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Trade diversion and misaligned incentives

An assessment of unilateral trade regulations against deforestation

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Green trade regulations

Green transitions

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About the Green trade regulations series

This document is part of the "**Green Trade Regulations**" series, which also includes three additional papers on: the greening of international trade in the Global North and the mapping of the green regulatory regime; the international strategies of the Global South in response to the CBAM and the EUDR; and the trade diversion effects and misaligned incentives associated with unilateral anti-deforestation regulations. Taken together, the series combines empirical infrastructure, regulatory contextualization, international strategic analysis, assessment of trade impacts, and the study of national responses across the Global South, with the aim of building a comprehensive political economy of environmental trade.

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1

Starting points

Executive summary

Trade policy is playing an increasingly central role as a tool for advancing environmental goals. Against this backdrop, new policies are emerging that condition market access on sustainability requirements in production. The most ambitious example is the European Union Deforestation Regulation (EUDR), which prohibits the import of soybeans, beef, palm oil, cocoa, coffee, rubber, and timber produced on land deforested after December 2020. Adopted in 2023 and postponed on two occasions, the regulation will apply to large operators in December 2026 and to micro and small enterprises from June 2027 onward, and it directly affects the main exporting countries of these commodities, most of them developing economies.

The effectiveness of the EUDR depends on exporters being unable to easily redirect their sales to other markets without equivalent requirements, as that would imply a reconfiguration of trade flows without any reduction in deforestation. This paper examines the extent to which the European regulation is effective in its goal of discouraging production on deforested land. To do so, it analyzes the regulation's impact on the main exporters of the affected products (Argentina, Brazil, Cameroon, Colombia, Côte d'Ivoire, Guatemala, Honduras, Indonesia, Malaysia, Peru, and Uganda) across five supply chains: soybeans, palm oil, coffee, cocoa, and beef.

To assess the EUDR's effectiveness as an environmental policy instrument, this paper proposes a simulation against the most adverse scenario possible: one in which full non-compliance with the regulation completely shuts exporters out of the market. The results of this exercise estimate an upper bound, that is, the maximum impact the instrument could exert on producers, and reveal that, even under this extreme assumption, the economic pressure is moderate and misaligned with the environmental objective.

Key messages

1 **The potential for trade reallocation in response to the EUDR is very high, which considerably limits its effectiveness in reducing deforestation embedded in global trade:.**

The findings indicate that, at the median of the simulations, 93.6% of exports losing access to the European market are redirected to third-country markets.

2 **The EUDR shows limited capacity to alter the economic incentives for production in deforestation zones:**

The closure of the European market is estimated to produce a moderate decline in producer prices and in the total value of exports. At the median, prices fall by 3.9% and exports decline by 1.8%. There is, however, marked heterogeneity across countries and products.

3 **The economic impact of the EUDR is concentrated in countries with greater trade exposure to the European market and does not align with their relative contribution to global deforestation:**

Trade exposure explains 70% of the variation in prices. A ten-percentage-point increase in the share of a country-product's exports directed to the European market is associated with a 1.56-percentage-point decline in producer prices. By contrast, the economic pressure generated by the EUDR does not align with deforestation levels attributable to the analyzed products. Neither producer price declines nor export losses show a positive relationship with attributable deforestation.

4 **The EUDR may reduce deforestation embedded in European consumption but faces structural limitations in transforming global production patterns.**

When the importing party's market share is small and alternative destinations without equivalent requirements exist, a substantial portion of production can be redirected rather than transformed. The estimated trade diversion suggests that the EUDR would succeed in reducing the environmental footprint of European consumption, but with limited effects on global deforestation.

2

The study

Trade diversion and misaligned incentives. An assessment of unilateral trade regulations against deforestation.

Introduction

The European Union Deforestation Regulation (EUDR) represents the most ambitious example of a broader trend in trade policy: the use of market access instruments to advance the fulfillment of environmental objectives. These instruments, in turn, are shifting their regulatory focus from products to production processes (Mendoza, 2026).[1] The regulation prohibits the import of a selection of commodities and derived products (soybeans, beef, palm oil, cocoa, coffee, rubber, and timber) unless it can be demonstrated that their production did not take place on land deforested after December 2020 (European Union, 2023). Postponed on two occasions, it will apply to large operators in December 2026 and to micro and small enterprises from June 2027 onward (European Union, 2025).

The EUDR's effectiveness depends critically on trade diversion toward third-country markets being limited: if exporters can easily redirect their sales to destinations without equivalent requirements, the regulation will tend to reconfigure trade flows rather than reduce deforestation embedded in exports. In this paper, we examine this assumption using a structural gravity model in general equilibrium and show that the potential for trade diversion toward third-country markets is high, which implies a significant risk of deforestation leakage, and that the deterrent pressure exerted by the regulation does not align with the environmental objectives it pursues.

On the leakage risk, Bastos Lima and Schilling-Vacaflor (2024) demonstrate that this is not merely hypothetical: supply chain divergence, understood as the segmentation of production and exports to meet differentiated market requirements, is already an established practice in sectors such as Brazilian soybeans and Indonesian palm oil, and it undermines the EU's capacity to externalize its environmental standards when its share of global demand is both small and declining. The successive postponements of the regulation reflect these tensions, as well as the diplomatic responses they have prompted from exporting countries (Zelicovich, 2026). In their assessment of the EUDR, Muradian et al. (2025) argue that its unilateral, demand-side character, operating at the level of value chains rather than territories, faces structural limits in reducing tropical deforestation, since it may induce reconfigurations of trade flows without altering the

1 See Mendoza (2026) for an extended contextualization of the EUDR within the framework of the European Green Deal.

drivers of deforestation.

