# Primary Corporate Bond Markets and Social Responsibility

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# Motivation

- Two important and interrelated questions in Sustainable Finance:
  - What are the implications of ESG for financial returns?
  - Do financial markets have an impact on the ESG characteristics of firms?
- Why study primary corporate bond markets?
  - Bonds allow us to get a more direct estimate of the cost of capital that investors charge (compared to equity markets where expected returns are unobservable).
  - Primary markets provide attractive features being intermediated and less exposed to market frictions (e.g., liquidity).
  - Given that the cost-of-debt is observable and that bond issuers tend to issue bonds repeatedly, we can evaluate firm-level responses (in terms of ESG characteristics) to investors' preferences for sustainability.

# Overview of results

- Firms with better ES-scores pay, on average, lower credit spreads than firms with poorer ES-scores.
- ES-scores contain information about the credit risk of the firms (risk-based channel).
- No pronounced time-series patterns in spreads consistent with observed shift in investor preferences. But, the supply of G-bonds has increased over time (potentially attenuating the effects on spreads).
- Additional results:
  - Important ES-dimensions across the full sample are product-related and employee-related scores.
  - The ENV-score only matters in selected industries(e.g., mining).
  - ES-scores only matter for HY bonds and BBB-rated bonds.
- These empirical results are largely consistent with the predictions from our theory.

# Related literature (overview)

- ESG and bond markets, in particular:
  - Seltzer et al. (2020): focus on cross-state variation in environmental regulatory risk in combination with presumably exogenous, climate-risk related events.
  - Amiraslani et al. (2019): focus on secondary markets and corporate social capital which only seems to matter during crises (i.e., the GFC).
  - We study E&S comprehensively, exploit cross-sectional heterogeneity, explicitly assess implications for credit risk and also assess supply-side effects theoretically as well as empirically.
- ESG and credit ratings: Yang (2020) exploits that Moody's and S&P announced taking ESG information into account two years earlier than Fitch.
- Baker et al. (2018) study the pricing of U.S. green bonds — mostly issued by municipalities — and find that they are issued at lower spreads.
- ESG and loan markets: Goss and Roberts (2011), Chava (2014), Gao et al. (2020).
- ESG and equity markets: a large literature (see a recent survey paper by Matos (2020)).

# A simple model of ES-performance and bond spreads in primary markets (Heinkel et al. (2001))

- Two types of bonds: G-bonds (P-bonds) are issued by firms with good (poor) ES-ratings.
- Two types of investors: Green (neutral) investors only buy G-bonds (buy both bonds).
- Firms can make a costly ES investment and switch from a polluting technology to a green technology. Investment costs are heterogeneous across firms. I.e., bond supply is endogenous.
- The model distinguishes three channels for ES to affect bond spreads:
  - Channels 1 & 2 are related to credit risk (i.e., expected default losses and riskiness of bond payoffs).
  - Channel 3 captures the demand effect that results in limited risk sharing for P-bonds.
- Difference in bond prices is determined by those three channels and, in equilibrium, equal to the marginal firm's ES investment costs:

$$P_G - P_P = K^c = \delta + \frac{1}{\tau I}\left(N_P\sigma_P^2 - N_G\sigma_G^2 + (N_G - N_P)\sigma_{GP} + N_P\frac{I_g}{I_n}\sigma_P^2\left(1-\rho_{GP}^2\right)\right) \qquad (1)$$

# Model implications for empirical work

- G-bonds should have lower spreads than P-bonds.
  - To disentangle the mechanisms: (a) study the relation between ES-scores and credit risk, and (b) exploit time-series dynamics of the effects (model implies that spread differences widen when fraction of green investors increases).
  - *However:* endogenous G-bond supply attenuates, for example, the impact of an increase in investor preferences for green investments on bond spreads.
- Bond price differences increase with the variances of bond cash flows, $\sigma_G^2$ and $\sigma_P^2 \longrightarrow$ effects should be smaller for bonds with high ratings.
- Spread differences are more negative in industries and/or for ES-dimensions for which investment costs in ES are higher.
  - For example: mining firms and the ENV-score.

# Data, sample, and empirical methodology

- Multivariate framework — panel regression:

$$Spread_{i,t+1} = \alpha + \mathbf{X}_{i,t}\beta + \gamma ES_{i,t} + u_i + v_{t+1} + e_{i,t+1}$$

  where bond issues are indexed by $i$ and years by $t$.
- *Spread*: yield spread of new bond issues from Mergent FISD.
- *ES*: ES-scores (We ignore the G-dimension) from MSCI ESG KLD:
  - **E**nvironment and five **S** scores: Community, Diversity, Employee Relations, Product, and Human Rights.
  - Scores are normalized between -1 (worst) and +1 (best) using the full ESG sample (following the literature).
- **X**: bond ratings at issuance (Mergent FISD) and issuer balance sheet variables (Compustat).
- $u$ and $v$: industry and year fixed effects.
- Sample period: 2002 – 2020: covers two crisis periods (GFC and COVID19).

