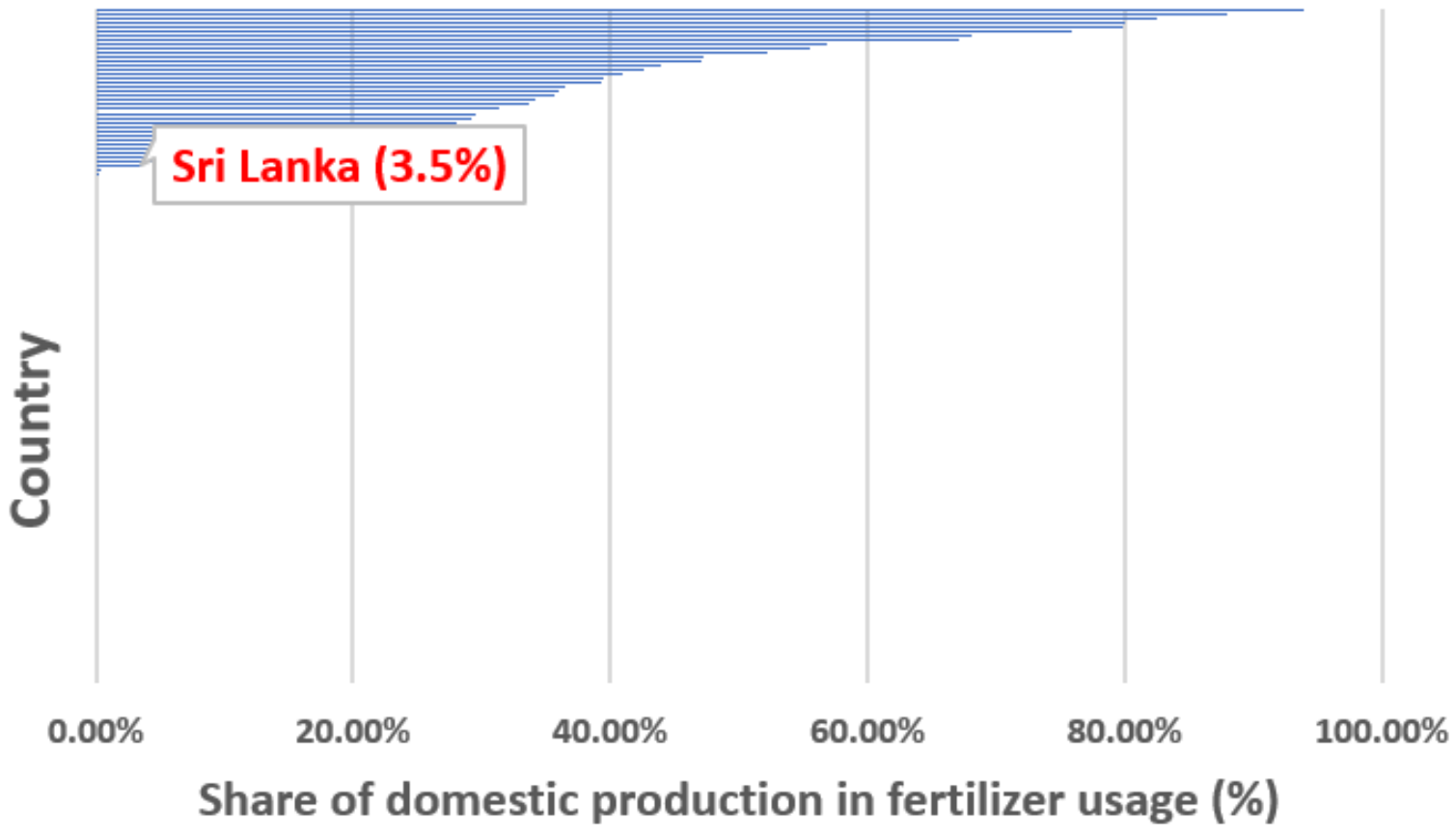
Source: Cali, Graciano, Ghose, Montfaucon, Ruta (2024).

Economy-wide effects of an NTM on a critical input



What are the aggregate and distributional consequences of a protectionist trade policy (import ban) on a critical input (fertilizer) for agricultural production, exports, and welfare?

Sri Lanka imports nearly all fertilizer needed by its agriculture sector



Sri Lanka bans chemical fertilizer imports on May 6, 2021

THE WALL STREET JOURNAL.

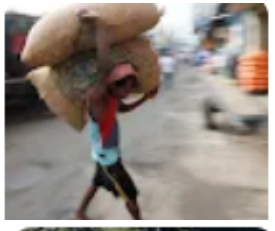
Sri Lanka's Farmers Struggle to Feed the Country—and Themselves

Aug 19, 2022

Reuters

Sri Lanka rows back on chemical fertiliser ban, but yields may not ...

Nov 24, 2021



The Economist

A rush to farm organically has plunged Sri Lanka's economy into crisis

Oct 16, 2021

While the stated intention was becoming the first country with **fully organic agriculture**, the actual purpose was **protectionist**

Protectionary import ban worsens trade deficit from agriculture

- Change in trade deficit from agriculture -$34 MM +$398 MM = + $364 MM
- Worsens foreign exchange situation

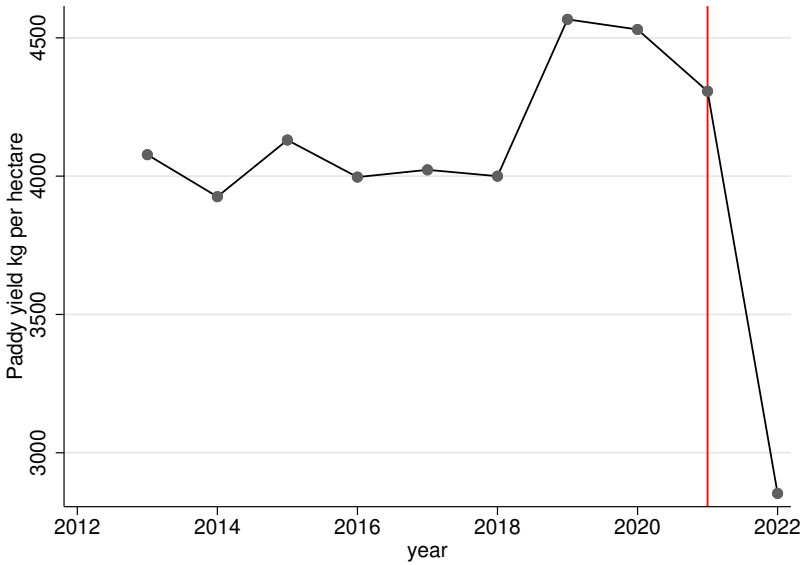
Table: Country-level effects

Variable	Effect	% Effect
Fertilizer imports ($)	-$34 MM	-16.9%
Fertilizer imports (kg)	-576 MM kg	-88.8%
Agro exports ($)	-$406.7 MM	-16.2%
Net Agro exports ($)	-$398.1 MM	-20%

