

The European Union deforestation-free policy and the potential impacts on the Brazilian economy: the soy supply chain case

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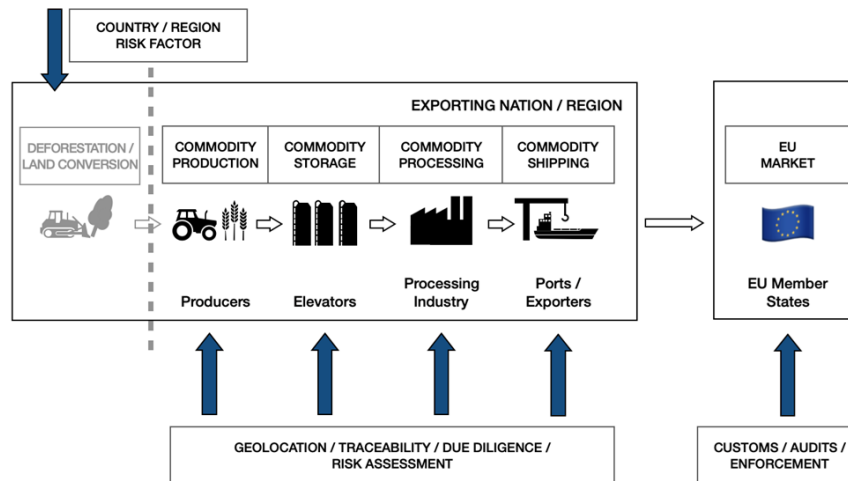
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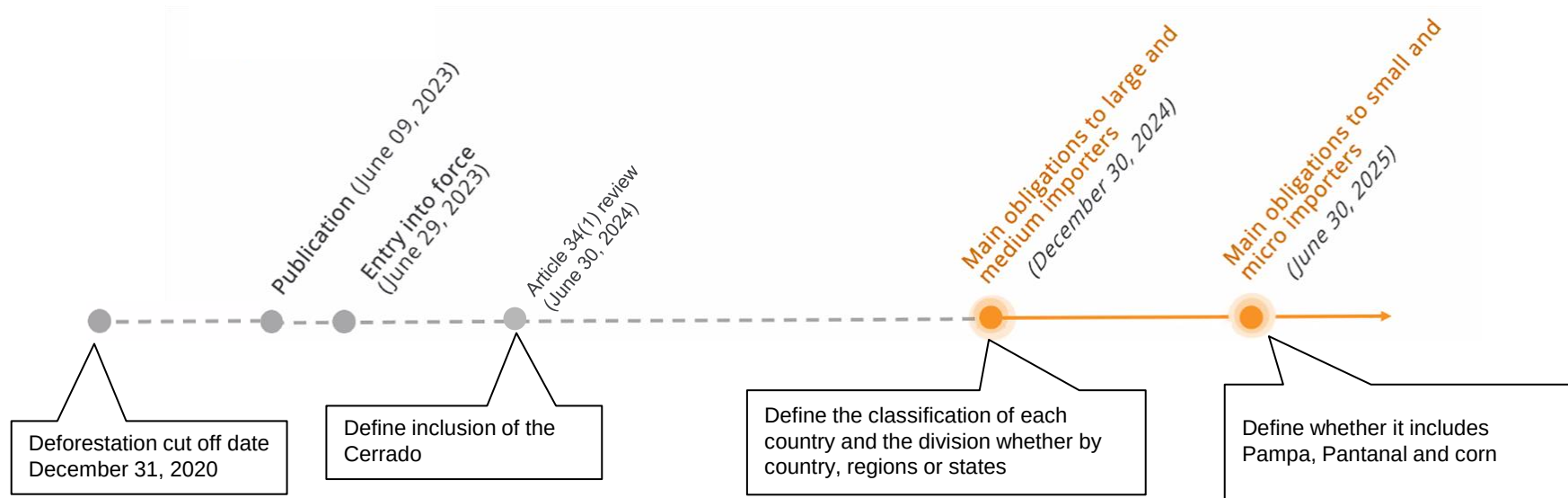
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In 2025, the European Union Deforestation Free Regulation (EUDR) comes into force...

