

EU deforestation law: fire on the horizon for soy traders?

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In April 2023, the European Union adopted a regulation to remove deforestation from its supply chains.[1] The regulation requires companies selling products to Europe that include commodities such as soy, palm oil, beef, or timber, to prove that they do not contribute to legal or illegal deforestation globally.

Figure 1. Soy traders' quarterly bond issuances since Q2 2018. Sources: Bloomberg, AFII.



Europe ranks among the largest importers of soy products, with at least half sourced from Brazil.[2,3] Soy traders will either need to incur costs to improve the sustainability of their supply chains or risk falling short of the regulation, which may limit their access to European markets or result in lofty fines. All these consequences could potentially result in a deterioration of their credit quality.[4]

We examine how bondholders exposed to leading soy traders can assess financial risk arising from the regulation and consider whether the market is already pricing in such concerns.

There are three main takeaways:

- **The EU regulation on deforestation is a material risk for soy producers' investors.** Furthermore, the EU may extend the regulation from deforestation to other ecosystems. **Credit deterioration and higher borrowing costs could be significant for investors.**
- **These heightened risks do not appear to be reflected in current credit spread levels.** It would be strategic for investors to review investments before the regulation is enforced, which could drive a pricing adjustment.
- **Amongst large investment grade issuers, American agribusiness Bunge, with $2.9 bn bonds outstanding, appears the most exposed to a potential spread repricing.**

[1] "Parliament adopts new law to fight global deforestation", European Parliament News, 19 Apr 2023.
[2] Around 17% of the Amazon forest has been cleared with soy being identified as a major driver of deforestation. See "Science Panel for the Amazon: Presentation of Initial Findings", UN SDSN, 6 Jul 2021 and "MAAP #161: Soy deforestation in the Brazilian Amazon", MAPP, 18 Jul 2022.
[3] "European Soy Monitor Report", IDH, 3 May 2022.
[4] "Investors may exit consumer goods firms over EU deforestation law", Reuters, 14 June 2023.

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EU deforestation regulation background

The "EU Regulation on deforestation-free supply chains" is an initiative under the European Green Deal.[5] The regulation comes after the European Commission defined a plan of action to halt deforestation in the "*2019 Commission Communication on Stepping up EU Action to Protect and Restore the World's Forests*".[6]

The regulation will require companies selling products to Europe that are exposed to cattle, cocoa, coffee, palm oil, rubber, soy or wood to have proof that they have not contributed to deforestation in the EU or elsewhere since 2020.[7] Companies not complying may pay a fine of at least 4% of their total annual turnover in the EU.

While setting a strong benchmark, the regulation has been criticised for exclusively covering degradation of specific types of forest and failing to address other biomes such as the Cerrado savannah, regularly devastated by soy production.[8]

The regulation will undergo a first review prior to September 2024, focusing on the potential inclusion of "other wooded land". Another review will be conducted in 2025, looking at the incorporation of grasslands, peatlands, and wetlands.[9,10]

Figure 2. Share of EU deforestation caused by selected commodities between 2008 and 2017. Source: European Parliament.

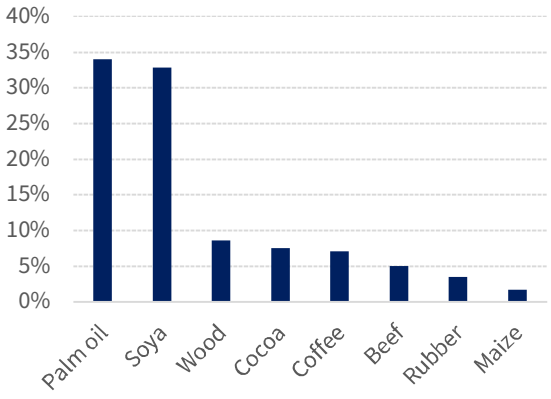


Figure 2 shows the commodities that have contributed to Europe's deforestation footprint.[11] The EU estimates that soy was responsible for almost a third. In countries like France and Denmark it is the leading cause of deforestation footprint linked to imported goods.[12] With a share of about 15% of total traded soy products, Europe is the second largest market after China.[13] Trase data indicates that Europe has a higher deforestation footprint per unit of soy imported, compared to China.