The quantitative evidence supports these concerns from multiple angles. These studies carry out ex ante impact analyses through counterfactual simulations based on diverse models and consistently find that European restrictions can shift trade toward less regulated markets, with modest effects on net deforestation (Busch et al., 2022; Yarlagadda et al., 2025; Sharma and Villoria, 2025; Zamani and Pelikan, 2026; Hsiao, 2026).[2] The most direct ex post causal evidence comes from Abman et al. (2026), who analyze the Forest Law Enforcement, Governance and Trade (FLEGT) program, a precursor to the EUDR in the timber sector, and find that it reduced the EU's share as a destination for timber exports, with a corresponding diversion toward Asia, and no significant effects on deforestation in participating countries.

The existing literature, however, leaves three gaps. First, much of the quantitative evidence is based on analyses applied to particular products or aggregate sectors, making it difficult to assess the heterogeneity of the EUDR's impacts across specific products and exporting countries. Second, while these studies document the risk of trade diversion toward unregulated markets, there is more limited evidence on the magnitude of the economic pressure that the instrument retains on producers as an incentive to reduce deforestation once trade is endogenously reallocated in general equilibrium. Third, it remains largely unexplored whether that pressure is distributed in a manner consistent with the regulation's environmental objective, for example, whether it falls more heavily on countries with greater attributable deforestation or whether it responds to other, non-environmental factors.

In response to these gaps, this paper advances in three directions. First, it provides disaggregated country-product evidence on the potential impact of the EUDR across 27 combinations of ten exporting countries and ten specific products belonging to the soybean, beef, palm oil, cocoa, and coffee supply chains. Second, it conducts an *ex ante* impact analysis using a structural gravity model in full-endowment general equilibrium (GEPPML), following the framework of Anderson et al. (2018), in which income, expenditure, and producer prices adjust endogenously while quantities produced are held fixed. Using this model, counterfactual simulations are conducted in which the European market is closed to a specific country-product while all other exporters retain access. The GEPPML framework makes it possible to quantify not only the reallocation of trade flows toward third-country markets, but also the impact on producer prices once that reallocation takes place.[3] Third, it contrasts the simulated economic impacts with attributable deforestation data at the country-product level, assessing the extent to which the economic pressure exerted by the EUDR falls on the supply chains that contribute most to forest loss.

The fixed-endowment assumption rules out supply-side responses such as expansion

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2 A separate strand of the literature examines the domestic impacts of the EUDR on specific exporting economies using computable general equilibrium models. For Argentina, De la Vega (2026) finds moderate macroeconomic effects and a limited reduction in domestic deforestation. For Brazil's soybean supply chain, Stam et al. (2026) estimate abatement costs of between USD 133 and USD 207 per ton of CO_2e, between seven and eleven times the reference carbon price for the period 2015 to 2025.

3 This extends the application of Sharma and Villoria (2025), who work in conditional equilibrium with constant prices.

or contraction of the agricultural frontier, so the model does not directly estimate how much deforestation the EUDR prevents. That question, already addressed in the cited literature using land-use models, requires modeling how production profitability, of which the producer price is the central component, affects land-use decisions.

Methodology

A model in which trade depends on the alternatives available in the global market

We quantify the trade effects of the EUDR using the structural gravity model developed by Anderson and van Wincoop (2003) and extended by Anderson et al. (2018) for general equilibrium counterfactual analysis. This framework provides an appropriate basis for quantifying the trade effects of policy changes and is consistent with a broad class of theoretical models of international trade (Arkolakis, Costinot, and Rodríguez-Clare, 2012). We present the model for a representative product; in the empirical implementation, we estimate the system separately for each product. We omit the product index to simplify notation. The detailed methodology is presented in the **Appendix**.

The model predicts trade flows in a manner analogous to physical gravity: trade increases with countries' economic size and decreases with the barriers between them. Formally, exports from country i to country j are given by:

(**1**)
$$X_{ij} = Y_i E_j \left(\frac{t_{ij}}{\Pi_i P_j} \right)^{1-\sigma}$$

where X_{ij} represents exports from country i to country j, Y_i is the exporting country's income, E_j is the importing country's expenditure, t_{ij} are bilateral trade costs, and $\sigma > 1$ is the elasticity of substitution across varieties. The terms Π_i and P_j are the outward and inward multilateral resistances, respectively.

Multilateral resistances capture the average competition each country faces in world markets. The outward resistance Π_i measures how easily country i can access all its destination markets, while the inward resistance P_j measures the supply alternatives available to consumers in country j. These indices are weighted aggregates, by the economic size of each partner, of all the bilateral trade costs a country faces, including geographical distance, tariffs, and non-tariff barriers, among others. Accordingly, bilateral trade depends not only on the direct costs between two countries, but on

how those costs compare with the other options available to each. This mechanism implies that a change in costs between two countries, such as a trade restriction, alters the multilateral resistances of all countries, redistributing trade flows at the global level.