- Ensure that products entering the European market are not produced in deforested areas
- Requires traders and operators to carry out due diligence, with traceability and segregation in the supply chains of soybeans and other agricultural commodities
- Prioritizes countries with low risk of deforestation without requiring risk assessment and mitigation.
- Failure to comply may result in penalties and even confiscation of products.



...until then, important definitions for Brazilian soybean trade with the EU will be made.



Objective

Estimate the impact on the Brazilian economy, national and regional, that the EUDR will have on the Brazilian soy supply chain and changes in land use (deforestation).

Specific objectives:

- Investigating the details of EUDR;
- Determining increase in the cost per ton of soy due to legislation for each region;
- Determining reduction in exports of soy from Brazil;
- Analyzing which states and industries will be most impacted economically;
- Analyzing if the deforestation decrease;
- Estimating impact in carbon emissions.

Methodology

- Use of a dynamic interregional EGC model for the Brazilian economy (TERM-BR model).
- Linearized, interregional, bottom-up, and dynamic (recursive dynamics).
- 27 regions of Brazil => later aggregated in 14 regions.
- 136 sectors => subsequently aggregated into 39 (11 from agriculture).
- Land use module: Crop, Pasture, PlantForest, Unused;
- 10 types of families.
- 10 types of workers.
- Base year: 2015. Solved using RunDynam / GEMPACK..



Figure 3 – Map of grouped Regions used in the model
Source: Elaborated by the author.

Auxiliary data for estimating the shock

Additional cost for Traceability and Segregation (ABIOVE-Earthworm Test) 30 €/T

- Test with traceability and transparency that guarantees soy does not come from deforested areas.
- The guarantee of the origin of the soybeans was based on the mapping of farms with soybeans that did not have polygons identified by PRODES / INPE as of January 2021
- The state of soybean production was the State of MT and the port used to export soybean meal was the Port of Santos / SP

Additional cost of Risk Assessment (Earthworm) 2 €/T

- The Earthworm Foundation has the ZDC – Zero Deforestation nor Conversion methodology for soy chains
- The average cost of risk assessment is 2 €/T of soybean meal

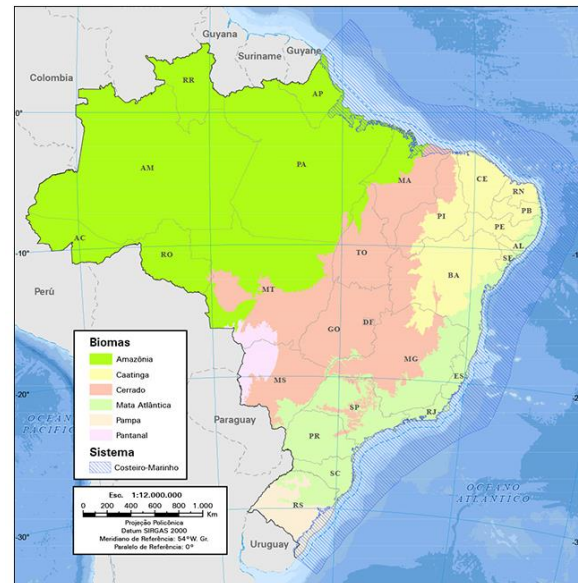
This value is an average of 6% in FOB prices for the last 12 months



Simulation strategy and scenarios

- Policy shock: The cost increases implemented in the model as increases in the rate of production taxes
- **Baseline (Base):** Shocking our model with the commodity price and projecting until 2030 based on GDP, population, and other variables.
- **Policy Scenario 1 (1AMZN):** increase in costs only applied to the regions of the Amazon Biome
- **Policy Scenario 2 (2AMZCER):** increase in costs applied to the regions of the Amazon and Cerrado Biomes
- **Policy Scenario 3 (3ALL):** increase in costs applied to all regions of Brazil that export to EU.