[5] "Green Deal: New law to fight global deforestation and forest degradation driven by EU production and consumption enters into force", EU Commission, 29 Jun 2023.
[6] "Stepping up EU Action to Protect and Restore the World's Forests", EU Commission - COM/2019/352 final, 23 Jul 2019.
[7] "Regulation (EU) 2023/1115 Of the European Parliament and the Council", Official Journal of the European Union, 31 May 2023.
[8] The regulation currently addresses areas with "trees taller than five metres and a canopy cover of 5-10%". "Saving the Cerrado: why Bunge, supermarkets and governments must act fast", MightyEarth, 6 Jun 2023.
[9] European Parliament legislative resolution of 19 April 2023 / (EU) No 995/2010 (COM(2021)0706 – C9-0430/2021 – 2021/0366(COD))
[10] The regulation currently addresses areas with "trees taller than five metres and a canopy cover of 5-10%". "Saving the Cerrado: why Bunge, supermarkets and governments must act fast", MightyEarth, 6 Jun 2023.
[11] Between 2008 and 2017, soy was responsible for 32.8% of the EU's deforestation footprint. See "Towards deforestation-free commodities and products in the EU", European Parliament, Apr 2023.
[12] "Trase analysis shows the opportunities for Amsterdam Declarations Partnership countries as they look to tackle commodity-driven deforestation.", Trase, 23 Jun 2022.
[13] "Mapping the European Soy Supply Chain", Profundo, Jan 2022.

Scoping the soy companies

In this section, we review the companies most exposed to ecosystem conversion in Brazil caused by soy, and review bond issuances in the sector.

If the regulation is extended to "other wooded land", this would impose significant additional tracking and reporting constraints on soy traders. It is therefore prudent to consider the full scope of ecosystems impacted by soy traders when carrying out a risk assessment.

Our starting universe consists of the 24 soy traders identified by Trase Finance as having the highest exposure to 2020 Brazilian ecosystem conversion.[14] Out of this universe, we find that 12 companies have issued publicly traded bonds, representing an amount outstanding of over $43 bn. We summarise our findings in Table 1.

Table 1. List of soy traders with largest exposure to Brazilian ecosystem conversion. Sources: Trase Finance, Bloomberg, AFII.

Company name	Exposure to Brazilian ecosystem conversion (Ha)	Credit rating	Bonds amount outstanding ($mn equivalent)
Bunge	60300	BBB	2900
ADM	31200	A	8398
Cargill	25700	A	12498
Gavilon	22900		
Olam	20900	NR	1191
Louis Dreyfus	16800	NR	1540
CHS	16700		750
Viterra	14100	BBB-	3356
COFCO	12600	NR	1514
Amaggi	9140	BB-	
Engelhart	6280		
GJ International	5880		
Mitsubishi	4600	A	4880
Novaagri	4260		
Mitsui&Co	3400	A	2718
Fiagril	850		
Caramuru	665		
Cutrale	629		
Sodrugestvo	215		
Marubeni	161	BBB+	4038
Agribrasil	115		
Sinagrio	96.6		
Cooperativa Agraria	83.5		
Agricola Al Vorada	42.5	NR	45

Companies outlined in red have live outstanding bonds.

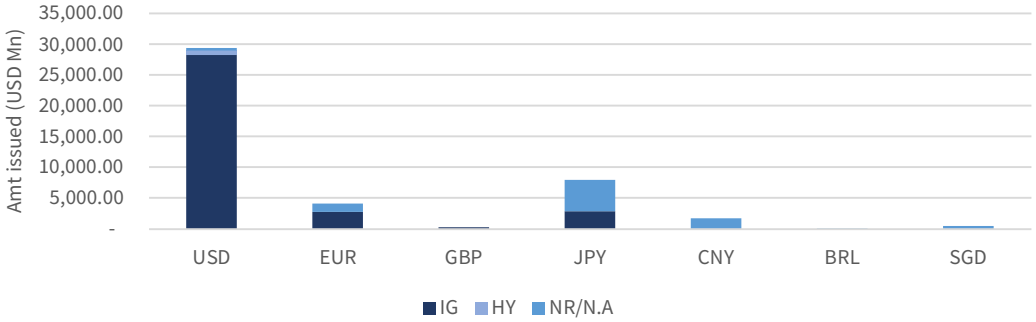
Trase's list relies on information originating from 2020. A few corporate events have since occurred, necessitating some data refinement. Firstly, Gavilon has been acquired and fully integrated by Viterra, making it appropriate to remove the company from the universe. As Viterra