We estimate the model using observed bilateral trade data

We follow the General Equilibrium PPML (GEPPML) methodology of Anderson et al. (2018), which enables general equilibrium counterfactual analysis using the Poisson pseudo-maximum likelihood (PPML) estimator. The key to the procedure is a result demonstrated by Fally (2015): the fixed effects estimated by PPML allow recovery of the multilateral resistances from the theoretical model without the need to solve the system of nonlinear equations numerically.

The econometric specification is:

(**2**)
$$X_{ijt} = \exp\left(\pi_{it} + \chi_{jt} + \delta_{ij} + \bar{\beta}\,\tau_{ijt}\right) \cdot \varepsilon_{ijt}$$

where π_{it} and χ_{jt} exporter-year fixed effects that absorb income and outward multilateral resistance; δ_{ij} are importer-year fixed effects that absorb expenditure and inward multilateral resistance; and $\tau_{ijt} = \ln\left(1 + tariff_{ijt}\right)$ are directional that capture all time-invariant bilateral determinants. The variable measures tariff costs. The coefficient is imposed externally using the trade elasticities estimated by Fontagné, Guimbard, and Orefice (2022) at the product level.

Estimation is carried out using PPML, which accommodates zero bilateral trade flows and produces consistent estimators in the presence of heteroskedasticity (Silva and Tenreyro, 2006), using the `ppmlhdfe` command in STATA, which handles multiple high-dimensional fixed effects (Correia, Guimarães, and Zylkin, 2020).

We simulate the most adverse scenario: complete closure of the European market

We model non-compliance with the EUDR as the total loss of access to the EU market. We operationalize this scenario through an additional 100% ad valorem tariff applied exclusively to the trade flows of the affected country toward the EU. We run an independent simulation for each country-product combination under analysis, modeling what would happen if a single country-product failed to comply with the EUDR while all others comply. We use 2022 as the base year for all simulations.

This design represents an extreme scenario in which no producer in the country under analysis meets the EUDR requirements. The estimates therefore constitute an upper bound: the actual impact will be smaller to the extent that some producers manage to

comply. This framing is central to the question motivating the paper: if even under the most adverse scenario the economic pressure on producers is moderate, the instrument faces structural limitations in transforming the incentives driving deforestation, regardless of the effective compliance rate. That rate will depend on traceability costs, institutional capacity, and value chain structure, factors that vary considerably across countries and products and cannot be modeled endogenously with the available data.

We allow prices and trade flows to adjust in sequence

The change in trade costs triggers adjustments throughout the world economy. Following the GEPPML methodology, we distinguish two scenarios that capture different degrees of adjustment.

In the *conditional general equilibrium*, trade flows are reordered in response to the adjustment of multilateral resistances to the new cost vector, while the value of production and expenditure remain fixed at their baseline values. This scenario captures an immediate effect, before producer prices adjust.

In the *full-endowment general equilibrium*, we allow producer prices, income, and expenditure to adjust endogenously. The country that loses access to the EU faces lower demand for its production, and prices fall to clear the market. The price decline makes the product more competitive in third-country markets, facilitating trade diversion.

We compute the full-endowment equilibrium through an iterative procedure that updates prices, income, expenditure, and multilateral resistances until convergence is reached, starting from the conditional equilibrium. We report results from the full-endowment equilibrium.

Results are summarized in three indices: the trade diversion rate (the share of exports lost to the EU that is offset by greater exports to other destinations), the percentage change in producer prices, and the percentage change in total exports.

Data

Trade, production, and deforestation data from international public sources

Table 1 summarizes the data sources used. The database constructed to estimate the structural gravity model covers the period 2010 to 2022, with 2022 being the last year for which complete data were available at the time of the study.

TABLE 1.

Data sources

Variable	Source
Bilateral international trade	FAOSTAT Detailed Trade Matrix
Production	FAOSTAT Supply Utilization Accounts
Producer prices	FAOSTAT Producer Prices
Bilateral tariffs	ITC Market Access Map
Elasticities of substitution	Fontagné, Guimbard and Orefice (2022)
List of EUDR products	Reglamento (UE) 2023/1115
Attributable deforestation	DeDuCe (Singh and Persson, 2024)

The FAOSTAT trade and production data use the CPC 2.1 Expanded for Agriculture classification, which we maintain throughout the analysis. The production data allow calculation of intranational trade, defined as the difference between the value of production and total exports, following the methodology of Borchert et al. (2021). Trade data are expressed in current US dollars. Production data, expressed in metric tons, are converted to value by multiplying by unit prices. For these prices, we use the minimum between the producer price and the export price. For years with missing prices, we interpolate linearly between the nearest observed values.

The bilateral tariffs from MACMAP correspond to effectively applied tariffs, that is, the minimum tariff rate across all existing tariff regimes for each bilateral pair. These tariffs are reported under different revisions of the Harmonized System depending on the country and year (HS 2007, HS 2012, HS 2017, or HS 2022). We harmonize all codes to HS 2007 using UNSTAT correspondence tables, and then to CPC using FAO correspondence tables. When multiple origin codes correspond to a single destination code, we compute a simple average. For years with missing tariffs, we interpolate and extrapolate linearly, imposing that the result be non-negative and not exceed the maximum observed for that bilateral pair.

