



OESTERREICHISCHE NATIONALBANK

EUROSYSTEM

Assessing Transition Risks: Comparing quantitative measures for Austrian non-financial IFRS companies

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Overview

- Background: Future pricing of emissions as main driver of transition risks
- **Basic idea: stressing a non-financial firm's balance sheets at firm level using a unique dataset of self-collected data**
- Short to medium term horizon
- Emission prices are based on scenarios by the Network for Greening the Financial System (NGFS)
- Static balance sheet assumption
- The paper's model builds on the already established credit risk models by the OeNB and BBk

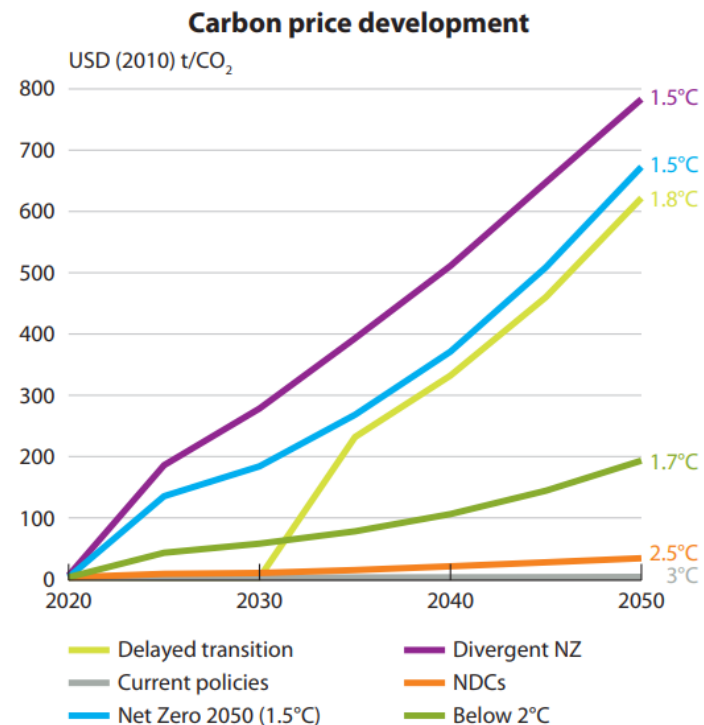
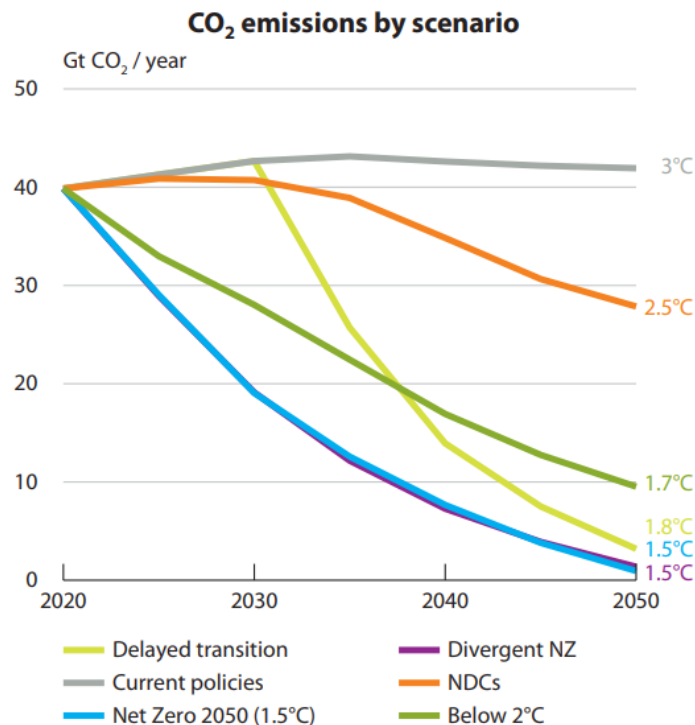
Data

- **Financial statement data:** (Self-reported) financial statement data of Austria IFRS groups
- **Emission data:** focus on scope 1 emissions, solely derived from manually collected data via the ERICA WG and the OeNB's ICAS (majority of companies referred to CO2 equivalents)
- **Analysis:** restricted to financial statements of the year 2020; sample is structured in climate policy relevant sectors (CPRS) and non-CPRS

CPRS classification	CPRS	Companies
1 - Fossil fuel	Yes	3
2 - Utility	Yes	7
3 - Energy intensive	Yes	12
4 - Buildings	Yes	2
5 - Transportation	Yes	10
6 - Agriculture, etc.	Yes	0
7 - Finance	No	0
8 - Scientific, R&D	No	0
9 - Others	No	15
Total		49