[14] "Beyond forests: traders face EU regulatory risks from soy expansion in Brazil", Trase Finance, 21 Mar 2023.

only integrated Gavilon in 2023, we do not consolidate the companies' ecosystem conversion data.[15] Secondly, in June this year Bunge announced its merger with Viterra, with Bunge assuming all of Viterra's debt. Since the transaction has not yet been completed, Viterra is still included.

It is worth noting that despite being well received by the market, the combined entity will possess by far the largest ecosystem conversion footprint associated with soy globally and its land-use change strategy should consequently be scrutinised.[16]

Figure 2. Amount outstanding (USD Mn) by currency and credit rating of the issuers highlighted in Table 1. Source: Bloomberg, accessed 10 Aug 2023.

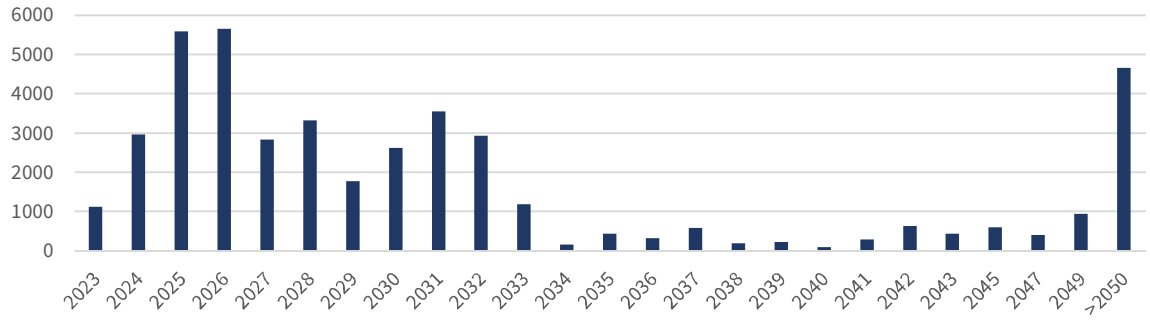


As shown by Figure 2, the vast majority of these bonds are investment grade and issued in G7 currencies, USD being the most common. Only one issuance was rated as high-yield, a $750 mm bond from Amaggi. Only six of the bonds ($2.21 bn amount outstanding) have been issued in Green, Social, Sustainable, or Sustainability-linked formats (GSS+).

Cargill is the largest issuer out of the target universe with $12.5 bn in outstanding bonds. It most recently came to market in April of this year, with two US dollar and one euro bond worth over $1.65 bn. As covered at the time, the bonds were well received by the market despite sustainability concerns regarding the issuer.[17] The euro bond in particular was met with high demand, being 9x oversubscribed.[18]

Figure 3 shows that a significant proportion of bonds will mature in the next few years, with almost 35% of the total amount outstanding maturing before 2027. This potential refinancing need presents an opportunity for investors to engage with these issuers around ecosystem conversion and how the company manages its exposure to the new EU regulation.

Figure 3. Amount outstanding (USD Mn) by maturity. Source: Bloomberg, accessed 10 Aug 2023.



[15] "Viterra completes Gavilon acquisition", Feed&Grain, 4 Oct 2022.
[16] "Bunge-Viterra merger: an ESG analysis", AFII, 14 Jun 2023.
[17] "Cargill: EUR bond, EU deforestation regulation", AFII, 14 Apr 2023.
[18] "Cargill Euro Bonds Boomed Despite EU Deforestation Law Risks", Bloomberg, 21 Apr 2023.