The elasticities of substitution come from Fontagné, Guimbard, and Orefice (2022), who estimate trade elasticities at the HS 2007 level. Under the standard CES demand assumption, the elasticity of substitution equals one minus the trade elasticity. We convert HS codes to CPC and, where necessary, aggregate using weighted averages based on 2022 world exports.

The list of products covered by the EUDR is defined in Annex I of Regulation (EU)

2023/1115 using the EU's combined nomenclature, whose first six digits coincide with HS 2022. We convert these codes to CPC to identify the affected products.

The attributable deforestation data from DeDuCe (Singh and Persson, 2024) are available at the level of primary commodities (e.g., soybeans, oil palm fruit, green coffee, cocoa beans, and bovine meat), while our simulations include both primary and processed products (e.g., soybean oil, soybean meal, cocoa beans, cocoa paste, among others). To link the results, we map each product to its primary commodity and aggregate the values: producer price changes using production-weighted averages, and exports using simple sums.

Ten countries, ten products, five supply chains covered by the EUDR

The gravity model is estimated, for each product, on a panel of countries. Countries whose share of cumulative global production or expenditure over 2010–2022 exceeds 0.5% are retained as individual units. Countries that do not meet this threshold are aggregated into two residual groups, Rest of the EU and Rest of the World, based on their EU membership. This criterion reduces the dimensionality of the panel while preserving the trade coverage needed for estimation.

The selection of countries and products for the simulations is constructed from EU imports of EUDR-covered products in 2022 as observed in FAOSTAT. We select countries that account for more than 1% of these imports and that were classified as standard risk by the European Commission: Argentina, Brazil, Cameroon, Colombia, Côte d'Ivoire, Guatemala, Honduras, Indonesia, Malaysia, Peru, and Uganda. Similarly, we select products that account for more than 1% of imports: soybeans, soybean oil, soybean meal, palm oil, palm kernel oil, green coffee, cocoa beans, cocoa paste, cocoa butter, boneless bovine meat (fresh or chilled), and acid oils from refining. From the resulting country-product combinations, we retain those with exports to the EU exceeding USD 100 million.

We run 29 general equilibrium simulations. We exclude two combinations (Brazil-soybeans and Peru-green coffee) where the algorithm does not converge to a valid numerical solution. The final sample comprises 27 country-product combinations

covering ten countries and ten products (Table 2).

TABLE 2.

Simulated country-product combinations

	ARG	BRA	CMR	COL	CIV	GTM	HND	IDN	MYS	UGA
Soybean oil (237)	✓									
Soybean meal (238)	✓	✓								
Palm oil (257)				✓		✓	✓	✓	✓	
Palm kernel oil (258)								✓	✓	
Coffee, green (656)		✓		✓		✓	✓	✓		✓
Cocoa beans (661)			✓		✓					
Cocoa paste (662)					✓					
Cocoa butter (664)			✓		✓			✓		
Beef, boneless (870)	✓	✓								
Acid oils, refining (1276)	✓							✓	✓	

Nota: ✓ = simulado. Códigos de producto según CPC 2.1 Extended de FAOSTAT; códigos de país según ISO 3166-1 alfa-3.

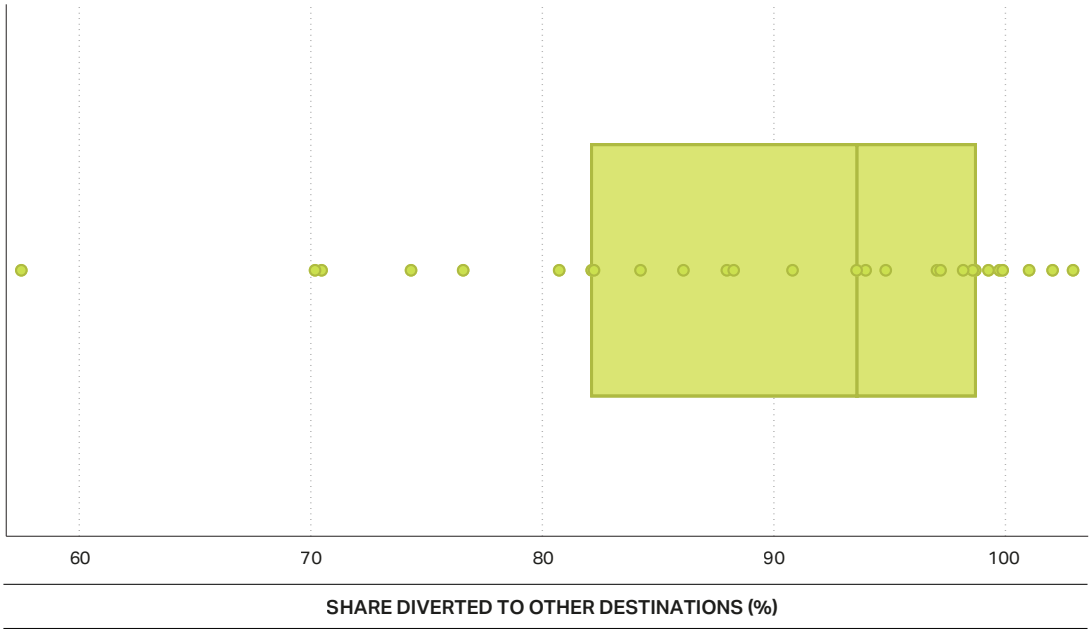
The analysis does not include natural rubber or timber products. The former is not available in the production database used. The latter are found in FAOSTAT's forestry databases, which are separate from the agricultural product databases used in this paper.