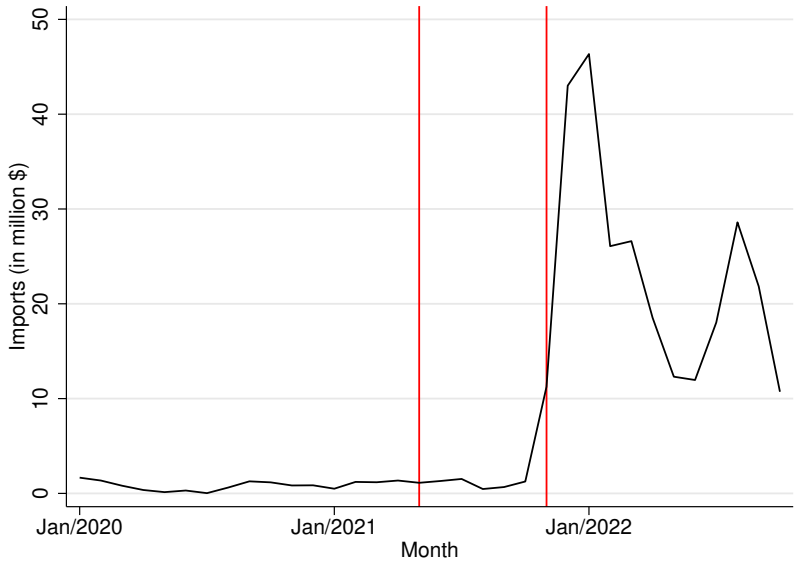
Source: Ghose, Fraga, and Fernandes (2024)

Net agricultural exports depend on production, imports, and exports

Sri Lanka's rice yields declined by more than 30% while rice imports exploded



(a) Annual Maha yield

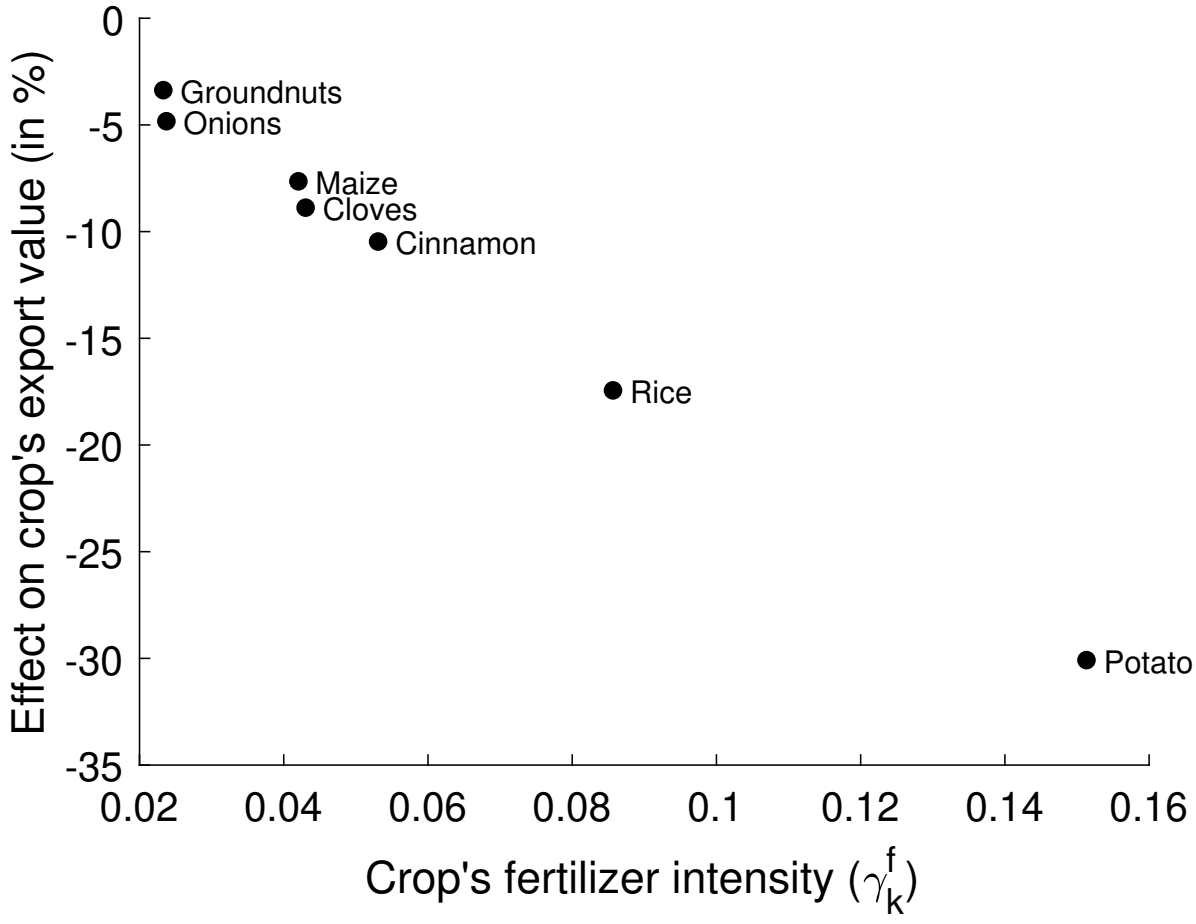


(b) Monthly rice imports

Notes: The left panel shows the Maha (September-March of the following year) rice yield, 2012-2022. The right panel shows the monthly imports of rice. Red lines in May and November 2021 mark the fertilizer import ban's beginning and end, respectively.

This decline was not driven by weather-related factors (Ozdogan, Wang, Ghose, Fraga, Fernandes, and Varela; 2024)