Region	1AMZN	2AMZCER	3ALL
Rondonia	4.0%	4.0%	4.0%
ParaAP	1.8%	1.8%	1.8%
MtGrosso	1.0%	1.0%	1.0%
MaToPi	2.3%	2.3%	2.3%
Bahia		1.5%	1.5%
MtGrSul		0.9%	0.9%
GoiasDF		0.7%	0.7%
MinasG		0.5%	0.5%
SaoPaulo		0.3%	0.3%
Parana		0.7%	0.7%
RSul			1.3%
AmazACRR			
RNordeste			
RSudeste			



Fonte: IBGE

Reduction in Brazilian exports and negative direction of GDP.

Table 4 – Effect in the main macroeconomic aggregates. Deviations from the baseline, accumulated (accumulated % change from 2023 to 2030)).

VARIABLES	SCENARIOS		
	1AMZN	2AMZCER	3ALL
Real Gross Domestic Product (GDP)	-0.001	-0.002	-0.003
Real Household Consumption	-0.001	0.000	-0.001
Real Government Consumption	0.000	0.000	-0.001
Real Investment	0.000	0.003	0.004
Export Volume	-0.018	-0.047	-0.052
Import Volume	-0.015	-0.036	-0.041
Real Wage	-0.011	-0.022	-0.026
Export Price Index	0.019	0.045	0.052
Consumer Price Index	-0.001	-0.002	-0.002

Source: Elaborated by the author.

Reduction in soybean production and increase in cotton, corn, coffee, rice, wheat and other permanent crops



Figure 5 – Effect in the industry outputs nationally (% change from 2023 to 2030)

Source: Elaborated by the author.

Regionally, the drop in soybean production is more pronounced.