Findings

93.6% of trade excluded from the EU finds alternative destinations

The closure of the European market reconfigures trade flows rather than eliminating them. This considerably limits the effectiveness of the EUDR as an instrument for reducing deforestation embedded in global trade. To quantify the degree of trade reorientation, we define a diversion rate for each simulation. This rate measures the increase in exports to destinations outside the EU, expressed as a percentage of the exports lost to that market. A rate of 100% indicates that the country fully offset its lost sales with sales to other destinations. A rate of 0% indicates that no reorientation took place. The

median rate across the 27 simulations is 93.6%, with an interquartile range of 82.1% to 98.7% (Graph 1). In most cases, more than 80% of the affected trade finds alternative



N = 27, Median = 93.6%, P25 = 82.1%, P75 = 98.7%

destinations. Some cases exceed 100%, indicating a net increase in total exports.

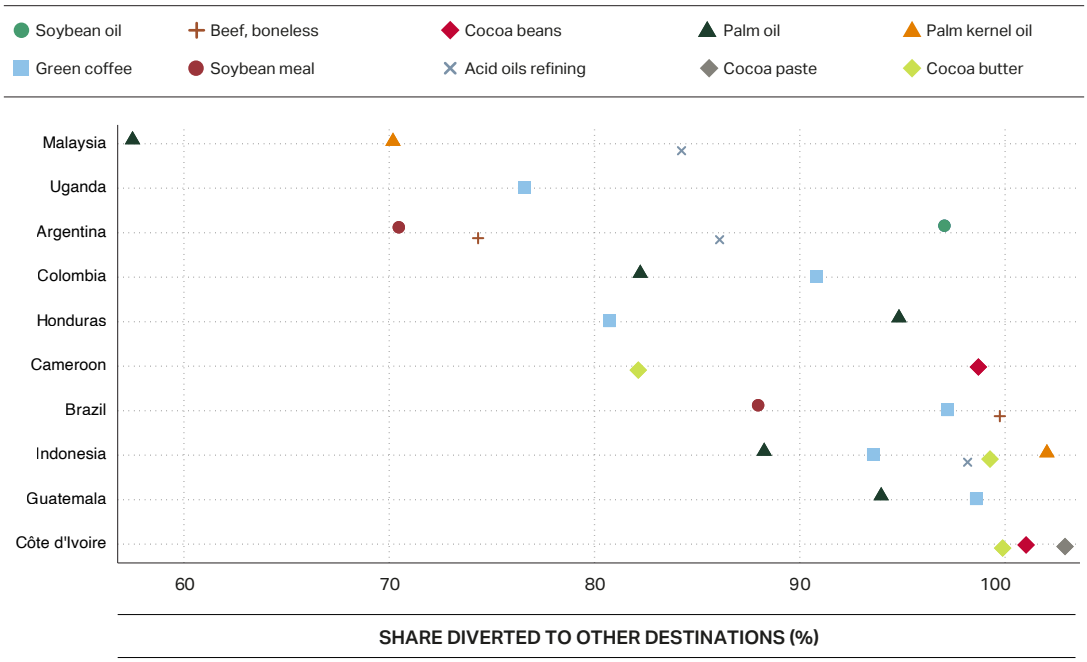
GRAPH 1

Distribution of the trade diversion rate

Note: The rate measures the increase in exports outside the EU as a percentage of exports lost to that market. Each point corresponds to an independent simulation in which a country-product loses total access to the EU market.
Source: Own elaboration based on GEPPML simulations.

Trade reorientation occurs through a general equilibrium mechanism. When an exporter loses access to the European market, other suppliers increase their sales to the EU to fill the gap. These suppliers, however, do not expand their production: they redirect exports that were previously destined for third-country markets. Those third-country markets now face reduced supply from their usual providers and seek new sources. The exporter affected by the EUDR, shut out of the EU but with production intact, captures part of that demand. The end result is a reconfiguration of bilateral flows at the global level, in which trade lost with the EU is partially or fully offset by new sales to other destinations.

The potential for diversion varies considerably across countries and products (Graph 2). Malaysia, Uganda, and Argentina show products with diversion rates below 80%. At the other extreme, Côte d'Ivoire manages to divert the entirety of its affected exports, with rates at or above 100% for its products. Heterogeneity is also observed within a single country: in Argentina, soybean meal has a diversion rate of 70%, while soybean oil reaches 97%.



