COSTLY REGULATION, MINIMAL RESULTS: THE EU DEFORESTATION REGULATION EFFECT ON GLOBAL SOY TRADE

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EU DEFORESTATION REGULATION

KEY PROVISIONS:

- Prohibits trade of seven forest-risk commodities unless "deforestation-free" & "legally-produced"
- Covers soy, cattle, palm, cocoa, coffee, rubber and wood
- **Due Diligence (DD) requirement:** Member countries are responsible for ensuring that **companies** conduct deforestation-free trade
- **Breaching** invites penalties (fines, confiscation, temporary exclusion) for companies

IMPLEMENTATION TIMELINE

Dec 2025
Large Companies

Jun 2026
Small & Medium Enterprises

Key Concerns:

1) DD is costly
2) Data-intensive burden to comply with DD, with the risk of facing penalties

SOY: AN IMPORTANT CASE FOR THE EUDR

DEFORESTATION IMPACT

Major cause of South American forest loss, especially in Brazil

33%

EU consumption of global soy-related deforestation

CONCENTRATION RISK

Brazil, Argentina, Paraguay (BAP) account for:

70%

Soy-related deforestation globally

BAP MARKET POSITION

Export share: 57%

Major importers
China (65-70% soybeans)
EU (8% soy)

EU MARKET POSITION

10%
Global soybean imports (2nd largest)

24%
Global soybean meal imports (largest)

52%
BAP share in the EU soy import

Source: Deforestation estimate data from Singh et al (2024) and trade from UN Comtrade

TWO KEY QUESTIONS OF INVESTIGATION

MOTIVATING QUESTION ?

Does the EUDR effectively reduce deforestation-linked soy trade?

1

TRADE REALLOCATION

What can be the trade reallocation pattern after the EUDR implementation?

2

ECONOMIC IMPACT

Who bears the costs of compliance and trade restrictions?

STRUCTURAL GRAVITY MODEL APPROACH

DATA AND METHOD:

- CEPII-BACI database for bilateral trade flows, FAOSTAT for domestic sales, and ITC MacMap for tariff
- 90 countries covering above 95% of global trade on soy, period: 2007-2022
- Gravity-based PPML approach developed by Anderson et al. (2018)
- Model EUDR compliance costs as increased trade frictions

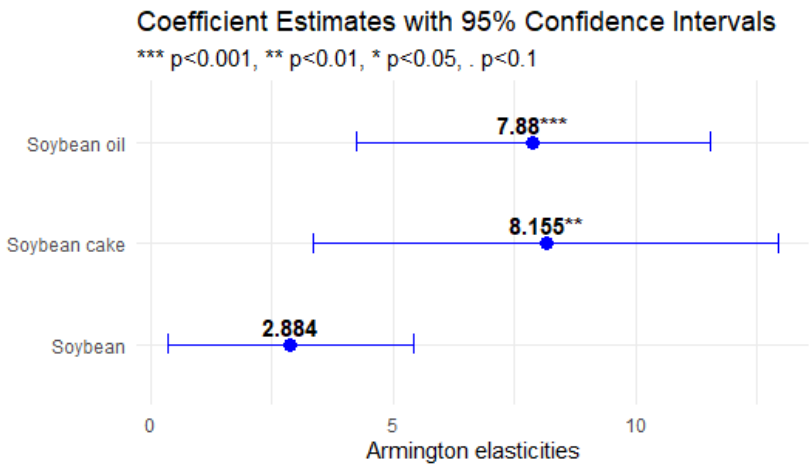
EMPIRICAL STEPS:

- Create separate models for soybeans, soybean oil, and soybean cake
- Estimate Armington elasticities, which are one minus tariff elasticities (2007 to 2017)
- Set up a conditional equilibrium, keeping the supply and expenditure constant for the base year 2022
- Model the EUDR compliance costs as increased equivalent tariffs as counterfactual trade costs
- Measure change in export/import, price indexes, producer prices, and terms of trade

Estimation of Armington Elasticities

Figure 1: Estimates of Armington elasticities with their confidence intervals.

Note: Armington elasticities are defined as 1 minus tariff elasticities. We estimate tariff elasticities using the pseudo-Poisson maximum likelihood (PPML) estimator. Exporter-year, importer-year, and country-pair fixed effects are included. Standard errors are clustered at the country-pair level.



EUDR IMPLEMENTATION

SCENARIO 1: COMPLIANCE

All countries comply with EUDR

- 6% increase in trade costs
- Equivalent to ad valorem tariff
- Based on EU impact assessment estimates (EU Commission 2021) & external estimates (Robobank 2023; European Feed Manufacturers' Federation (FEFAC) 2024)

SCENARIO 2: NON-COMPLIANCE

Brazil, Argentina, and Paraguay do not comply

- Prohibitive tariffs: 5000% (soybeans), 700% (processed)
- Based on own gravity estimates
- Represents market exclusion scenario

KEY FINDING 1: RESTRICTED SOY SHIFTS TO CHINA

TRADE FLOW CHANGES UNDER NON-COMPLIANCE

- Brazil to China: +12% soybeans, +1,186% soybean cake
- Argentina to China: +680% soybean cake
- Paraguay to China: +16.7% soybeans, +22.5% soybean oil, +563% soybean cake

NO SIGNIFICANT TRADE FLOW CHANGES UNDER COMPLIANCE

IMPLICATION

Deforestation-embodied trade doesn't disappear—it relocates. China's strong demand absorbs restricted exports from South America.

