

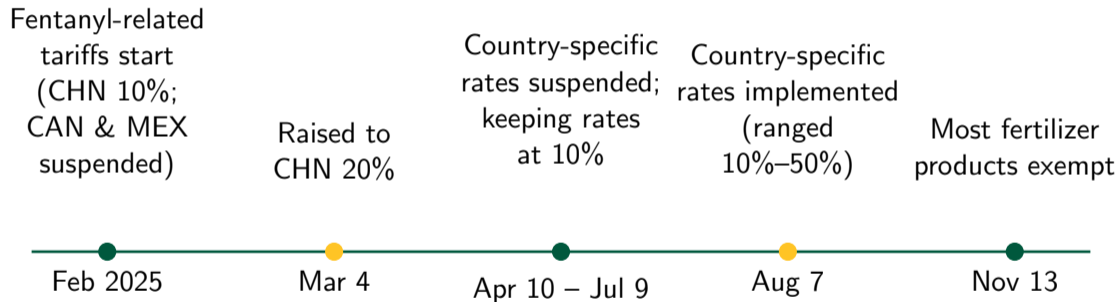
The Short-Run Price Impact of 2025 U.S. Tariffs on the Fertilizer Market

Jiyeon Kim, Rwit Chakravorty, Wuit Yi Lwin, and Shawn Arita

Department of Agribusiness and Applied Economics,
North Dakota State University

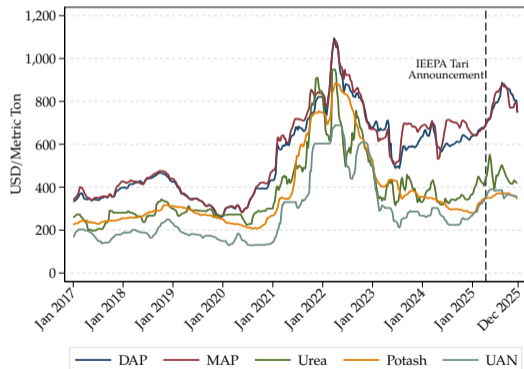
2025 IATRC Annual Meeting
December 14-16, 2025

IEEPA Tariff Timeline



U.S. Fertilizer Prices

Figure: Fertilizer Prices on the US Gulf Coast



- Farmers have been concerned about further rise in fertilizer expenses in addition to the exist high burden.
 - Fertilizer expenses up 37%, fuel and oil up 32%, and seed up 18% during 2020–2025F (ERS, 2025).
- IEEPA tariff policy can raise import prices.
 - Positive tariff pass-through (Cavallo et al., 2021; Fajgelbaum et al., 2020; Amiti et al., 2020).

Research questions

- Did the 2025 IEEPA tariffs affect U.S. fertilizer import flows?
 - Examine the trade effect of U.S. IEEPA tariff using the gravity model.
- To what extent were the IEEPA tariffs on fertilizer passed through to U.S. buyer prices, and did pass-through vary by exporting country, product characteristics (e.g., nitrogen vs. phosphate vs. potash)?
 - Estimate the short-run impact of IEEPA tariff on U.S. fertilizer prices using the difference-in-differences (DiD) model.

U.S. Fertilizer Consumption and Import in 2024

Figure: Domestic vs Imported Nutrient Consumption
(Source: The Fertilize Institute)

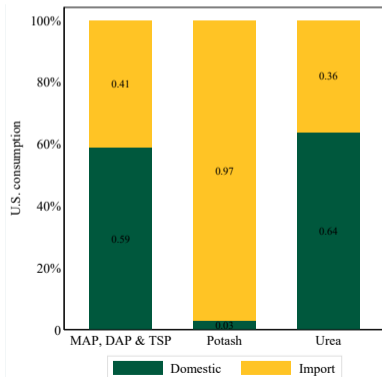
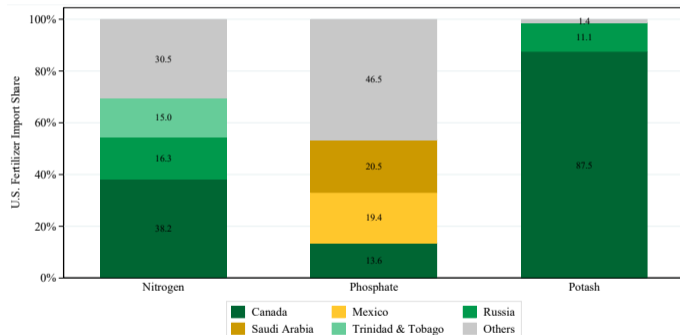
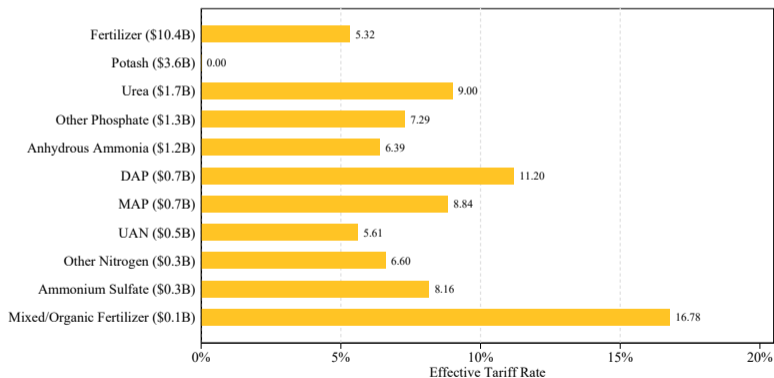