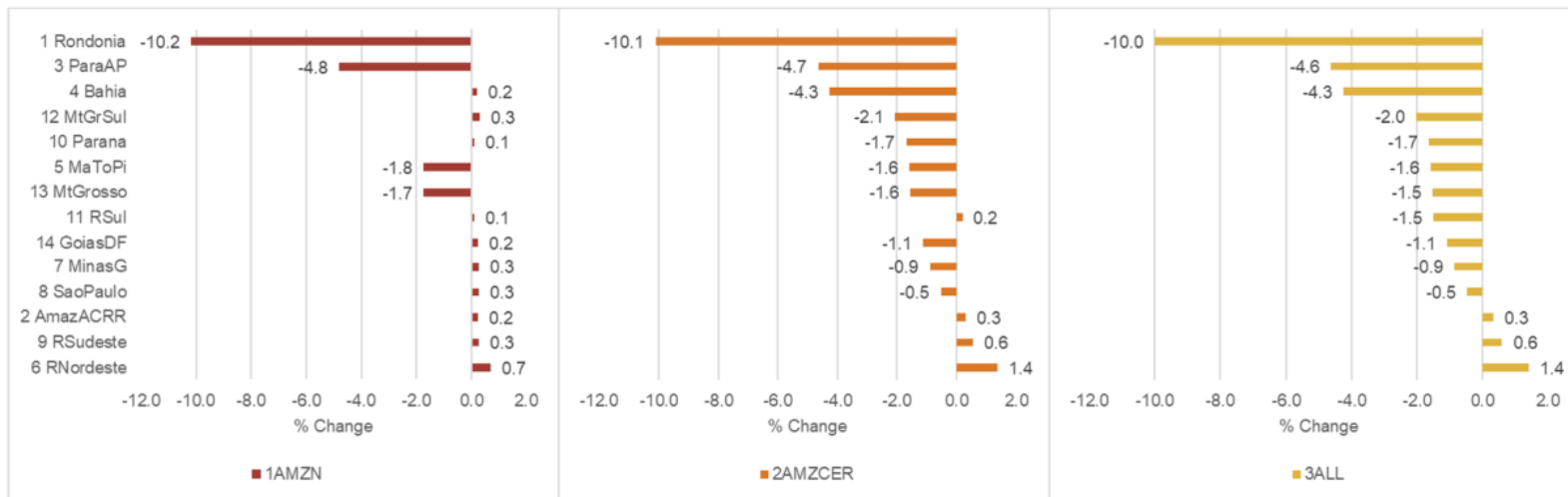


Figure 12 – Model results for soybeans industry output regionally (% change from 2023 to 2030)

Source: Elaborated by the author.

Drop in the consumption capacity of the middle class due to salary cuts

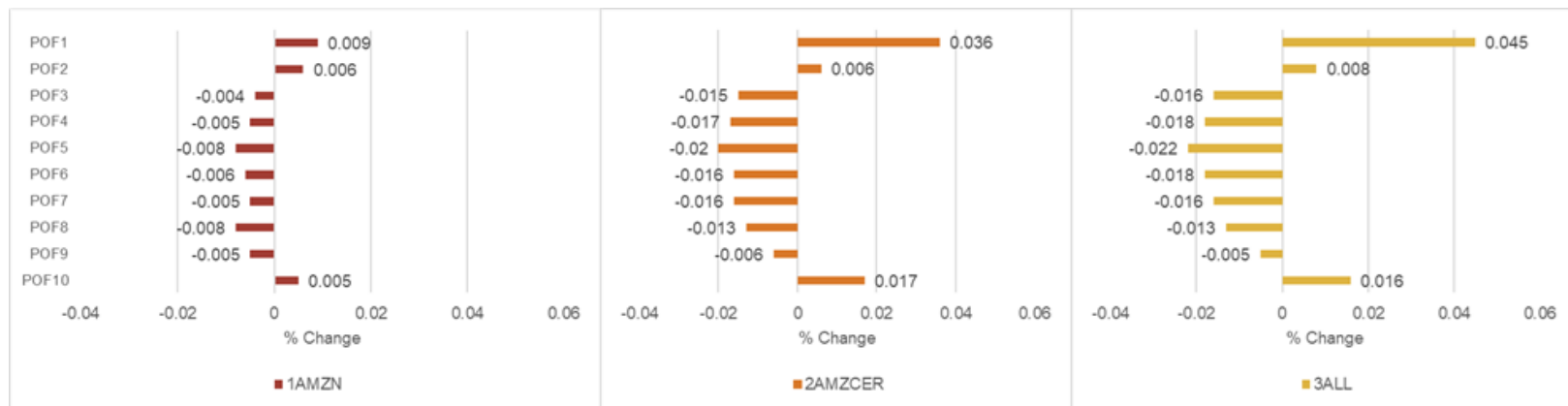


Figure 6 – Effect in the total real household consumption nationally (% change from 2023 to 2030)

Source: Elaborated by the author.

MtGrosso and Rondonia with the greatest economic impact. Parana is not affected.