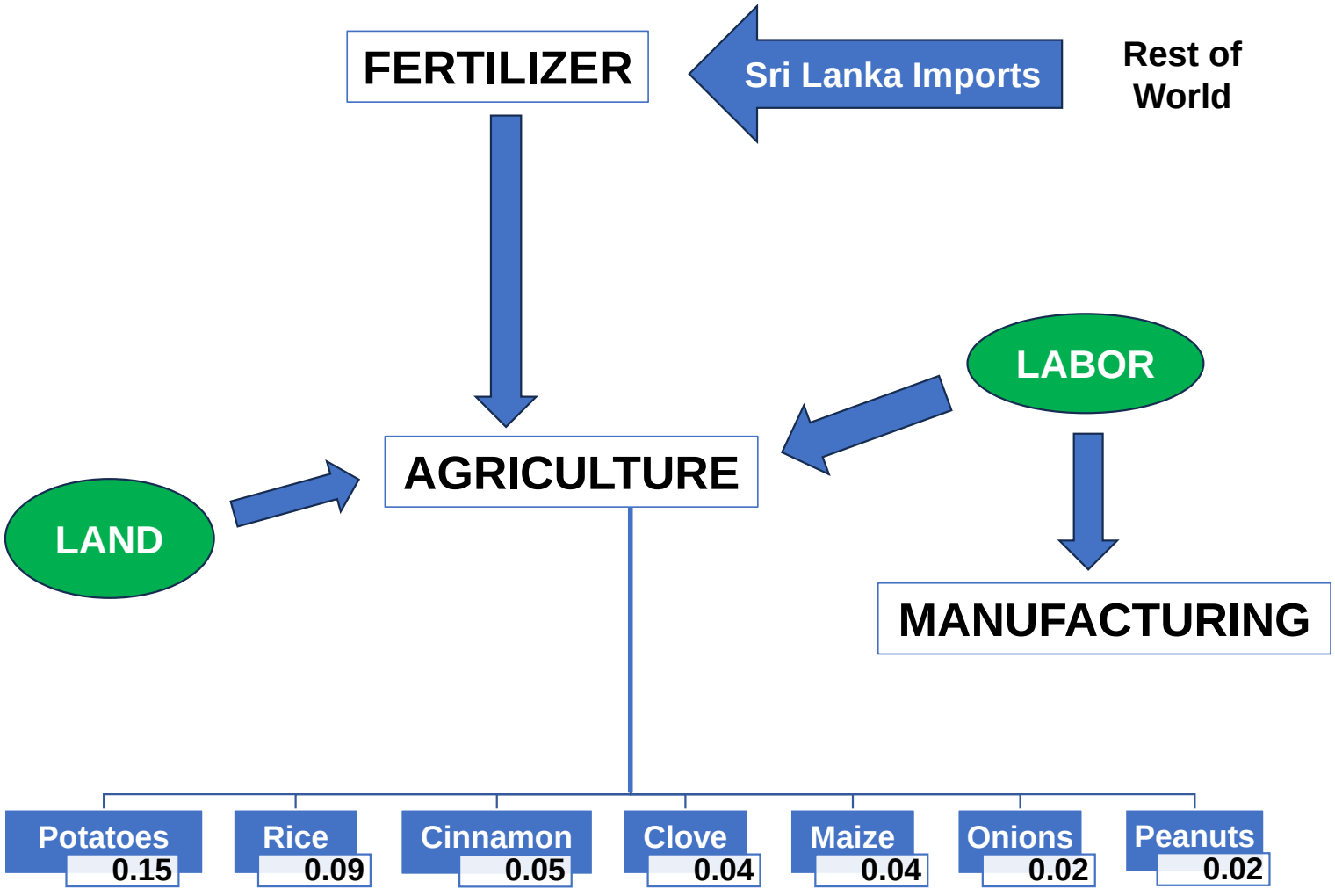
Exports decline more for crops more intensive in fertilizer



We present below a novel methodology to study the effects of import restrictions using a quantitative general equilibrium model

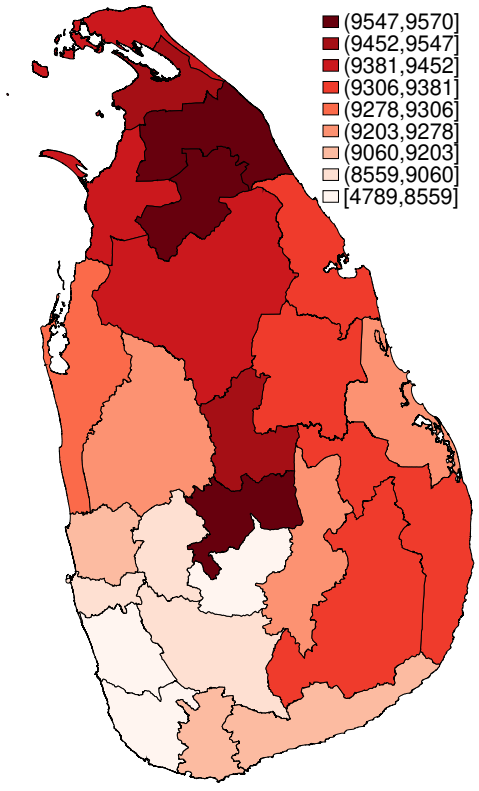
SUPPLY SIDE

Key ingredient: 1. Input output linkages

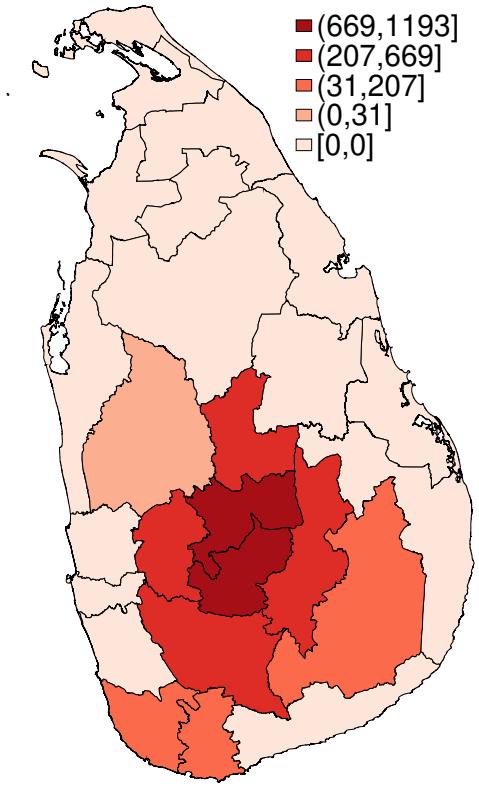


Fertilizer Intensity: the share of fertilizer in the crop's production costs (Source: National Fertilizer Secretariat, and authors' calculations)

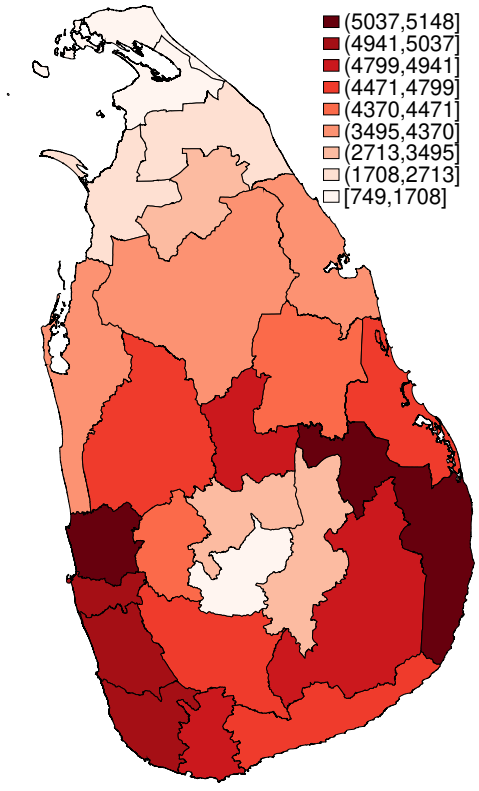
Key ingredient: 2. Geographical differences in potential crop yields



RICE
(kg/ha)