To conclude, bondholders have an opportunity to influence soy-linked deforestation. Many of the largest companies, with considerable ecosystem footprints have public bonds and are regular issuers. In particular, a large portion of the bonds mature over the next three years, and so issuers may come to market for refinancing. This would give investors the chance to engage on these issues.

Evaluating bondholders' risk

We now offer a comparative analysis of companies' magnitude of risk arising from the EU regulation.

From a bondholder's perspective, the EU regulation represents a very material financial risk. Hefty penalties in case of non-compliance, loss of access to a major soy market and reputational risk may significantly impede soy traders' revenues.

Three key factors emerge as primary drivers of financial risk for investors: the role of soy in the company's revenue structure, the degree of exposure to ecosystem conversion, and the effectiveness of the company's mitigation strategy. When comparing companies' risks, it's important to note that even if two companies share similar absolute levels of ecosystem conversion exposure, their risk levels may differ significantly based on factors such as the size and diversification of their operations.

In order to evaluate the financial risk stemming from soy-linked land conversion, understanding companies' footprints in proportion to their operations is crucial. This involves calculating the conversion risk relative to companies' revenue, which we refer to as the "AFII Exposure intensity." We draw a parallel here with carbon intensity, a standardized metric used to assess companies' climate risk relative to their size which allows for a meaningful comparison. It can be argued that this exposure is backward looking and does not reflect companies' future exposure. However, there is proof of supply-chains stickiness, especially for traders with the largest market shares.[19]

To assess the effectiveness of a company's mitigation strategy, we rely on the Forest 500 soy score, which ranks corporates' commitments, reporting and implementation strategies towards deforestation.[20] We summarise our findings in Table 2.

Forest 500 score

Forest 500 select companies most exposed to tropical deforestation and assesses them against four categories: Overall approach, content of commitments, social commitments / considerations, and reporting & implementation. Sections 2-4 are repeated for palm oil, soy, beef, leather, timber, and pulp and paper. Reporting & implementation is the category holding the most weight, reflecting the importance of action over promises. The process yields a score out of 100.

[19] "Understanding the Stickiness of Commodity Supply Chains Is Key to Improving Their Sustainability", T. N.P. dos Reis, P. Meyfroidt, E. K.H.J. zu Ermgassen, C. West, T. Gardner, S. Bager, S. Croft, M. J. Lathuillière, J. Godar, One Earth, 24 Jul 2020.

[20] "Forest 500 Data & Methods". Accessed 22 Aug 2023.

Table 2. Companies' exposure to land conversion risk. Sources: Bloomberg, Trase Finance, AFII, annual reports.

Organisation	Ecosystem conversion exposure (Ha -Trase)	Revenue – 2022 ($ bn)	AFII Exposure intensity (ha/$mn)	Forest500 soy score
Bunge	60300	67.23	0.90	43
ADM	31200	101.56	0.31	50
Cargill	25700	165.03	0.16	44
Olam	20900	39.83	0.52	16
Louis Dreyfus	16800	59.93	0.28	39
Viterra	14100	54.00	0.26	31
COFCO	12600	76.86	0.16	43
Amaggi	9140	7.00	1.31	60
Mitsubishi	4600	153.75	0.03	12
Mitsui&Co	3400	104.71	0.03	11
Marubeni	161	75.77	0.00	11

Bunge and Amaggi stand out for having the greatest conversion risk compared to their revenue, making these companies more susceptible to the financial repercussions of non-compliance with EU regulatory requirements. Despite Amaggi having the highest Forest 500 score in the ranking, both companies are still poorly scored.

Although Cargill and Archer-Daniels-Midland carry the second and third-highest conversion exposure respectively, they appear considerably less risky than Bunge in relative terms. When comparing the two companies, which are similar in size and operations, Archer-Daniels-Midland appears to carry a higher level of risk compared to Cargill.

Asian companies Marubeni, Mitsui&Co and Mitsubishi rank bottom among soy traders in terms of soy-related exposure in their revenue streams. This could explain why their land conversion strategy is quite weak, as suggested by their very low Forest 500 scores.

