EUROPEAN CENTRAL BANK

EUROSYSTEM

The low-carbon transition, climate commitments and firm credit risk

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Disclaimer: The views expressed are those of the authors only and do not necessarily reflect the views of the European Central Bank or the Eurosystem.

Motivation

Transmission channel

Drivers of transition risk:

Government policy, technological change, market sentiment urge firms to adapt to a low-carbon economy and to reduce their GHG emissions

Firms' credit risk:

Reduced ability of the borrower to repay and service debt

Banks and investors' risk of losses:

Reduced ability to fully recover the value of an investment in the event of default*

Policy relevance: Climate disclosure, Credit ratings, Risk weights, Central bank operations

* BCBS (2021). Climate-related risk drivers and their transmission channels

Research questions and main results

How is climate-related transition risk reflected in firm credit risk?

1. How is firm **exposure to transition risk** associated with firm credit risk estimates?
   - ➢ There is a positive relationship between GHG emissions and credit risk estimates, and government policy plays a role.
2. Does **climate disclosure** moderate how firm **exposure to transition risk** is associated with credit risk?
   - ➢ Yes, climate disclosure mitigates the relation between transition risk and credit risk.
3. How is firm's **management of transition risk** associated with its credit risk?
   - ➢ Disclosing commitment to reduce emissions is associated with low credit risk.

Novel dataset incl. forward-looking targets | Common framework for Rating and DtD | European vs US Transition

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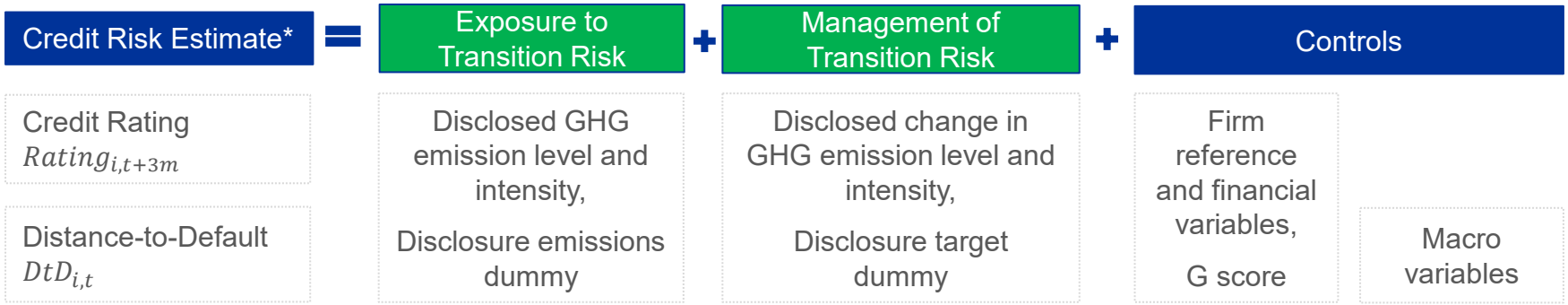
A novel dataset

- Firms: non-financial firms of S&P 500 and of STOXX Europe 600
- Period: 2010 - 2019
- Geography: US and Europe
- Sources: Refinitiv, Urgentem, Bloomberg, SBTi, ECB Ratings Database, ICE, Eurostat



*The higher the *Rating* or *Distance-to-Default*, the lower the Credit Risk associated with the firm