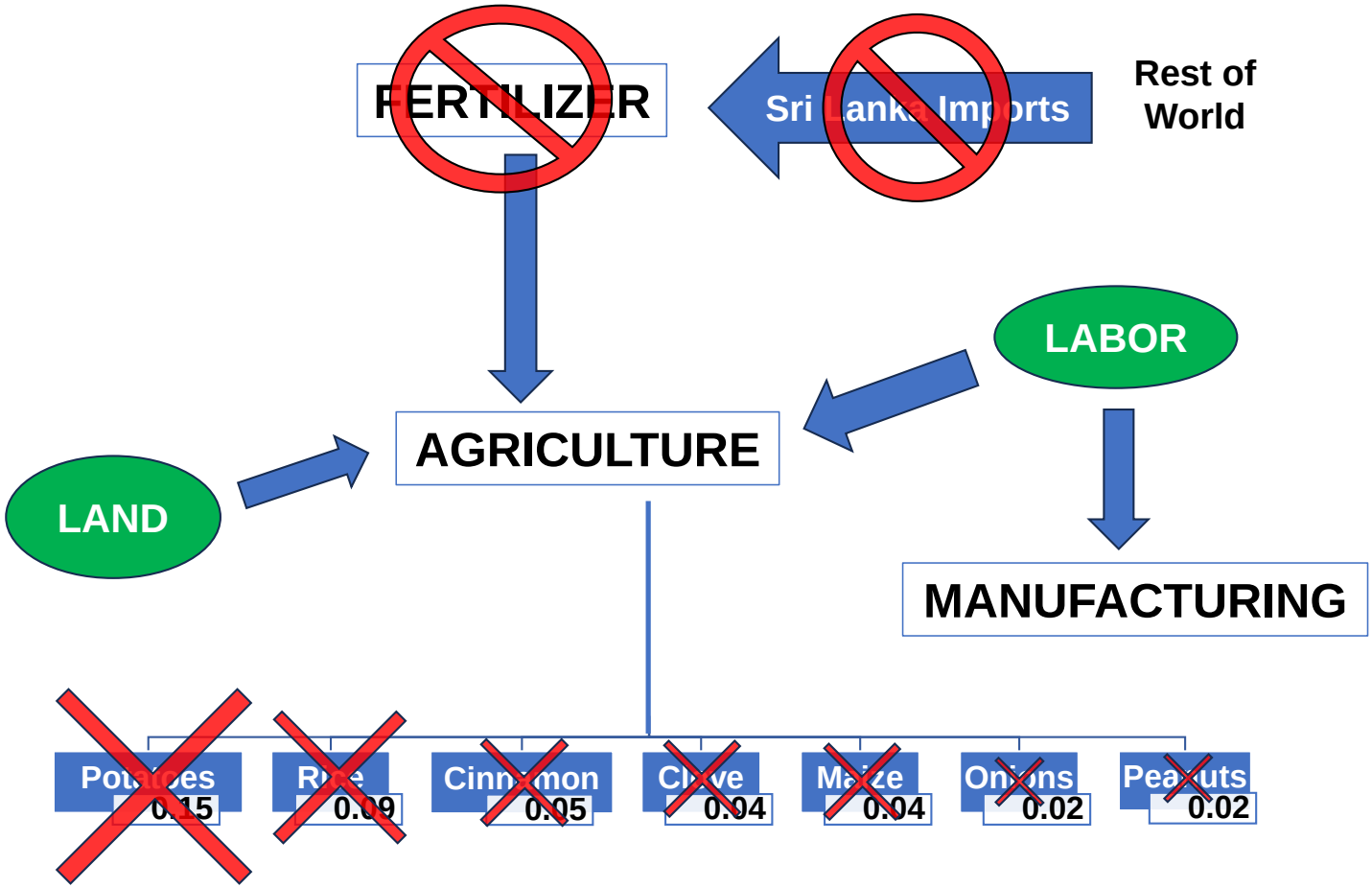
TEA
(kg/ha)



COCONUT
(kg/ha)

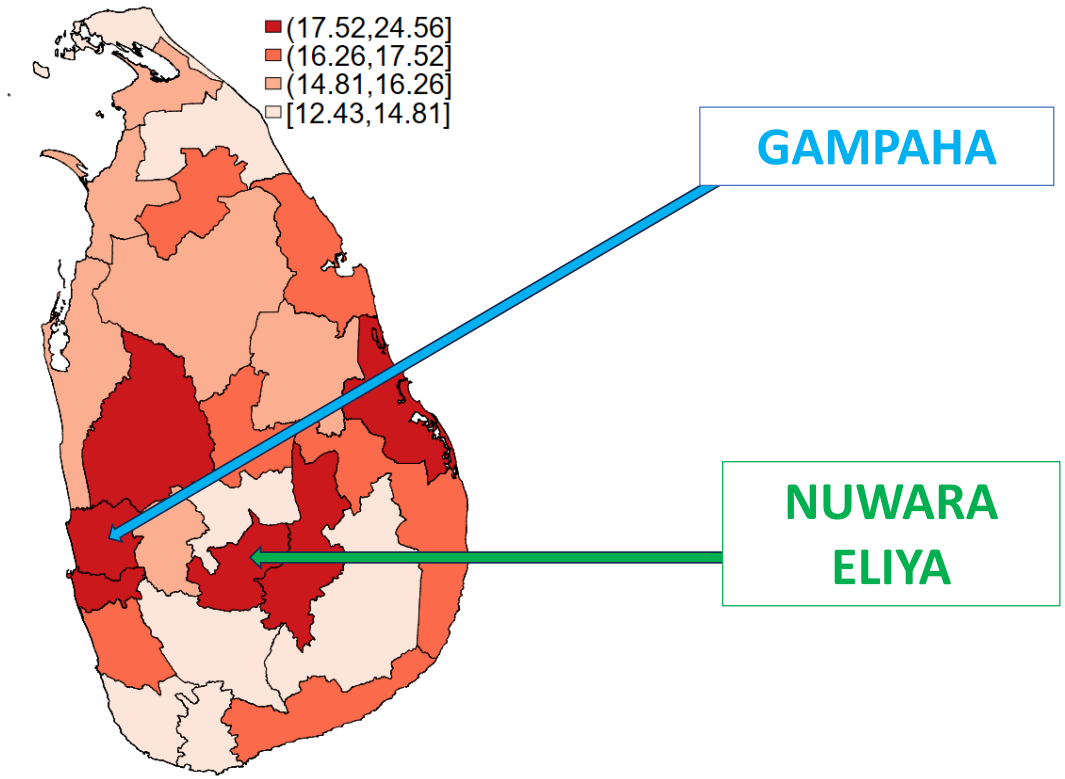
Potential crop yield: the district-level average of the crop's maximum potential attainable yield (in kilograms per hectare) as estimated by an agronomic model that takes into account local geographic factors such climate and geology (Source: FAO-GAEZ project)

These two key features determine the supply side effects of the fertilizer import ban



Since regions specialize in producing different crops, there are regional differences in fall in agricultural income due to the ban.