Bunge's and Amaggi's Brazilian soy operations stand out as carrying the greatest financial risk for investors in face of the EU regulation. Investors should consider this risk when assessing the companies' bonds.

Case Study: Bunge

Should the ecosystem conversion risk be reflected in credit spreads? This section uses Bunge as an example to illustrate the financial costs of not complying with EU Regulation.

The EU regulator may impose severe penalties for non-compliance with the regulation.[21] Such penalties include:

1. A maximum fine of at least 4% of the company's turnover in the EU.
2. Confiscation of revenues and products from the relevant transaction.
3. Temporary exclusion from public procurement and access to public funding for a maximum period of 12 months.
4. A temporary prohibition from placing relevant commodities on the EU market.

It may prove complex to evaluate the cost of penalties 2 and 3. However, as Bunge is publicly disclosing its turnover in the EU, it is possible to create a fairly accurate proxy for penalties 1 and 4. We can reasonably expect that if Bunge cannot export soy to the EU, the company would have to

[21] "Regulation (EU) 2023/1115 Of the European Parliament and the Council", Official Journal of the European Union, 31 May 2023.

distribute its products in other markets at a discounted price. That would create an opportunity cost for the company. We estimate the value of this cost by assuming a 10% discount.

We estimate that the company could lose 2.2% of its revenue for breaching the EU Regulation on Brazilian soy alone as illustrated in Table 3.

Table 3. Bunge's estimated financial losses in case of non-compliance with the EU regulation. Sources: Bloomberg, Trase Finance, AFII.

Annual opportunity cost of suspension from placing on the EU market relevant commodities/products	
Brazilian soy trade 2020 volume (kt)[22]	15,788
% of Bunge's total revenue in Europe	39%
Estimated Brazilian soy volume exported to the EU (kt) - 2020	6,157
Average 2022 soy price ($/t)	611.25
% discount for exporting to non-EU countries	10%
Total opportunity cost ($ bn)	**0.4**
Fine for non-compliance with the regulation	
Maximum fine	4% of annual EU turnover
Bunge 2022 total revenue ($ bn)	63.8
% of Bunge's total revenue in Europe	39%
Estimated Annual EU turnover ($ bn)	24.9
Total fine ($ bn)	**1.0**
Total cost for non-compliance ($ bn)	**1.4**

Although a substantial amount, a fine close to $1 bn does not seem unreasonable compared to precedents imposed by the European Commission.[23] We can reasonably assume that such a fine, combined with lost revenue due to losing access to the EU market, could impair the company's credit quality and its risk perception from the market.

[22] Trase Finance's Bunge Ltd profile. Accessed 25 Aug 2023.

[23] As an example, the EU fined Alphabet unit Google EUR 4.34Bn for breaching anti-trust rules. See "Google loses challenge against EU antitrust decision, other probes loom", Reuters, 14 Sept 2022.

Regulatory risk and market pricing

In this section, we examine whether ecosystem conversion risk is a driver of soy traders' bonds spreads using regression analysis.

It is reasonable to assume that financial risk arising from the EU Regulation should be one of the factors driving soy traders' credit spreads. UNFCCC evaluates that the value loss of companies in the commodities sector is up to -22% between 2020 and 2030, partly due to increased regulatory risks and supply-chain related cost impacts.[24] However, the success of recent bond issuances and lack of regulatory risk disclosure may reflect the market's failure to consider such risks.[18]

To test the existence of such a relationship, we perform an OLS cross-sectional regression of bond spreads against a "conversion variable" measuring soy traders' ecosystem conversion risk. We add the maturity of the bond and its credit rating as control variables, accounting for them statistically to remove their effects on the conversion variable. To streamline statistical modelling, we opt to focus solely on USD bonds issued by companies listed in Table 1, excluding perpetual or convertible bonds, while ensuring the availability of data.

The OLS regression takes the following form:

$$Spread_i = \beta_0 + \beta_1 \times ConversionVariable_i + \beta_2 \times Maturity_i + \beta_3 \times CreditRating_i$$

We construct a conversion variable using three different measures of conversion risk: the absolute ecosystem conversion exposure as calculated by Trase, the "AFII Exposure intensity" as defined in the previous section and the Forest 500 soy score.