Scenarios

- NGFS only presents carbon prices in 5-year intervals, beginning from 2015 → interpolation of carbon price increase
- Standard stress scenario with additional costs induced by a price of EUR 60 per ton of CO₂ equivalents → focus on an orderly transition



Modelling assumptions

- The simulation of a companies' creditworthiness under a short-term stress is based on a static balance sheet assumption:
 - ⊗ Higher carbon prices lead to higher costs which reduce profits and equity → no additional financing to offset additional costs
 - ⊗ Higher costs are not passed on to customers → purchase and sales prices as well as production and sales volumes remain unchanged
 - ⊗ No additional management actions, production or low-emission technology changes are taken
 - ⊗ Composition of balance sheet remains otherwise unchanged
 - ⊗ No change in business model
 - ⊗ No consideration of CO₂ costs already taken into account in the financial statement

Method

- Scenario analysis and assumption of a hypothetical CO2 price → simulation of a companies' creditworthiness under stress:
 1. Determine scope 1 emissions for each company.
 2. Determine additional costs following from a hypothetical higher CO2 price (in the sense that current CO2 costs come on top of the already existing expenses).
 3. Make financial projection on the basis of the stressed cost factor.
 4. Use stressed profits and equity as basis for stressed credit risk rating.
 5. Calculate stressed rating/probability of default using the statistical model of OeNB's inhouse credit assessment system (ICAS)

- Model ratios:

Ratio	Stressed
EBIT, adjusted	Yes
Self-financing ability	Yes
Net indebtedness ratio	No
Capital interest burden	No
Return on cash flow	No
EBITDA – ROI	Yes

Results – Stressed financial statements and PD changes

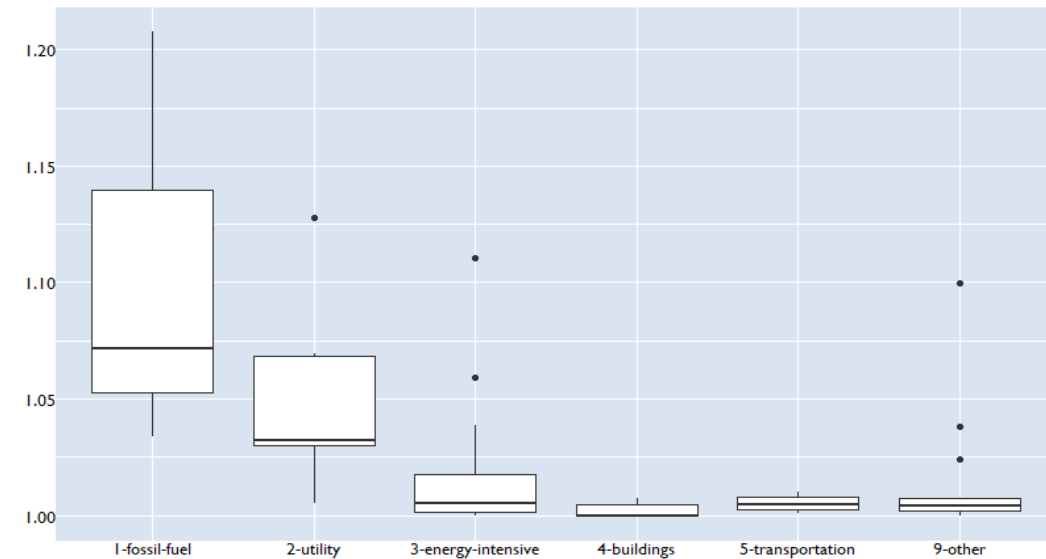
Impact on production costs (60 EUR/t CO₂ equivalents for the CPRS classification):

→ Particularly high for the sectors fossil fuels and utility

Impact on the PD in the standard scenario for the CPRS classification:

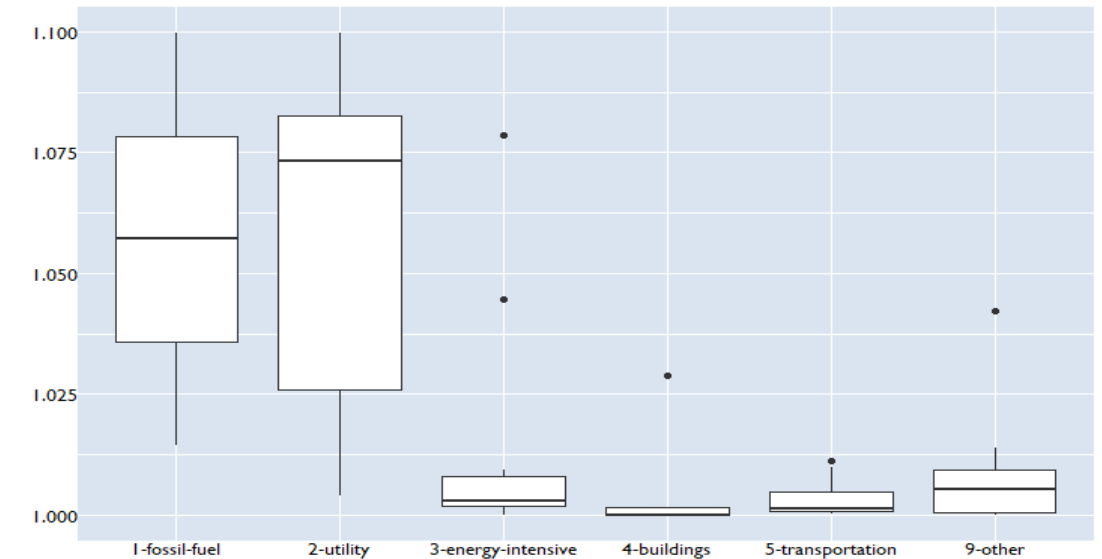
→ Average PD increase of more than 5%

Change in productions costs (raw materials and consumables)



Source: OeNB.

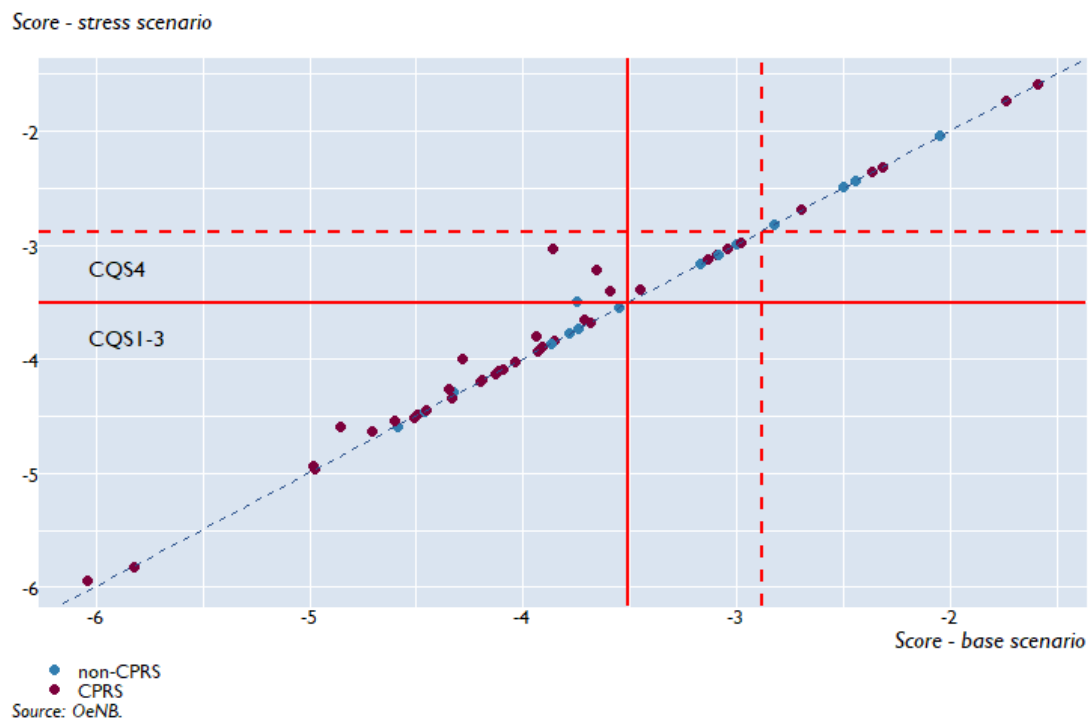
Stressed Rating [PD Stressed/PD]



Source: OeNB.