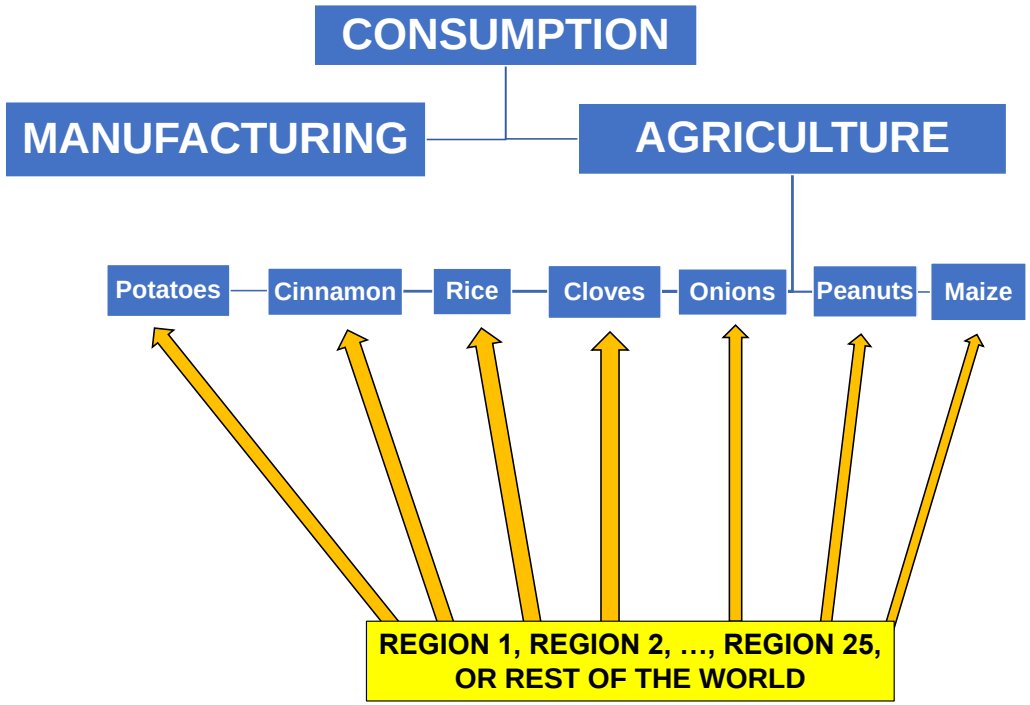
These two key features determine the supply side effects of the fertilizer import ban



- **Nuwara Eliya** (largest decline in agro income) has the largest share of potato (most fertilizer intensive crop) at baseline
- **Gampaha** (2nd largest decline in agro income) is heavily concentrated in rice

DEMAND SIDE

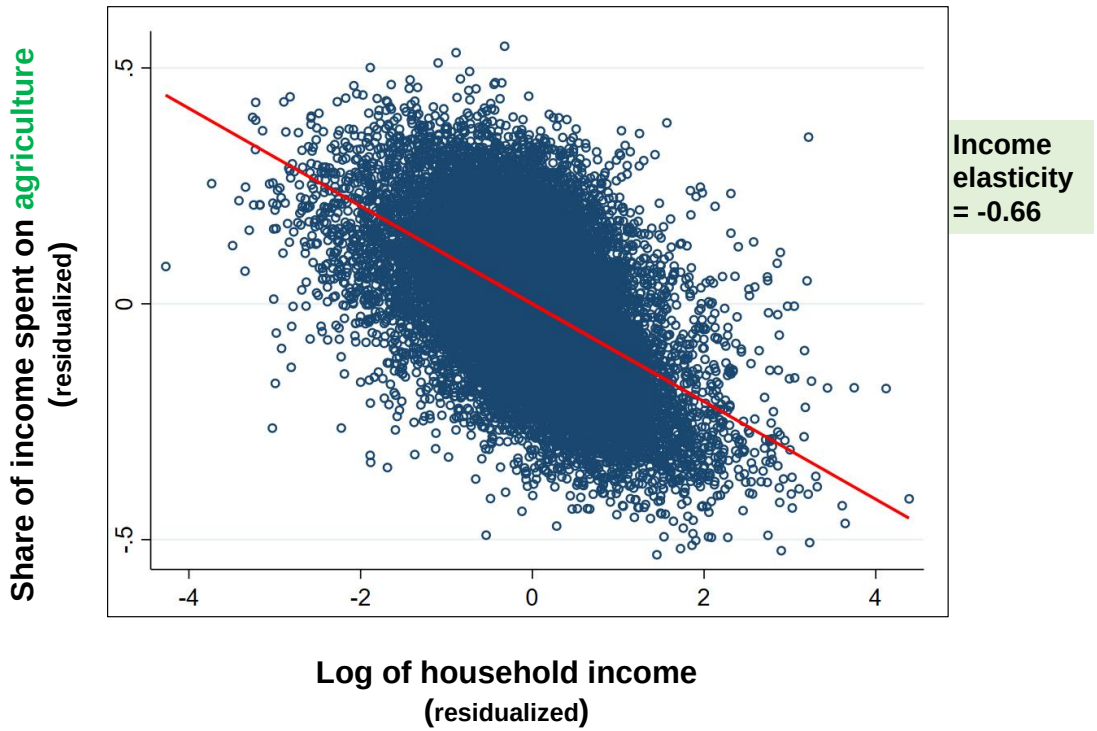
Key ingredient: 1. People eat a variety of agricultural produce sourced from different places



Welfare changes due to the import ban depend on consumer preferences:

1. Substitutability across crops (e.g. maize instead of rice)
2. Substitutability within crops (e.g. how easy is it to give up Sri Lankan red rice for American white rice?)

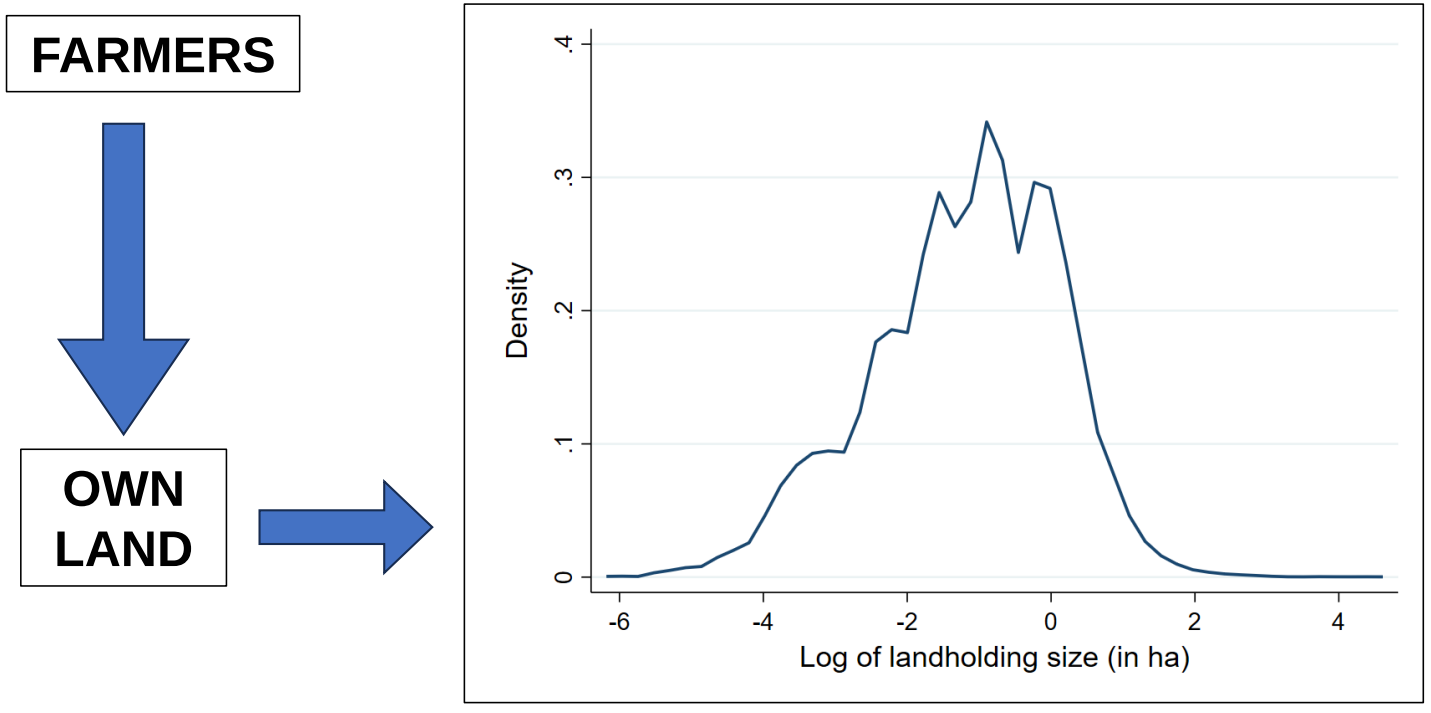
Key ingredient: 2. Poorer people spend a larger share on food, a feature of most countries