The bond's maturity and credit rating are only partial predictors of spread levels. However, the objective is to determine whether deforestation risk is an influencing factor, rather than to construct an exhaustive statistical model. Using a simplified model with a limited set of variables allows for easier comparison of statistical significance.

Given the relatively stable nature of deforestation risk metrics, we opt to perform the regression over the average of daily spreads calculated on a quarterly basis, smoothing time series and eliminating market noise.[25]

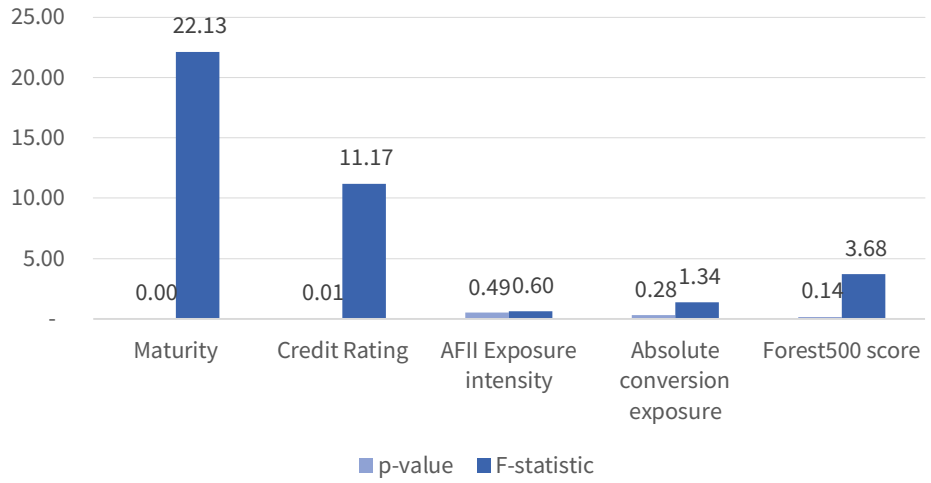
We conduct this regression analysis between Q2 2022 and Q2 2023. The statistical significance of each variable is determined by its p-value and F-statistics derived from the type III sum of squares. Type III sum of squares evaluates the contribution of a specific variable independent of the other variables in the model, including any interactions involving the variable of interest. A p-value below 0.05 and a high F-statistic indicate the variable is statistically significant.

The outcomes of the regression analysis are presented in Annex 1. In contrast to the bond's maturity and credit rating, we find that the ecosystem conversion risk does not appear to have a significant impact on spread levels over the observed period. This is especially true for the "exposure" and "absolute conversion footprint" variables, for which the p-values are well above the 0.05 threshold.

[24] "Assessing the financial impact of the land use transition on the food and agriculture sector", UNFCCC, Sept 2022.
[25] "Data Smoothing", Corporate Finance Institute, 14 Dec 2022.

The Forest 500 soy score shows slightly higher statistical significance. This implies that while markets may not account for the actual footprint of soy traders, they may account for strategies' strengths and weaknesses.

Figure 4. Type III sum of squares average p-values and F-statistics over the observed period. Source: AFII.



In conclusion, we see a lack of evidence that ecosystem conversion risk is a definitive driver for bond spreads. Bondholders should consider the risks that regulatory costs become a significant driver of spreads, with the associated impact on bond prices.

Conclusions

Financial institutions have not yet proactively addressed deforestation (and more broadly ecosystem conversion) in their investment policies.[26] However, the EU deforestation regulation, and other increasing regulatory pressures[27] require the agricultural industry to act, and this should be reflected in asset prices.

Companies exposed to commodities linked to ecosystem conversion face heightened credit risk if they do not comply with the EU regulation. We have illustrated the implications for bondholders using Brazilian soy traders.

The energy sector provides a study case of how companies involved in unsustainable activities - namely coal and fossil fuels – now face an increased cost of capital.[28] If financial institutions increasingly adopt more stringent ecosystem conversion policies, borrowing costs could become substantially higher for agricultural companies that poorly manage their supply chains, anticipating costs to comply with regulation, or fines for non-compliance.