Results - Migrations

Rating migrations as measured on the Eurosystem Quality Steps (from the base line scenario to the standard scenario):



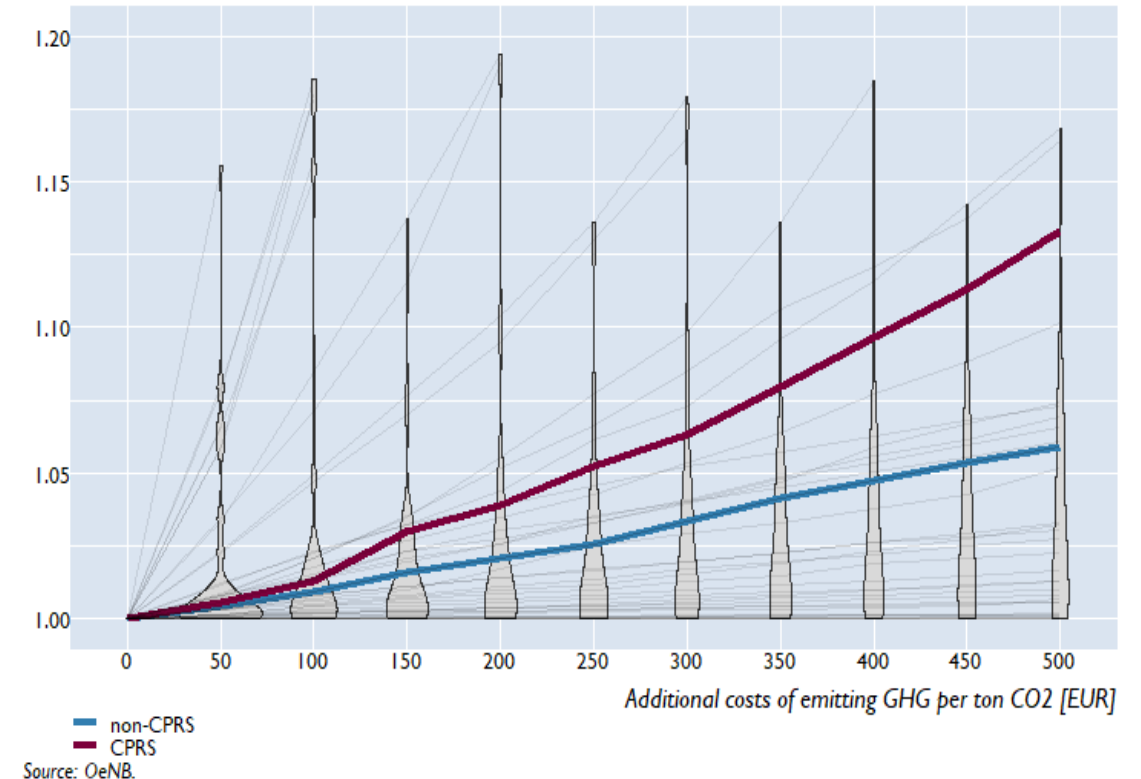
Downgrades in terms of EQS per CPRS sector:

CPRS classification	Companies	Downgrades (in % of entities in this sector)
1 - Fossil fuel	3	1 (33%)
2 - Utility	7	2 (29%)
3 - Energy intensive	12	1 (8%)
Other CPRS	12	0 (0%)
9 – Others (non-CPRS)	15	1 (6%)
Total	49	6 (12%)

Results – Sensitivity analysis

- Scenarios in the range from 0 to 500 EUR/t CO₂
 - Purple and blue line refer to the median stressed rating for (non-)CPRS
- CPRS stronger affected by an increase in CO₂ prices
- Variance of the impact increases with higher carbon prices