Notes: residualized variables are computed as deviations from the regional average. Data source is the 2019 Household Survey.

Poor households susceptible to agricultural shocks because they spend a large share of their budget on food and rely on agro income (Artuc, Porto, and Rijkers; 2024): Household Impacts of Tariffs database

Key ingredient: 3. Land, thus, agricultural income is unequally distributed, a feature of developing countries



Type of household	Number of households	%
Small landowner (< 4ha)	1,469,622	98.9%
Large landowner (>= 4ha)	16,014	1.1%

Source: Household Survey, 2016

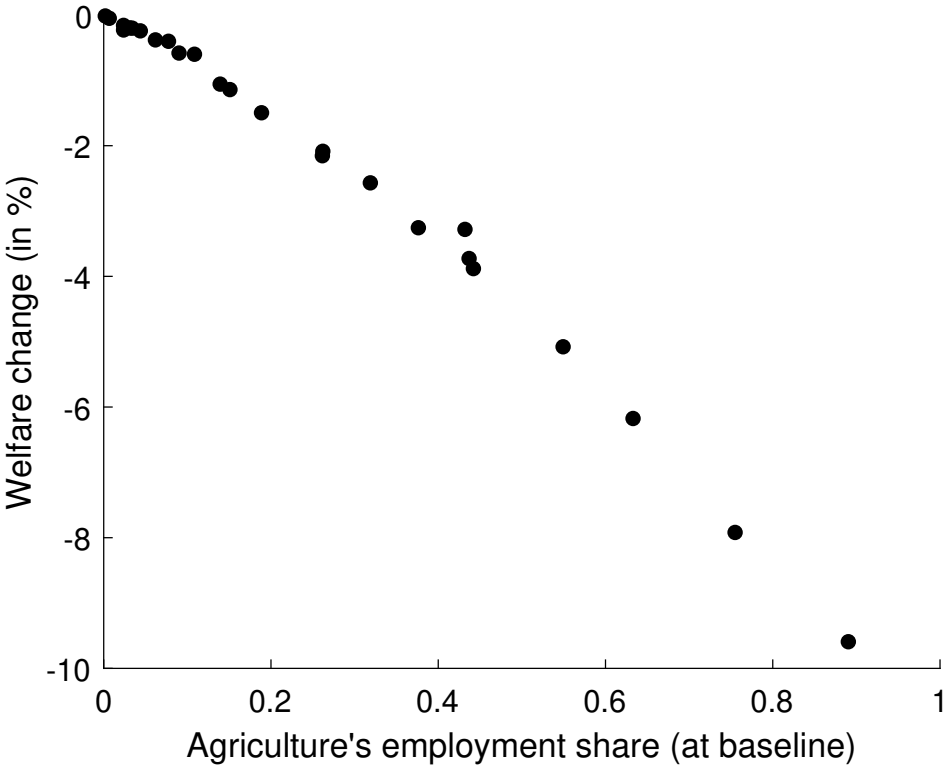
Two key features matter for welfare

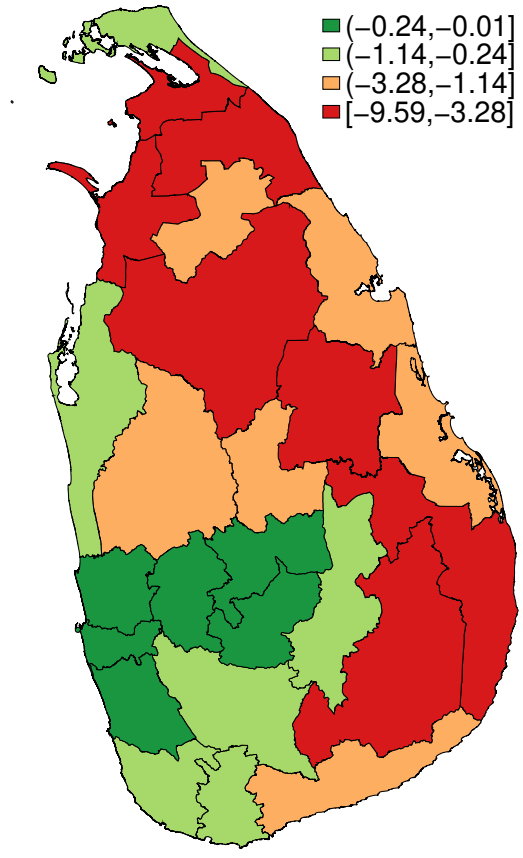
- The two key features of most economies in the world but rarely modeled in spatial trade models
  1. Poorer people spend a larger share of their income on food
  2. Land-inequality (income inequality) within and across districts

- Our framework introduces both features in the class of spatial models

- More land/ income unequal district (given mean land size/income) $\rightarrow$ low agro spending $\rightarrow$ smaller agro sector $\rightarrow$ larger manufacturing $\rightarrow$ larger outside option for workers when negative shock hits the agricultural sector (e.g., the fertilizer import ban)

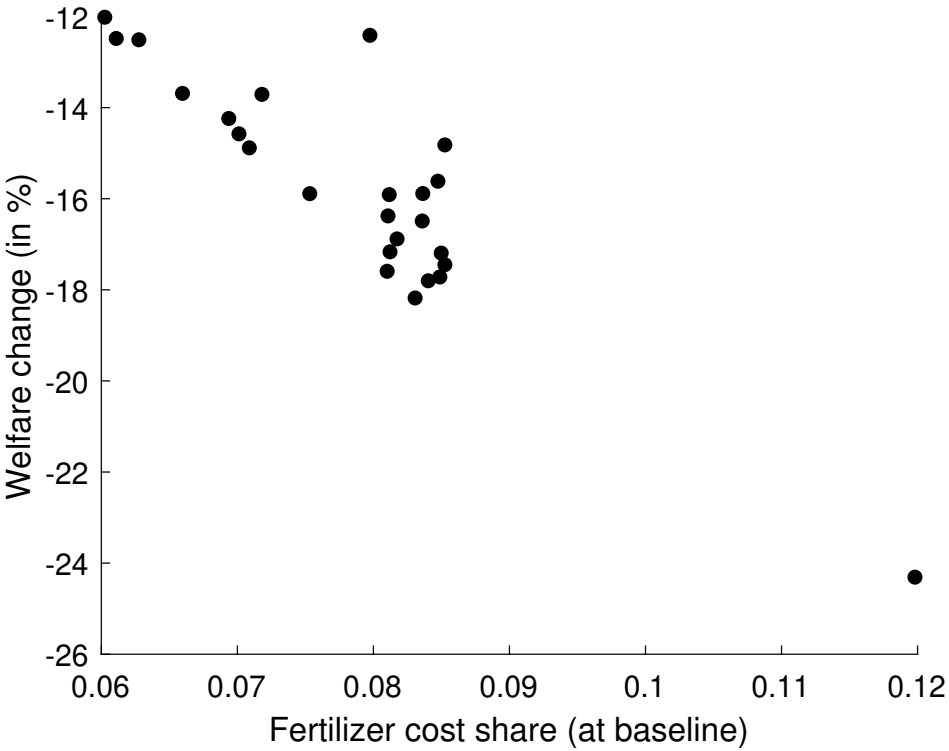
Welfare effects on workers from fertilizer import ban