Such risks appear currently unpriced by bond markets. Bondholders should consider the risk that these costs will begin to be priced in by the market, and the associated implications for bond prices.

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[26] "Marfrig-Minerva deal: decoding the wood from the trees", AFII, 31 Aug 2023.
[27] Similar regulations are also underway in the US and the UK. See "The UK Environment Act - what's happening now?", ClientEarth, 1 Apr 2022 and "Tackling global forest loss: What the US can do", Global Witness, 26 Jan 2023.
[28] "Energy Transition and the Changing Cost of Capital: 2023 Review", Oxford Sustainable Finance Group, March 2023.

Annex 1: OLS regression results

Table 4. Type 3 sum of squares statistics with "AFII Exposure intensity" as the conversion variable. sources: Trase, Bloomberg, AFII.

Q1 2022	Maturity	Credit Rating	Absolute conversion exposure
P-value	<0.0001	0.000	0.226
F-statistic	27.963	13.756	1.499

Q2 2022	Maturity	Credit Rating	Absolute conversion exposure
P-value	<0.0001	0.018	0.737
F-statistic	20.666	5.942	0.113

Q3 2022	Maturity	Credit Rating	Absolute conversion exposure
P-value	0.000	0.030	0.441
F-statistic	16.511	4.907	0.602

Q4 2022	Maturity	Credit Rating	Absolute conversion exposure
P-value	<0.0001	0.035	0.524
F-statistic	22.074	4.655	0.410

Q1 2023	Maturity	Credit Rating	Absolute conversion exposure
P-value	<0.0001	0.019	0.578
F-statistic	22.402	5.796	0.313

Q2 2023	Maturity	Credit Rating	Absolute conversion exposure
P-value	<0.0001	0.001	0.424
F-statistic	37.476	12.736	0.647

Table 5. Type 3 sum of squares statistics with "Absolute conversion exposure" as the conversion variable. Sources: Trase, Bloomberg, AFII.

Q1 2022	Maturity	Credit Rating	AFII Exposure intensity
P-value	<0.0001	0.005	0.325
F-statistic	25.620	8.424	0.986

Q2 2022	Maturity	Credit Rating	AFII Exposure intensity
P-value	<0.0001	0.008	0.331
F-statistic	20.084	7.471	0.957

Q3 2022	Maturity	Credit Rating	AFII Exposure intensity
P-value	0.000	0.005	0.449
F-statistic	16.270	8.446	0.579

Q4 2022	Maturity	Credit Rating	AFII Exposure intensity

P-value	<0.0001	0.015	0.191
F-statistic	21.466	6.223	1.749

Q1 2023	Maturity	Credit Rating	AFII Exposure intensity
P-value	<0.0001	0.010	0.144
F-statistic	21.998	7.130	2.192

Q2 2023	Maturity	Credit Rating	AFII Exposure intensity
P-value	<0.0001	0.006	0.211
F-statistic	33.757	8.063	1.593

Table 6. Type 3 sum of squares statistics with "Absolute conversion exposure" as the conversion variable. Sources: Trase, Bloomberg, AFII.

Q1 2022	Maturity	Credit Rating	Forest500 soy score
P-value	<0.0001	<0.0001	0.027
F-statistic	19.040	19.296	5.142

Q2 2022	Maturity	Credit Rating	Forest500 soy score
P-value	0.000	0.000	0.089
F-statistic	15.409	16.166	2.977

Q3 2022	Maturity	Credit Rating	Forest500 soy score
P-value	0.000	0.000	0.470
F-statistic	13.801	14.346	0.529

Q4 2022	Maturity	Credit Rating	Forest500 soy score
P-value	<0.0001	0.000	0.202
F-statistic	18.280	14.088	1.663

Q1 2023	Maturity	Credit Rating	Forest500 soy score
P-value	<0.0001	<0.0001	0.056
F-statistic	17.826	17.834	3.790

Q2 2023	Maturity	Credit Rating	Forest500 soy score
P-value	<0.0001	<0.0001	0.006
F-statistic	27.740	25.794	8.001

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