KEY FINDING 2: US AND CANADA FILL EU IMPORT GAP

↑EXPORT INCREASES TO EU

+198%
US Soybeans to the EU

+969%
US Soybean Cake to the EU

+118%
Canadian Soybeans to the EU

+549%
Canadian Soybean Cake to the EU

IMPLICATION

Deforestation-free exporters replace deforestation risk exporters

KEY FINDING 3: THE EU BEARS THE ECONOMIC COST

Scenarios	Indicators	Soybean	Soybean Oil	Soybean Cake
Compliance	Expenditure losses (M = million USD)	-2699.35 M	-310.11 M	-1406.45 M
	Price index (% change)	5.35%	3.16%	5.32%
Non-compliance	Expenditure losses (M = million USD)	-16210.07 M	-566.24 M	-15889.08 M
	Price Index (% change)	51.19%	3.90%	124.38%

Figure 1: Expenditure losses (million USD) faced by EU27 under the EUDR simulation. The loss is measured relative to the baseline (2022) without the EUDR. The price index denotes the average of the change in the price index in 27 EU countries.

Note: The expenditure loss is measured as $\left[\frac{\widehat{E_i^{CFL}}}{\widehat{P_i^{CFL}}} - \frac{\widehat{E_i^{BLN}}}{\widehat{P_i^{BLN}}}\right]$.

KEY FINDING 4: LIMITED EFFECT ON BAP

No reduction in exports of soy products !!

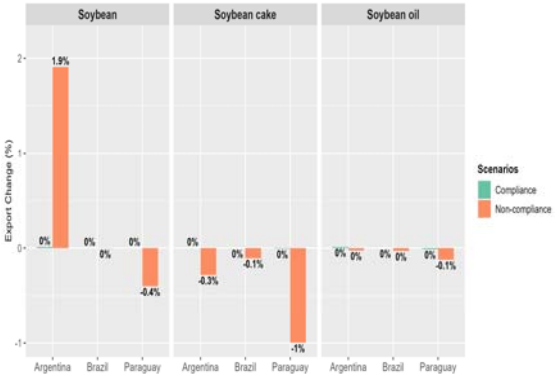


Figure 2: Change in exports from BAP, holding both supply and expenditure constant, relative to the baseline scenario without the EUDR

Increased exports of soy products !!

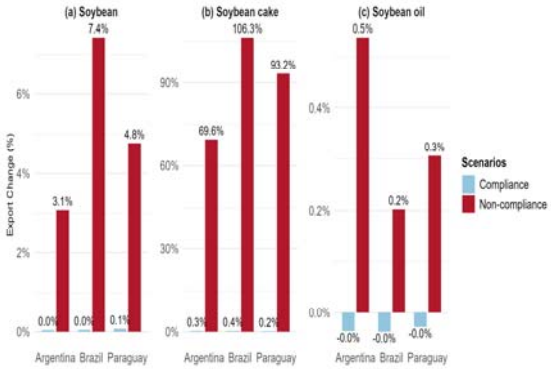


Figure 3: Change in exports from BAP, assuming that supply remains constant, relative to the baseline scenario without the EUDR

KEY FINDING 4: LIMITED EFFECT ON BAP

(a) Percentage change in price index.

	Soybean		Soybean cake		Soybean oil	
	Compliance	Non-compliance	Compliance	Non-compliance	Compliance	Non-compliance
United States	-0.34%	2.71%	0.06%	60.30%	0.13%	0.39%
Paraguay	-0.34%	-10.21%	0.01%	4.09%	-0.12%	-2.33%
China	-0.34%	-4.98%	0.03%	37.76%	-0.14%	-0.33%
Canada	-0.35%	13.97%	0.07%	62.73%	0.11%	0.39%
Brazil	-0.34%	-8.91%	-0.08%	-6.69%	-0.13%	-0.83%
Argentina	-0.34%	-4.89%	0.00%	0.79%	-0.08%	-0.47%

- BAP see a reduction in price index of soybeans

(b) Percentage change in terms of trade

	Soybean		Soybean cake		Soybean oil	
	Compliance	Non-compliance	Compliance	Non-compliance	Compliance	Non-compliance
United States	-0.00%	-0.02%	-0.00%	0.26%	0.00%	0.00%
Paraguay	0.00%	-0.13%	-0.01%	-0.86%	-0.15%	-1.49%
China	0.00%	0.22%	0.00%	0.28%	0.00%	0.00%
Canada	-0.00%	1.60%	0.00%	1.53%	-0.00%	0.01%
Brazil	0.00%	-0.00%	-0.00%	-0.05%	-0.00%	-0.00%
Argentina	0.00%	0.03%	-0.00%	-0.13%	0.00%	-0.00%

Quartile Q1 (Lowest) Q2 Q3 Q4 (Highest)

- BAP see minimal reduction in terms of trade

Figure 4: Changes in indices under compliance and non-compliance scenarios relative to a baseline without the EUDR. Quartile is measured at the scenario-product level for each index.

THREE POTENTIAL OUTCOMES & LIMTATIONS FOR SOY MARKET

1. **DEFORESTATION-EMBODIED TRADE REALLOCATION UNDER NON-COMPLIANCE**

   Restricted exports shift to unregulated markets (China)

2. **WITHIN-BORDER LEAKAGE UNDER COMPLIANCE**

   Sub-region exposed strongly with the EU market vis-a-vis China follows deforestation-free production, shifting the Chinese demand pressure to other sub-regions

3. **TWO DISTINCT SUPPLY CHAINS UNDER COMPLIANCE**

   Low market share of the EU can lead to deforestation-free chain targeting the EU market, which is a small share of the total chain (8 to 10%), and another targeting the ROW, including China

Well-intentioned but less likely to be effective !!

CURRENT APPROACH LIMITATIONS

- Demand-side only regulation
- Limited to single market (EU)
- High compliance costs, uncertain benefits

ALTERNATIVE APPROACHES

- Direct forest conservation incentives
- Supply-side measures in producer countries
- Broader agreement with multiple importers

THANK YOU !!

Any Questions ??