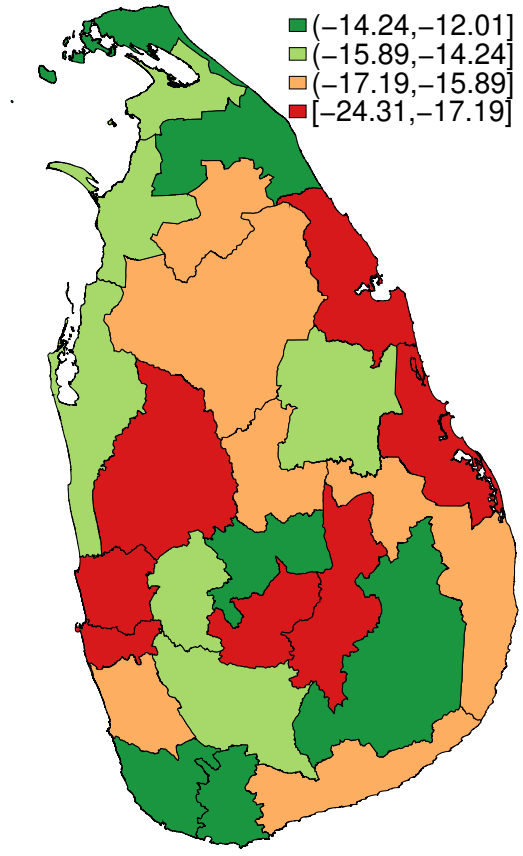




Geographic Heterogeneity #1: Worker suffers little if her region has large manufacturing employment "buffer" that can easily absorb her.

Welfare effects on farmers from fertilizer import ban





Geographic Heterogeneity #2: Worse effects in regions specialized in fertilizer-intensive crops ($\rho = -0.90$).

Overall welfare effects of fertilizer import ban

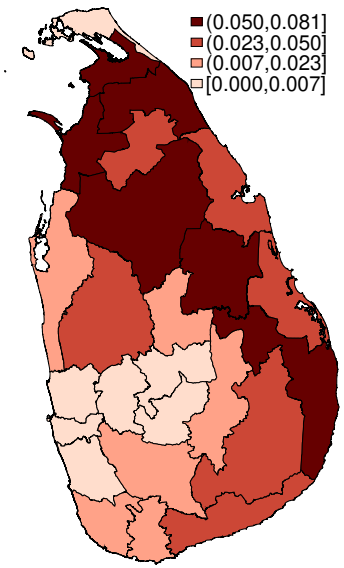
Table: Welfare (cross-district average) in terms of income (equivalent variation)

Agent type	**Equivalent variation**
Worker	-2.26%
Repr. Farmer	-15.83%
Repr. Agent	-4.48%

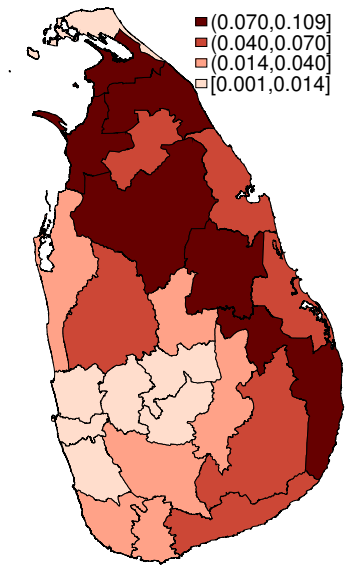
- Worker (sectorally mobile) suffers less than farmers
- Farmers (whose income is attached to agriculture) suffers more.

Fertilizer intensity of a district should thus strongly correlate with GDP loss.

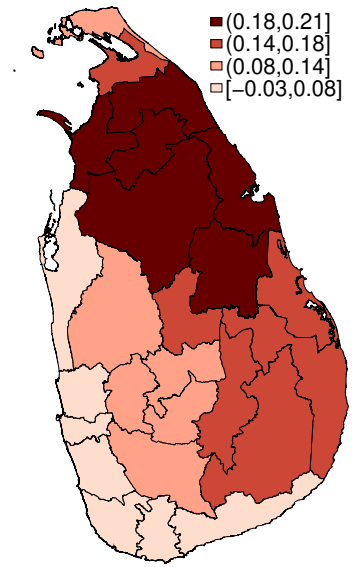
GDP declined by 5.8% in fertilizer-intensive relative to less fertilizer-intensive districts



a. Fertilizer's importance in local economy



b. Fall in (log) income predicted by model



c. Fall in (log) income implied by change in nightlights (4/2021 - 1/2022)

- Geographic mobility in the long-run can attenuate negative welfare effects (Artuc, Bastos, and Lee 2021; Ghose, 2024)

Summarising our framework to study the effects of import restrictions

A general framework with many regions producing crops with differing fertilizer intensities + land inequality + trade with the rest of the world

Example applications:

1. How would the effects of a quantitative restriction on intermediate imports differ from the effects of a tariff?
2. How does the global fertilizer crisis affect countries dependent on imported fertilizers?

Matching trade, national accounts, price and satellite data:

- Number of workers and farmers
- Wages and crop prices
- Crop production and cultivation area at granular pixel level
- Trade policy: import ban ▸ Sri Lanka's gazettes

Lessons learned 1: collecting the right data is fundamental

- Frequent and consistent data on NTMs is crucial for their impact to be assessed and for policy dialogue on NTM reform
- But the only global NTM dataset, UNCTAD Trade Analysis and Information System (TRAINS), does not include a time dimension
- Nascent data and research efforts to collect better NTM data are country-specific:
  - led by researchers: Argentina
  - led by World Bank: Sri Lanka and Indonesia

Lessons learned 2: economic impacts of NTMs

- NTMs (as opposed to tariffs) act as fixed costs which reduce firms' resilience to shocks
  - Import approval and port of entry restrictions in Indonesia prevented firms from taking advantage of opportunities to expand and diversify exports
- Restrictive policies on imports of critical inputs can be harmful: reducing production, exports and welfare
  - Impacts are unequally distributed across space and economic agents
  - Input-output linkages are crucial to consider in analysis of impacts of NTMs
- Protectionist NTMs on inputs can back-fire: instead of saving foreign exchange they increase trade deficit

Open questions: how can trade policy be leveraged to foster development?