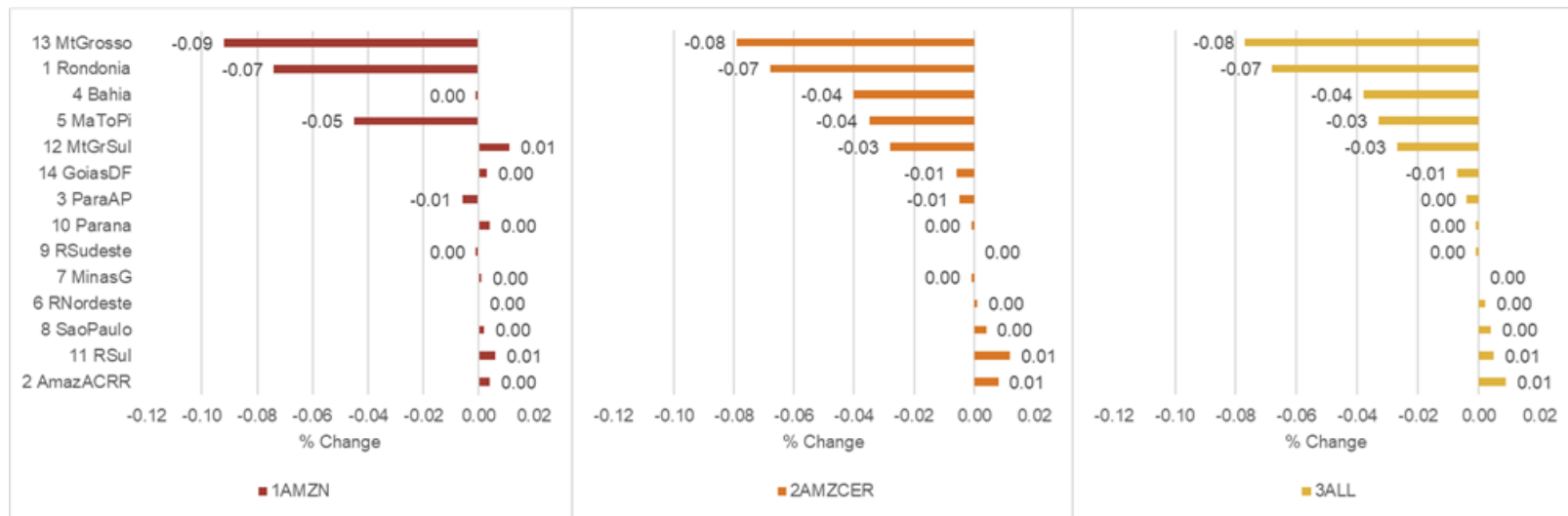


Figure 8 – Real GDP per region (% change from 2023 to 2030)

Source: Elaborated by the author.

Drop in the deforestation rate in the aggregate

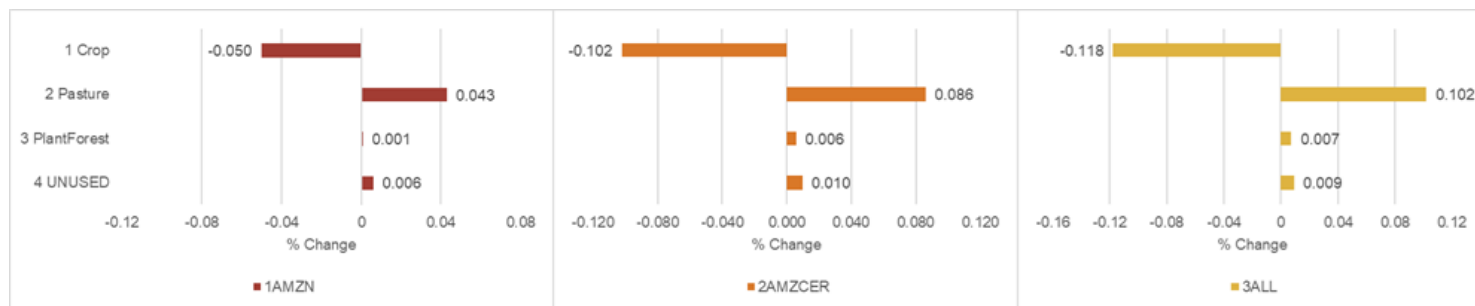


Figure 14 – Model results for National Change broad areas in hectares

Source: Elaborated by the author.