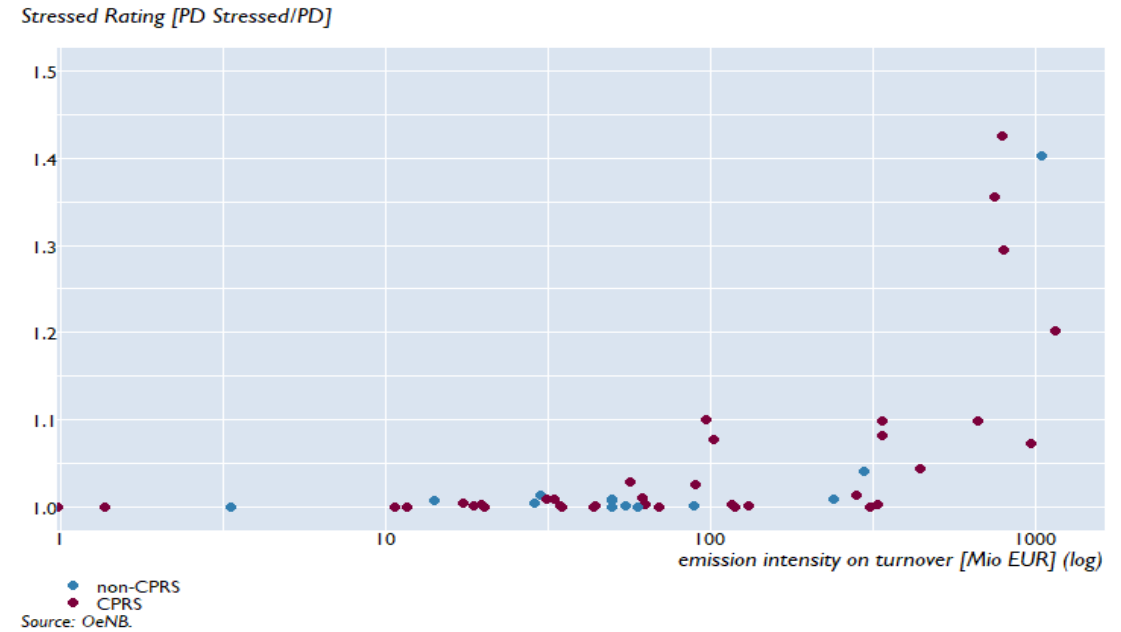
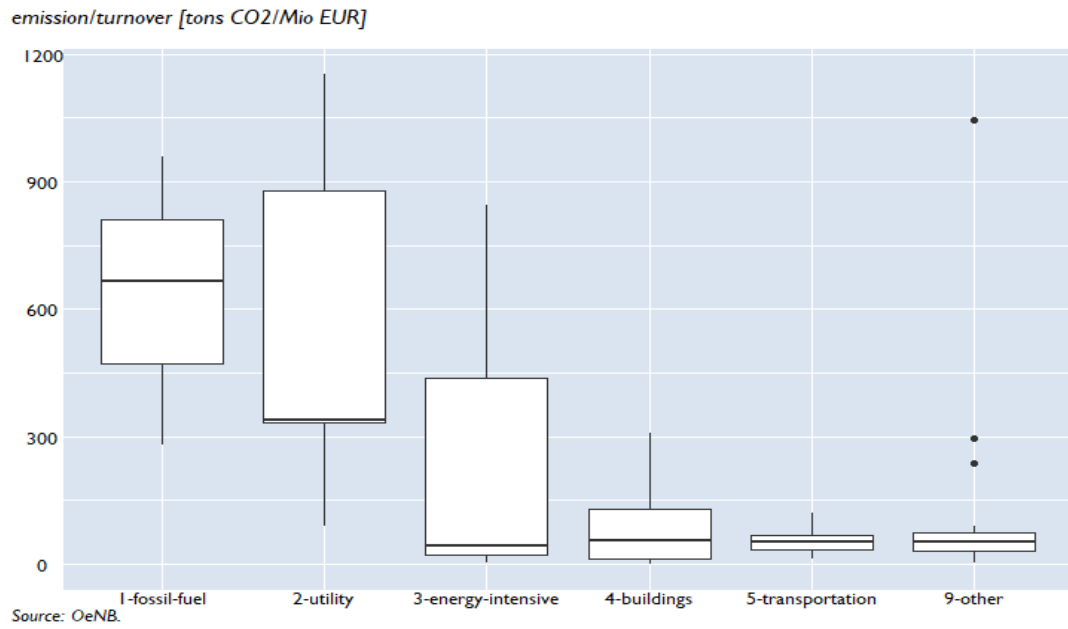
Stressed Rating [PD Stressed/PD]



Results – Comparison with non-forward-looking measures: emission intensity

Emission intensity: tons of CO₂ / turnover
 → 1-fossil-fuel and 2-utility have the highest emission intensity while the remaining CPRS are on the same level as the non-CPRS 9-other

Comparison of stressed rating in standard scenario with emission intensity for each company
 → rank correlation of 0.56 (Kendall's tau) for CPRS and 0.23 (Kendall's tau) for non-CPRS



Conclusion

- The OeNB's ICAS model for IFRS financial statements is applied to obtain the stressed PD of Austrian non-financial IFRS groups.
- Impact of the stressed carbon price of 60 EUR per ton CO₂ (standard scenario) is **most pronounced for the CPRS 1-fossil-fuel and 2-utility** – highest increase in costs (and thus strongest effect on profits and equity):
 - **increase of PD level** of more than 5%
 - **rating migration in terms of EQS** (with limited effect except for the most affected sectors where over a quarter of all companies would be downgraded under the stress scenario)
- Sensitivity analyses (PD shift for price levels from 0 to 500 EUR/t CO₂) reveals **stronger rises in PD levels for CPRS** with increased variance of impact with assumed price level
- Comparison of standard scenario with the emission intensity (t CO₂/turnover) shows that **coherence between both measures is higher for CPRS** than for non-CPRS

Danke für Ihre Aufmerksamkeit

Thank you for your attention

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