- NTMs on imports of critical inputs can pose risks
- What are other policy options available to LMICs? And how do different policies interact?
- Restrictions on exports of critical materials are being used to foster value added of domestic industries
  - Can this strategy be successful?
  - EU presented a complaint against Indonesia's nickel export ban at the WTO, Indonesia appealed but given the WTO appellate body crisis, Indonesia is keeping the ban

What can we at the World Bank do?

1. Deepen the collaboration between country teams and DEC, fostering more case studies with rich data collection and estimation of impacts
2. Contribute to upgrading of trade policy data so it is better fit to address the many open questions
3. Bridge gap with research community to encourage more work on impacts of NTMs and implications for development outcomes

Thank you!

afernandes@worldbank.org, dghose@worldbank.org

Special thanks to Paula Suarez, Maria del Mar Ortiz, Alvaro Espitia, Eduardo Fraga, and Daria Taglioni for their contributions to this Policy Research Talk

References

- Artuc, Erhan and Bastos, Paulo and Eunhee Lee, 2021. "Trade, Jobs, and Worker Welfare" CEPR Discussion Paper 16009.
- Artuc, Erhan, Porto, Guido, and Bob Rijkers, 2024. "Crops, Conflict and Climate Change," World Bank mimeo.
- Bernini, Federico and Ezequiel Garcia-Lembergman, 2022. "Multi-Destinations Firms Responses to Non-Tariff Barriers to Imports: Evidence from Non-Automatic Import Licenses in Argentina," https://ssrn.com/abstract=4344098
- Cali, Massimiliano, Graciano, Simon, Ghose, Devaki, and Angella Montfaucon, 2024. "Trade Policy and Exporters' Resilience: Evidence from Indonesia," World Bank Policy Research Working Paper 10068.
- Ederington, Josh and Michele Ruta, 2016. "Nontariff Measures and the World Trading System" Chapter 5 in Kyle Bagwell and Robert Staiger (eds.) *Handbook of Commercial Policy*. North-Holland.
- Ghose, Devaki, Fraga, Eduardo, and Ana Fernandes, 2023. "Fertilizer Import Bans, Agricultural Exports, and Welfare : Evidence from Sri Lanka," World Bank Policy Research Working Paper 10642.
- Ghose, Devaki, 2024. "Trade, Internal Migration, and Human Capital : Who Gains from India's IT Boom?," World Bank Policy Research Working Paper 9738.
- Kee Hiau-Looi and Nicita Alessandro, 2022. "Trade Fraud and Non-Tariff Measures," Journal of International Economics 139, pp. 1-20.
- Kee, Hiau-Looi and Enze Xie, 2024. "Trade Policies Mix and Match: Theory and Evidence" World Bank mimeo.
- Ozdogan, Mutlu, Wang, Sherrie, Ghose, Devaki, Fraga, Eduardo, Fernandes, Ana, and Gonzalo Varela, 2024. "Field-scale Rice Area and Yield Mapping in Sri Lanka with Optical Remote Sensing and Limited Training Data," World Bank mimeo.
- UNCTAD (2023). *Key Statistics and Trends in Trade Policy 2022: Green Goods Trade and Trade Policies*. United Nations.
- Zavala, Lucas, Fernandes, Ana, Haygood, Ryan, Reed, Tristan, and Jose-Daniel Reyes, 2023. "Quality Regulation Creates and Reallocates Trade". World Bank Policy Research Working Paper 10601.

Progress in NTM data collection: Sri Lanka's gazettes

- Hand-code gazettes on imports and exports regulations (March 2020-October 2022) identifying HS-8 products with import bans

ශ්‍රී ලංකා ප්‍රජාතාන්ත්‍රික සමාජවාදී ජනරජයේ ගැසට් පත්‍රය

අති විශෙෂ

The Gazette of the Democratic Socialist Republic of Sri Lanka

EXTRAORDINARY

අංක 2226/48 - 2021 මැයි මස 06 වැනි බ්‍රහස්පතින්දා - 2021.05.06
No. 2226/48 - THURSDAY, MAY 06, 2021

(Published by Authority)

PART I : SECTION (I) — GENERAL

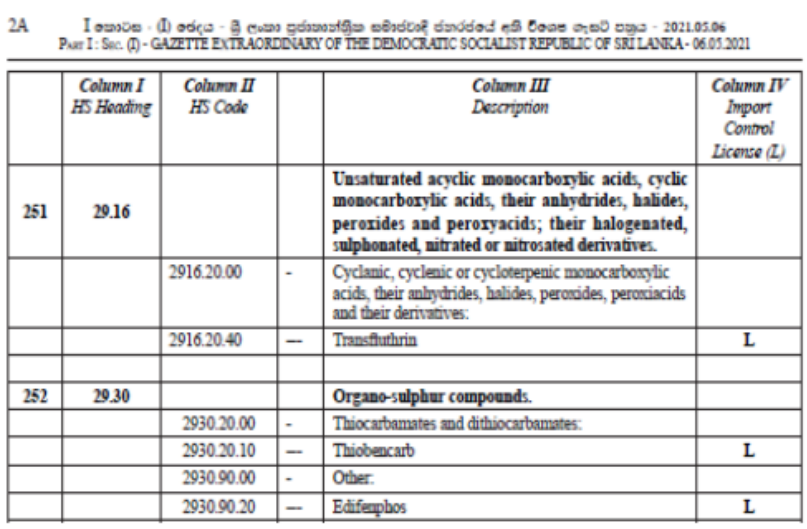
Government Notifications

Imports and Exports (Control) Act, No. 1 of 1969

IN terms of the powers vested in me by Section 20 read together with Sub-Section 4(1) and Section 14 of the Imports and Exports (Control) Act, No. 1 of 1969 as amended by Act, No. 48 of 1985 and Act, No. 28 of 1987, I, Mahinda Rajapaksa, the Minister of Finance, promulgate following Regulations.

MAHINDA RAJAPAKSA,
Minister of Finance.

Ministry of Finance,
Colombo 01,
06 May 2021.



2A I කොටස : (I) ඡෙදය - ශ්‍රී ලංකා ප්‍රජාතාන්ත්‍රික සමාජවාදී ජනරජයේ අති විශෙෂ ගැසට් පත්‍රය - 2021.05.06
PART I : SEC. (I) - GAZETTE EXTRAORDINARY OF THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA - 06.05.2021

	Column I *HS Heading*	*Column II* *HS Code*		*Column III* *Description*	*Column IV* *Import Control License (L)*
251	29.16			**Unsaturated acyclic monocarboxylic acids, cyclic monocarboxylic acids, their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives.**	
		2916.20.00	-	Cyclanic, cyclenic or cycloterpenic monocarboxylic acids, their anhydrides, halides, peroxides, peroxiacids and their derivatives:	
		2916.20.40	—	Transfluthrin	L
252	29.30			**Organo-sulphur compounds.**	
		2930.20.00	-	Thiocarbamates and dithiocarbamates:	
		2930.20.10	—	Thiobencarb	L
		2930.90.00	-	Other:	
		2930.90.20	—	Edifenphos	L

Back