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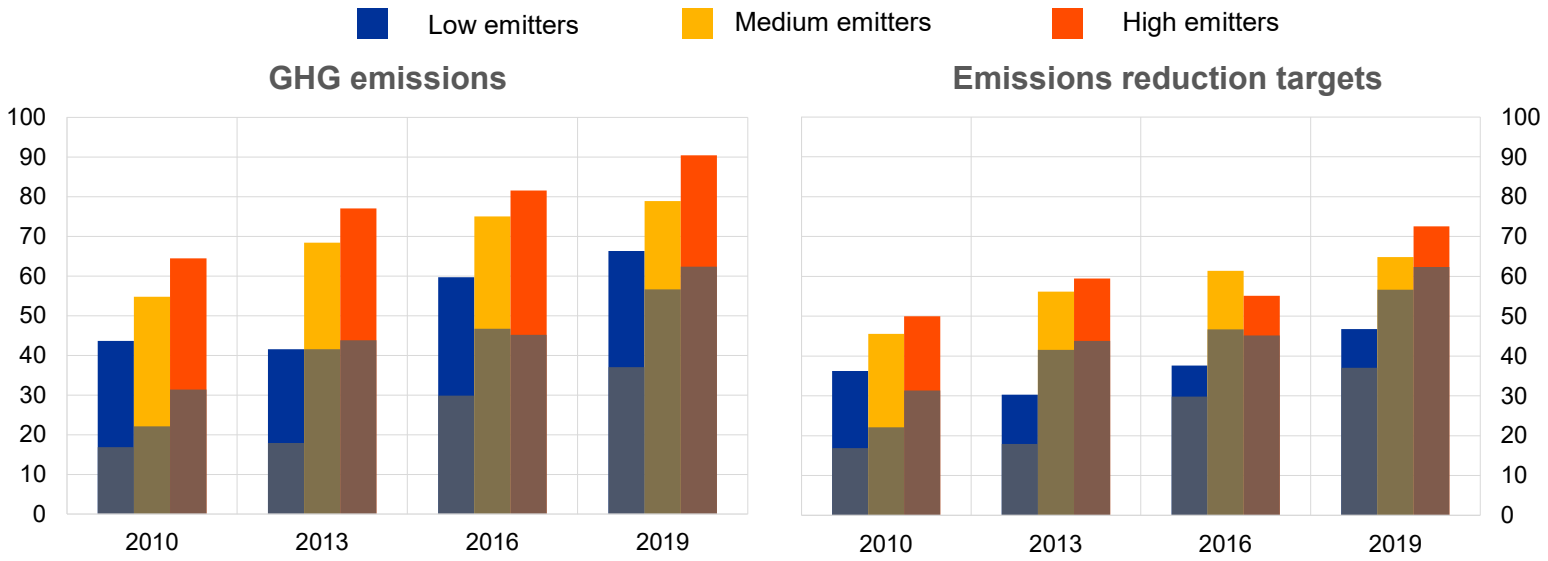
Stylised facts

Firms disclosing GHG emissions and emissions reduction targets

Percentage of firms in the respective emitters tercile out of 859 listed NFCs; shaded areas indicate audited disclosure



Sources: Urgentem, Refinitiv, and ECB calculations

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Credit Rating and Emissions

$$Rating_{i,t+3m} = \alpha + \beta_1 Scope\ 1_{i,t} + \beta_2 Scope\ 2_{i,t} + \beta_3 Scope\ 3_{i,t} + \sum_{j=1}^{6} \gamma_j FinancialControls_{j,i,t} + \rho\ SectorFE_i + \tau TimeFE_t + \sigma Country\ FE_i + \epsilon_{i,t}$$

- Higher **Scope 1 and 3 intensities** are associated with lower ratings (i.e. higher credit risk)
- Higher **Scope 1 levels** are also significant

Variable	emission intensity	emission level
Scope 1 GHG intensity	-194**	
	(93.0)	
Scope 2 GHG intensity	900	
	(918)	
Scope 3 GHG intensity	-6.26**	
	(2.71)	
Scope 1 GHG level		-0.012***
		(0.0038)
Scope 2 GHG level		0.0058
		(0.0073)
Scope 3 GHG level		-0.00024
		(0.00050)
Controls	Y	Y
Time fixed-effects	Y	Y
Sector fixed-effects	Y	Y
Country fixed-effects	Y	Y
Observations	4,201	4,194
R-squared	0.17	0.17

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Distance-to-Default and Emissions

$$DtD_{i,t} = \alpha + \beta_1 Scope\ 1_{i,t} + \beta_2 Scope\ 2_{i,t} + \beta_3 Scope\ 3_{i,t} + \sum_{j=1}^{6} \gamma_j FinancialControls_{j,i,t} + \sum_{k=1}^{7} \omega_k MacroControls_{k,i,t} + \rho\ SectorFE_i + \sigma Country\ FE_i + \epsilon_{i,t}$$

- Higher **Scope 1 and 3 intensities** are associated with lower DtD (i.e. leading to higher credit risk)
- **GHG levels insignificant**

Variable	emission intensity	emission level
Scope 1 GHG intensity	-348***	
	(124)	
Scope 2 GHG intensity	26.8	
	(212)	
Scope 3 GHG intensity	-65.1***	
	(21.7)	
Scope 1 GHG level		-0.0069
		(0.0065)
Scope 2 GHG level		-0.0016
		(0.023)
Scope 3 GHG level		0.00086
		(0.00079)
Controls	Y	Y
Sector fixed-effects	Y	Y
Country fixed-effects	Y	Y
Observations	20,829	20,829
R-squared	0.35	0.34