GRAPH 2

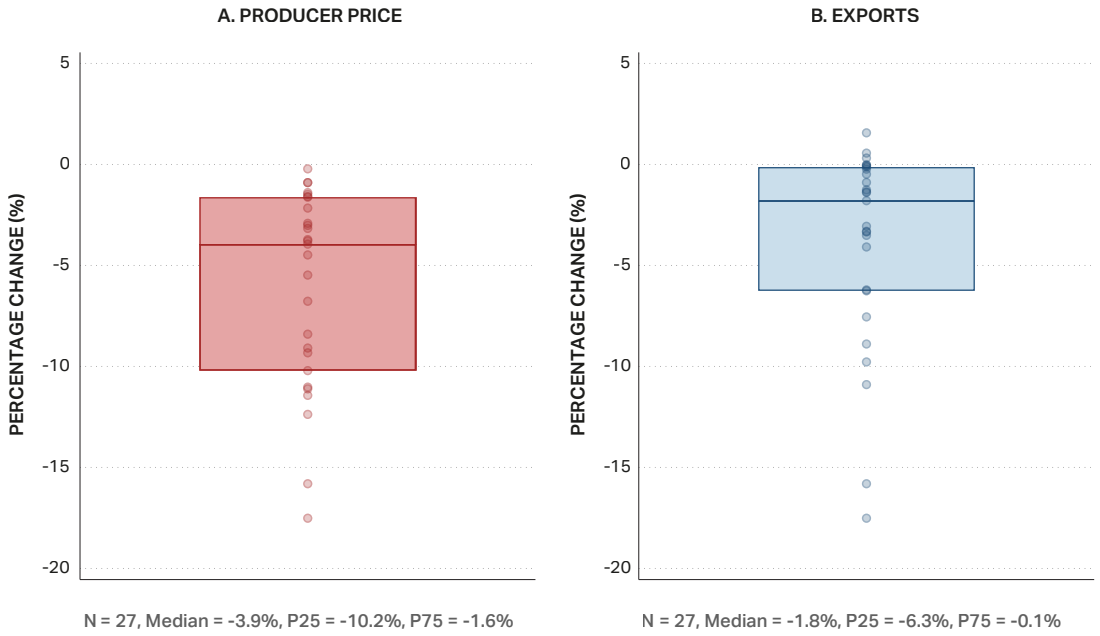
Trade diversion rate by country-product

Note: The rate measures the increase in exports outside the EU as a percentage of exports lost to that market. Each point corresponds to an independent simulation in which a country-product loses total access to the EU market.
Source: Own elaboration based on GEPPML simulations.

The economic pressure is moderate and concentrated in the countries most exposed to the European market

The closure of the European market reduces both the value of exports and the prices received by producers of the affected country-product. At the median of the 27 simulations, producer prices fall by 3.9% and total exports fall by 1.8% (Graph 3). The interquartile range for prices runs from 1.6% to 10.2%. For exports, the range is narrower:

from 0.1% to 6.3%. In 22 of the 27 simulations, prices fall by more than exports.



GRAPH 3

Distribution of changes in producer prices and total exports

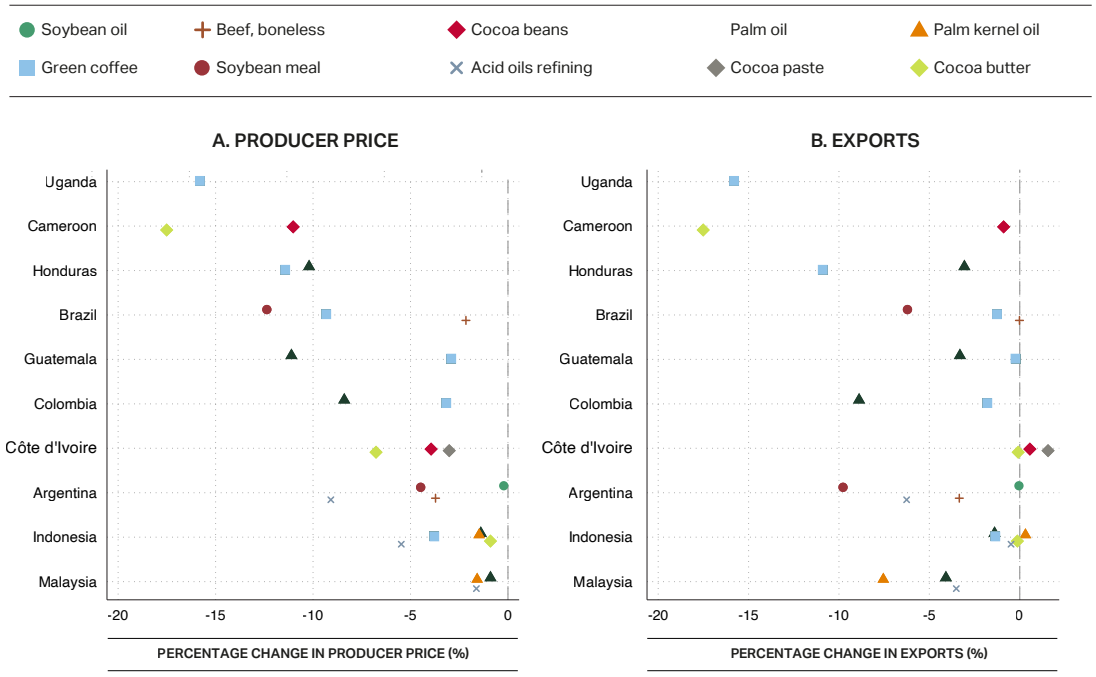
Note: Each point corresponds to an independent simulation in which a country-product loses total access to the EU market.
Source: Own elaboration based on GEPPML simulations.

Exports fall because the loss of sales to the EU is not fully offset by greater sales to other destinations. Producer prices absorb part of the shock. As they fall, they make the product more competitive in third-country markets and facilitate reorientation. This price adjustment is an endogenous outcome of the general equilibrium model: excess supply pushes prices down until the market clears.