Figure: U.S. Import Share by Fertilizer in 2024

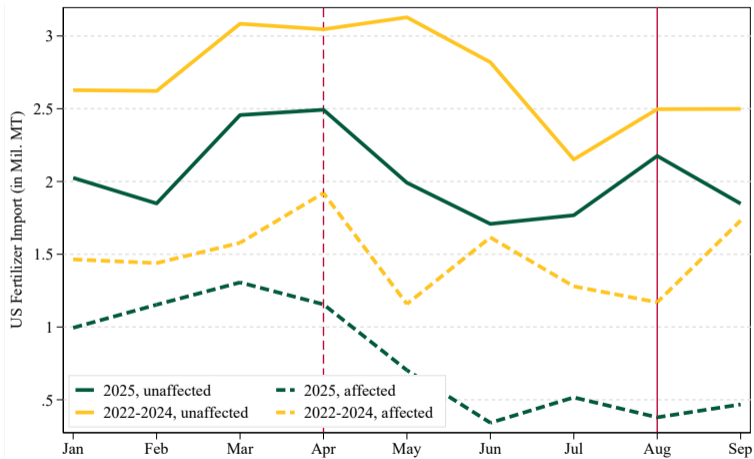


Import-Dependent Products Faced High IEEPA Tariff Rates

Figure: Average IEEPA tariff rates (as of August 2025)



US Fertilizer Import: Affected vs. Unaffected



Effects of IEEPA on Fertilizer Import: Gravity Model

Following Grant et al. (2021), we estimate the gravity model using the Poisson pseudo-maximum likelihood (PPML) regression.

$$Trade_{ijkmt} = \exp(\gamma_1 1(IEEPA_{ijkmt} > 0) + \mu_{ijkm} + \pi_{it} + \phi_{jt} + \theta_{kt} + \epsilon_{ijkmt}) \quad (1)$$

where

- i exporter, j importer, k fertilizer product, $m \in \{1, \dots, 12\}$ month, and $t \in \{2022, \dots, 2025\}$
- $Trade_{ijkmt}$: the value of bilateral trade of fertilizer product k
- $1(IEEPA_{ijkmt} > 0)$: dummy variable indicating 1 if $IEEPA_{ijkmt} > 0$, otherwise 0
- μ_{ijkm} : product-and-month specific bilateral trade cost
- π_{it}, ϕ_{jt} : outward and inward multilateral resistance
- θ_{kt} : year-to-year fluctuations in global fertilizer
- ζ_{mt} : month-by-year shifts

Short-Run Price Effect: Difference-in-Differences (Optimal)

We employ a difference-in-differences event study design comparing US retail price (treatment group) and international spot prices (control group) by product categories:

$$\Delta \ln(P_{ict}) = \sum_{k=-6}^6 \beta_k \mathbf{1}\{t = t_{0+k}\} \times \text{Treated}_i + \alpha_c + \gamma_t + \epsilon_{it} \quad (2)$$

where

- $\Delta \ln(P_{ict})$: price changes for fertilizer c imported from country i in time t
- $\sum_{k=-6}^6 \beta_k$: cumulative pass-through (complete pass-through = 1.0; zero = 0)
- α_c, γ_t : product category and time fixed effects

Short-Run Price Effect: Simple DID (Preliminary)

Fertilizer prices exhibit strong seasonality driven by demand tied to planting cycles. Without controlling for this seasonal demand pattern, estimates of short-run price effects may be biased. To mitigate this concern, we compare US retail prices with Canadian spot prices over alternative time windows (Apr.-Nov., Oct.-Nov.):

$$DID = (P_{US,2025} - P_{CA,2025}) - (P_{US,2024} - P_{CA,2024}), \quad (3)$$

where

- $P_{i,t}$: retail/spot prices for country $i \in \{US, CA\}$ and year $t \in \{2024, 2025\}$

Data

- Monthly bilateral imports and exports for fertilizers
 - Source: S&P Global Trade Atlas
 - Extract bilateral trade data using HS codes for fertilizers based on FATUS (USDA FAS)
 - at tariff-line level for U.S. (37 products); at HS6-digit level for others (30 products)
 - Covering bilateral global import flows from January 2022 to September 2025
- Country- and product-specific IEEPA tariff rates
 - Source: White House's executive orders
 - Exceptions are:
 - Countries excluded from IEEPA: Russia, North Korea, Belarus, and Cuba
 - Products excluded from the reciprocal tariff: other phosphate and potash
- Fertilizer price
 - Source: Bloomberg Terminal
 - Covering US spot/retail price and major international spot price from April 2024 to November 2025 for preliminary analyses