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Credit Rating and Climate Disclosure

$$Rating_{i,t+3m} = \alpha + \beta_1 DiscloseGHG_d_{i,t} + \beta_2 DiscloseGHG_d_{i,t} * Scope\ 1_{i,t} + \beta_3\ DiscloseGHG_d_{i,t} * Scope\ 2_{i,t} + \beta_4 DiscloseGHG_d_{i,t} * Scope\ 3_{i,t} + \beta_5 YoY\ Scope\ 1\ and\ 2_{i,t} + \beta_6 DiscloseCommit_d_{i,t} + \sum_{j=1}^{6} \gamma_j Controls_{j,i,t} + \rho\ SectorFE_i + \tau TimeFE_t + \sigma Country\ FE_i + \epsilon_{i,t}$$

- The **act of disclosing emissions** is associated with better ratings
- A **reduction in disclosed emission intensity** is associated with better ratings
- A similar relationship is observed between Distance-to-Default and disclosure

Variable	emission intensity	emission level
DiscloseGHG dummy	0.68***	0.57***
	(0.21)	(0.17)
DiscloseGHG x Scope 1 GHG intensity	-359**	
	(171)	
DiscloseGHG x Scope 2 GHG intensity	40.2	
	(3,145)	
DiscloseGHG x Scope 3 GHG intensity	-3.46	
	(4.92)	
Disclosed intensity change	-0.049*	
	(0.026)	
DiscloseCommit dummy	0.44***	0.44***
	(0.16)	(0.16)
DiscloseGHG x Scope 1 GHG level		0.0081
		(0.011)
DiscloseGHG x Scope 2 GHG level		0.0067
		(0.058)
DiscloseGHG x Scope 3 GHG level		-0.0015*
		(0.00081)
Disclosed level change		0.0025
		(0.0037)
Governance	0.0076**	0.0072*
	(0.0038)	(0.0037)
Firm-level controls	Y	Y
Time fixed-effects	Y	Y
Sector fixed-effects	Y	Y
Country fixed-effects	Y	Y
Observations	3,984	3,962
R-squared	0.18	0.18

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Credit Rating and Emission Reduction Targets

$$Rating_{i,t+3m} = \alpha + \beta_1 DiscloseGHG_d_{i,t} + \beta_2 DiscloseGHG_d_{i,t} * Scope\ 1_{i,t} + \beta_3\ DiscloseGHG_d_{i,t} * Scope\ 2_{i,t} + \beta_4 DiscloseGHG_d_{i,t} * Scope\ 3_{i,t} + \beta_5 YoY\ Scope\ 1\ and\ 2_{i,t} + \beta_6 DiscloseCommit_d_{i,t} + \sum_{j=1}^{6} \gamma_j Controls_{j,i,t} + \rho\ SectorFE_i + \tau TimeFE_t + \sigma Country\ FE_i + \epsilon_{i,t}$$

- **Committing to lower emissions** is associated with better ratings

Variable	emission intensity	emission level
DiscloseGHG dummy	0.68***	0.57***
	(0.21)	(0.17)
DiscloseGHG x Scope 1 GHG intensity	-359**	
	(171)	
DiscloseGHG x Scope 2 GHG intensity	40.2	
	(3,145)	
DiscloseGHG x Scope 3 GHG intensity	-3.46	
	(4.92)	
Disclosed intensity change	-0.049*	
	(0.026)	
DiscloseCommit dummy	0.44***	0.44***
	(0.16)	(0.16)
DiscloseGHG x Scope 1 GHG level		0.0081
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Disclosed level change		0.0025
		(0.0037)
Governance	0.0076**	0.0072*
	(0.0038)	(0.0037)
Firm-level controls	Y	Y
Time fixed-effects	Y	Y
Sector fixed-effects	Y	Y
Country fixed-effects	Y	Y
Observations	3,984	3,962
R-squared	0.18	0.18

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Credit Rating and Emission Reduction Targets

$$Rating_{i,t+3m} = \alpha + \beta_1 DiscloseGHG_d_{i,t} + \beta_2 DiscloseGHG_d_{i,t} * Scope\ 1_{i,t} + \beta_3\ DiscloseGHG_d_{i,t} * Scope\ 2_{i,t} + \beta_4 DiscloseGHG_d_{i,t} * Scope\ 3_{i,t} + \beta_5 YoY\ Scope\ 1\ and\ 2_{i,t} + \beta_6 DiscloseCommit_d_{i,t} + \sum_{j=1}^{6} \gamma_j Controls_{j,i,t} + \rho\ SectorFE_i + \tau TimeFE_t + \sigma Country\ FE_i + \epsilon_{i,t}$$