The impacts vary considerably across countries and products (Graph 4). Producer prices fall in every case without exception. Uganda, Cameroon, and Honduras show the largest declines, with values ranging from 10% to 18%. Indonesia and Malaysia face smaller declines of up to 6%. Even Côte d'Ivoire, which as we will see maintains stable exports, faces price declines of between 3% and 7%. To redirect sales to markets outside the EU, producers must lower their prices.

Exports, by contrast, vary in both magnitude and direction. Uganda, Cameroon, and Honduras show the largest declines, with values of up to 18%. At the other extreme, Côte d'Ivoire and Indonesia show changes close to zero or even positive. Heterogeneity is also observed within a single country: in Argentina, soybean meal falls by 10% while soybean oil barely changes; in Cameroon, cocoa butter falls by 18% while cocoa beans fall by just 1%.

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GRAPH 4

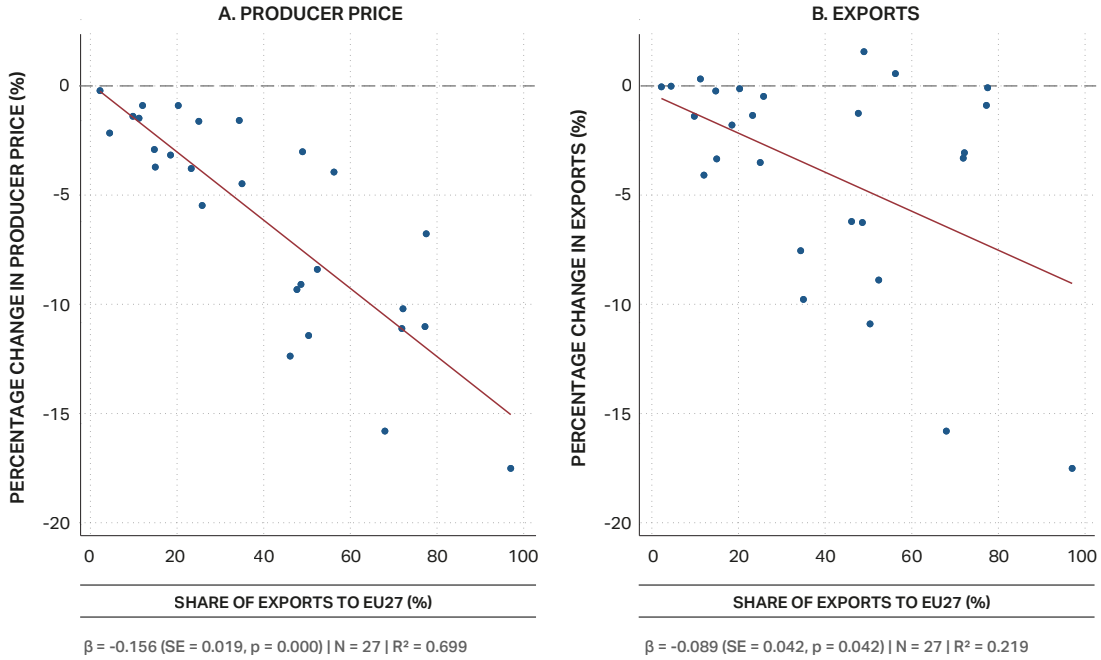
Changes in producer prices and total exports by country-product

Note: Each point corresponds to an independent simulation in which a country-product loses total access to the EU market.
Source: Own elaboration based on GEPPML simulations.

The magnitude of the impact depends on trade exposure to the EU, defined as the share of the country-product's total exports destined for the EU. Graph 5 shows a negative and statistically significant relationship between trade exposure and the declines in prices and exports. A ten-percentage-point increase in exposure is associated with a 1.56-percentage-point decline in producer prices ($p < 0.001$) and a 0.89-percentage-point decline in exports ($p = 0.042$). Trade exposure explains nearly 70% of the variation in prices ($R^2 = 0.699$) and 22% of the variation in exports ($R^2 = 0.219$).

These results show that the EUDR imposes heterogeneous economic costs, determined by the pre-existing trade structure. The following section examines whether these

costs align with attributable deforestation levels for each country and sector.



GRAPH 5

Changes in producer prices and total exports by trade exposure to the EU

Note: Trade exposure is defined as the EU's share of total exports for the country-product. Each point corresponds to an independent simulation in which a country-product loses total access to the EU market.
Source: Own elaboration based on GEPPML simulations.