**Increase in forests is limited to MaToPi, MinasG and Bahia.
However, MtGrosso and Rondonia with deforestation.**

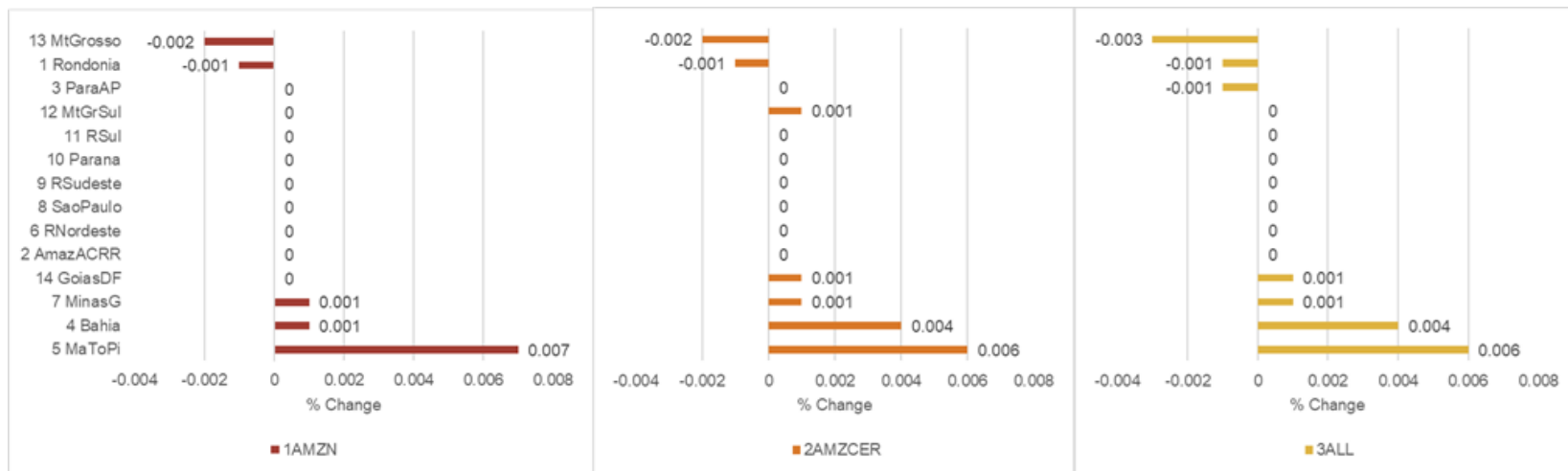


Figure 16 – Change in Natural Forests areas, million of hectares (c) regionally
Source: Elaborated by the author.

Final considerations

- Study results suggest multi-faceted impact on the Brazilian economy and emissions due to compliance with EUDR in the soybean supply chain, with a potential decrease in deforestation aligning with European Parliament's regulation intentions.
- There is a predicted negative and very small impact on national GDP and currency devaluation, with middle-class households potentially facing a slight decline in consumption due to reduced wages.
- The substitution effect is expected in agricultural crops: coffee, corn, orange, rice, and wheat could replace soybean production. However, coffee and possibly corn are not viable alternative crops due to EUDR inclusion.
- Export volumes may shift to cotton and corn, but these won't offset the reduction in soybean production and export.
- Regional economic impacts vary: MtGrosso and Rondonia are most negatively affected, exacerbating regional inequality. MaToPi and Bahia face an economic downturn despite recent agricultural growth and forest land potential, while Parana is anticipated to remain relatively unaffected.
- Regional emissions are expected to slightly reduce except in MtGrosso, Rondonia, MaToPi, and ParaAP due to pasture land use change.
- The Cerrado biome inclusion is undecided; scenario 2 and 3 results indicate similar high-risk impacts as entire country classification. Other regions (GoiásDf, ParaAP, RSudeste, MinasG, RNordeste, Sao Paulo) are not significantly impacted economically or environmentally. Limitations noted: the study cannot estimate export leakage to other nations, and future research should apply shocks directly to costs or technology for a deeper understanding of policy impact.