- **Committing to lower emissions** is associated with better ratings
- The **more ambitious** the target, the larger this effect
- A similar relationship is observed between Distance-to-Default and emission reduction targets

Variable	emission intensity	emission level
Scope 1 GHG intensity	-49.6	
Scope 2 GHG intensity	-21.5	
Scope 3 GHG intensity	27.6*	
Disclosed intensity change	-0.014***	
Scope 1 GHG level		-0.0044
Scope 2 GHG level		0.018
Scope 3 GHG level		0.00045
Disclosed level change		0.0014***
TargetPerc CDP	0.0032**	0.0031**
TargetYear CDP	0.0027	0.0031
TargetBaseYear CDP	-0.014*	-0.013
Firm-level controls	Y	Y
Time fixed-effects	Y	Y
Sector fixed-effects	Y	Y
Country fixed-effects	Y	Y
Observations	1,116	1,111
R-squared	0.40	0.39

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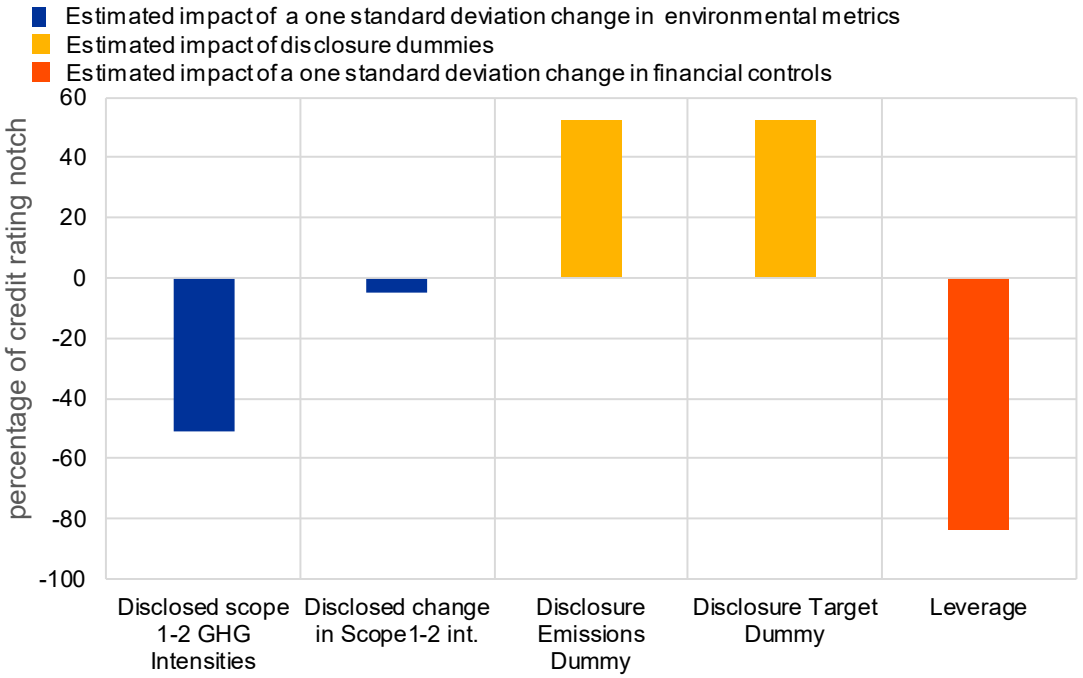
Credit Rating and Climate Disclosure



- Firms with **higher disclosed GHG intensity** and **actual GHG increase** tend to have worse ratings.
- Firms **disclosing emissions** and a **forward-looking target** to reduce emissions tend to have better ratings.
- The **magnitude** of the effect of disclosed GHG intensity is comparable to that of traditional determinants of rating

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Conclusions and policy implications

How is climate-related transition risk reflected in firm credit risk?

- ✓ High emissions are associated to some extent with higher credit risk, both ratings and DtD.
- ✓ Governments' low-carbon transition policies affect transition risk and credit ratings.
- ✓ Disclosing emissions moderates the relation between emissions, ratings and DtD.
- ✓ Disclosing emission reduction targets is associated with lower credit risk, both ratings and DtD.

Caveats: Availability, reliability, and comparability of disclosed and inferred metrics of transition risk.

Policy implications

- ✓ Credit rating agencies: Transparency on incorporating climate factors into CRA methodologies
- ✓ Prudential regulation of banks and insurers – link to risk weights
- ✓ Central banks' monetary and non-monetary operations
- ✓ Corporate climate disclosure: Forward-looking emissions targets and credible transition plans with milestones

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