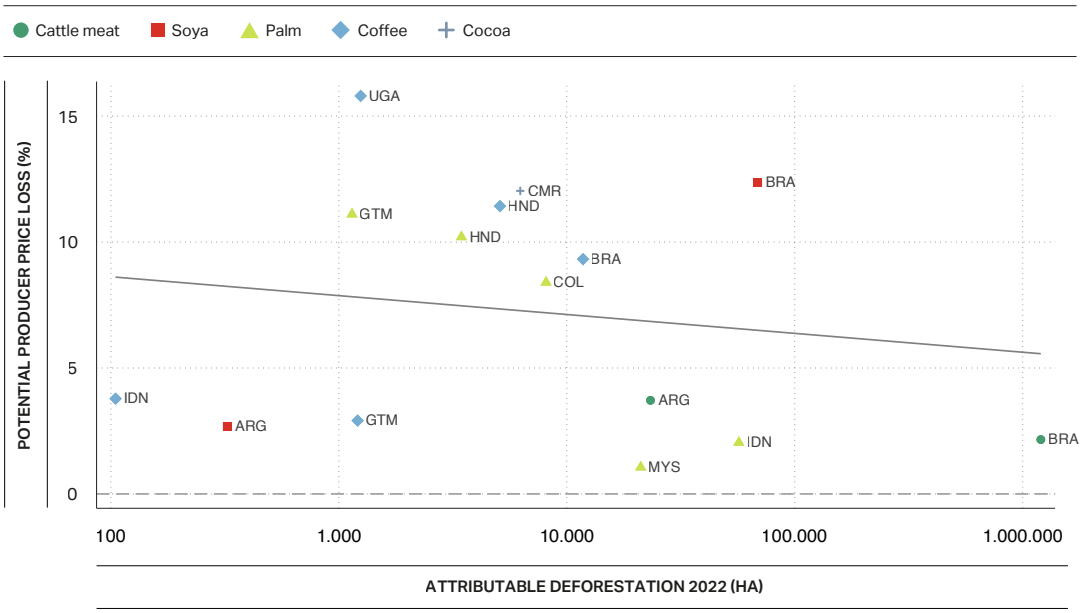
The economic pressure of the EUDR is not concentrated where deforestation is greatest

The economic costs of losing access to the European market do not align with deforestation levels. To assess whether the pressure exerted by the EUDR falls more heavily on the country-products associated with greater forest loss, we cross the simulated impacts with attributable deforestation data from DeDuCE (Singh and Persson, 2024), a global database (2001 to 2022) that estimates deforestation driven by agriculture and forestry activity, attributing it to country-commodity pairs using satellite information and agricultural statistics. We use attributable deforestation in 2022, measured in hectares, as the reference variable.

The economic pressure of the EUDR, measured by the decline in producer prices, is not concentrated where deforestation is greatest (Graph 6). Bivariate regressions show a slightly negative, though not statistically significant, relationship between deterrent pressure and attributable deforestation. Brazilian beef, the largest contributor to deforestation in the sample, directs less than 5% of its exports to the EU and faces a potential

price decline of around 2%. By contrast, Ugandan green coffee, with low attributable deforestation, has a trade exposure of 68% and a potential price decline of 16%.

GRAPH 6



β = -0.749 (SE = 1.311, p = 0.577) | N = 15 | R^2 = 0.025

Changes in producer prices and trade exposure by attributable deforestation

Note: The potential loss in producer prices is interpreted as the deterrent pressure exerted by the EUDR on each country-product. Attributable deforestation corresponds to 2022 and comes from DeDuCe (Singh and Persson, 2024). Each point corresponds to a country-commodity, aggregating the simulated products to their primary commodity.
Source: Own elaboration based on GEPPML simulations and DeDuCe.

This pattern reflects an inherent limitation of the unilateral design. The EUDR can reduce deforestation embedded in European consumption, but its capacity to alter the economic incentives facing producers depends on the EU's relative weight as an export destination. Where the EU accounts for a small share of demand, the loss of access does little to change producer incentives, even when attributable deforestation is high. The effectiveness of the EUDR is thus mediated by the pre-existing trade structure.

Conclusion

Unilateral regulations such as the EUDR can reduce deforestation embedded in the consumption of the markets that implement them, but face structural limitations in

transforming global production patterns. The estimated trade diversion in this study suggests that the EUDR would succeed in reducing the environmental footprint of European consumption, but with limited effects on global deforestation. These results should also be interpreted as an upper bound: since the simulation assumes full non-compliance, the effective pressure on producers will be even smaller than estimated. Partial compliance with production segmented by market widens the margin for diversion and weakens the economic incentives to transform production practices.

The EUDR operates as a stick, restricting access to the European market. Its effectiveness depends on producers being unable to avoid it. When they can redirect their production toward alternative markets without equivalent requirements, the economic pressure is attenuated. Achieving that coverage through coordination across all relevant consumer markets is, in practice, difficult. Positive incentives, or carrots, do not suffer from this problem: they act on the relative profitability of conservation versus deforestation regardless of the export destination. Instruments such as payments for ecosystem services, carbon credits, and forest conservation funds are therefore more robust to trade diversion.

The distribution of impacts also raises questions about the equity of the instrument. The most affected countries are not necessarily the largest deforesters, but rather those with the greatest historical dependence on the European market. The EUDR penalizes according to trade links rather than environmental performance, which limits its capacity to generate the incentives the problem requires. A policy proportional to its environmental objective should correct that logic and concentrate economic incentives precisely where deforestation is greatest.

In this regard, a central lesson emerges for Global South countries: the need to move toward multilateral governance that involves both importing and exporting countries. By its unilateral nature, the EUDR has limited capacity to transform global production incentives. Producing countries must also be negotiating parties, not merely recipients of a regulation designed without them. Without their cooperation, regulations such as the EUDR can only act on trade flows and not on land-use policies, forest governance, and the other domestic drivers of deforestation. The alternative is multilateral or plurilateral agreements that combine environmental commitments with positive economic incentives beyond trade restrictions.

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