Short-Run Trade Impact

VARIABLES	(1) <i>ijkl, it, jt, kt, mt</i>	(2) <i>ijk, it, jt</i>
1(IEEPA)	-0.369** (0.158)	-0.499*** (0.186)
$(\exp(\gamma) - 1) \times 100$	30.9%	39.3%
Pseudo R_2	0.940	0.893
Observations	462,429	575,527

Robust standard errors clustered at exporter-importer-product in parentheses.

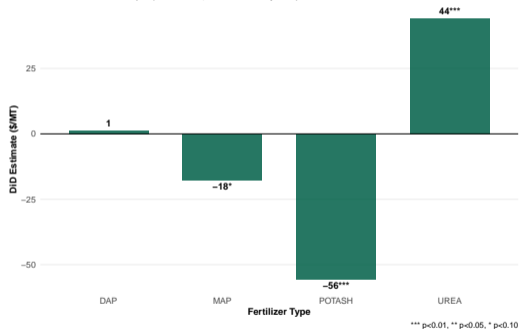
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

- Overall, IEEPA tariffs led to about 31% decline in US monthly fertilizer imports on average.

Short-Run Price Impact (Preliminary)

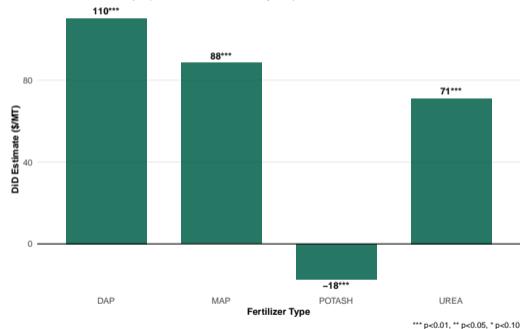
Tariff Pass-Through: April–November 2025 vs 2024

US Retail vs Canada Spot (all USD/MT; Canada FX-adjusted)



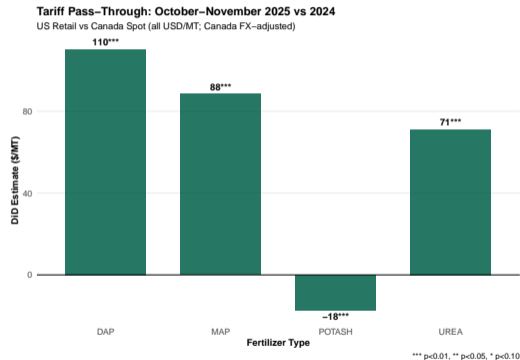
Tariff Pass-Through: October–November 2025 vs 2024

US Retail vs Canada Spot (all USD/MT; Canada FX-adjusted)



Short-Run Price Impact (Preliminary)

- In actual tariff period, significant pass-through for MAP and DAP
 - For DAP, estimated pass-through rate roughly 12%, greater than avg. IEEPA rate (11%) (\$110/\$915 ~ 12%)
 - For MAP, roughly 9.4% (>8.8%) (\$88/\$935 ~ 9.4%)
 - For Urea, roughly 11.8% (>9%) (\$71/\$601 ~ 11.8%)



Concluding Remarks

- Findings
 - Implementation of IEEPA tariffs reduced US fertilizer imports about 31% on average.
 - IEEPA tariff pass-through rates were positive and heterogeneous by fertilizer products.
 - Focusing on the actual tariff period (Oct-Nov), significant positive pass-through for DAP (+\$110/MT) and MAP (+\$88/MT).
- Further Direction
 - Trade impact analysis
 - Sensitivity analysis
 - Tariff pass-through analysis
 - Add fixed effects, control for seasonality.

References

- Amiti, M., Dai, M., Feenstra, R. C., and Romalis, J. (2020). How did china's wto entry affect u.s. prices? *Journal of International Economics*, 126:103339.
- Cavallo, A., Gopinath, G., Neiman, B., and Tang, J. (2021). Tariff pass-through at the border and at the store: Evidence from us trade policy. *American Economic Review: Insights*, 3:19–34.
- ERS, U. (2025). Farm income and wealth statistics - production expenses.
- Fajgelbaum, P. D., Goldberg, P. K., Kennedy, P. J., and Khandelwal, A. K. (2020). The return to protectionism*. *The Quarterly Journal of Economics*, 135:1–55.
- Grant, J. H., Arita, S., Emlinger, C., Johansson, R., and Xie, C. (2021). Agricultural exports and retaliatory trade actions: An empirical assessment of the 2018/2019 trade conflict. *Applied Economic Perspectives and Policy*, 43:619–640.