## What are potential implications of observing an insignificant $\gamma$?

Recall that

$$P_G - P_P = K^c = \delta + \frac{1}{\tau I}\left(N_P\sigma_P^2 - N_G\sigma_G^2 + (N_G - N_P)\sigma_{GP} + N_P\frac{I_g}{I_n}\sigma_P^2\left(1-\rho_{GP}^2\right)\right)$$

- A specific ES-score is irrelevant for the risk profile and investors do not care about it.
- G-bonds and P-bonds are close substitutes (irrelevance with respect to risk characteristics). Even though investors might care about the ES-score, the risk sharing argument does not bind (see, Berk and van Binsbergen, 2021).
- Adjustment costs with respect to this ES-score are small. Most firms are "green"with respect to that dimension.

$\Longrightarrow$ Heterogeneity of effects across industries, rating classes and ES-scores.

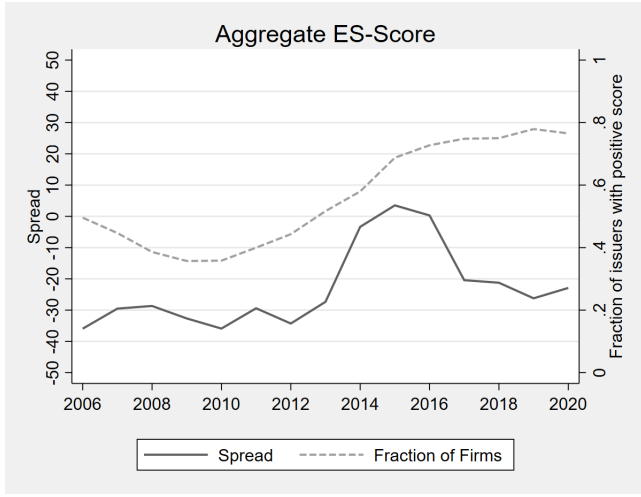
# ESG and credit spreads: full sample evidence

| VARIABLES | (1) ES score All Years Spread | (2) Individual scores All Years Spread |
|---|---|---|
| env_score | | 0.192 |
| | | (0.976) |
| com_score | | 5.971 |
| | | (0.204) |
| div_score | | -7.003 |
| | | (0.108) |
| emp_score | | -9.722 |
| | | (0.098) |
| hum_score | | 11.036 |
| | | (0.119) |
| pro_score | | -20.501 |
| | | (0.000) |
| es_score | -18.824 | |
| | (0.007) | |
| COVID19 | | |
| Constant | 493.910 | 495.080 |
| | (0.000) | (0.000) |
| Industry and Year FEs | Y | Y |
| Firm controls | Y | Y |
| Rating dummies | Y | Y |
| Observations | 5,227 | 5,227 |
| R-squared adjusted | 0.607 | 0.608 |

- Good ES-performance is related to a significant reduction in spreads:
  - An issuer with the best possible ES-score in a given year enjoys a 19 bps reduction in spreads.
  - The 19 bps represent a modest effect in economic terms but reflect an average effect.
- Product score (pro_score) is the main driver followed by the employee-relation score and the diversity score.
- Firm characteristics, rating dummies as well as industry and year FEs are included in all specifications (coefficients are not reported here but make intuitive sense).
- Explanatory power of the model above 60%.

# Aggregate ES-score and credit spreads: time-series dynamics

- Have the effects of ES scores on spreads increased (in absolute terms) over time?
- Consistently negative point estimate using a 5-year rolling window but no pronounced time-series patterns.
- Supply of bonds with positive ES-scores, however, has increased from 40% to 80%.



# Underlying mechanisms: credit risk vs. investor preference

- *Investor preference channel:* despite of the increasing awareness of ES objectives among investors, the effects of ES scores do not exhibit strong downward-sloping time trends, as predicted by the theory.
  - However, effect might be attenuated through an increase in supply of G-bonds, as we find empirically.
- *Risk channel:*
  - Following the bonds in our issuance sample over a three-year horizon, we document that aggregate and individual ES scores tend to reduce the occurrence of default.
  - We also find that ES scores decrease the probability of credit rating downgrades — in the case of HY bonds.

# Conclusion

- We find that ES-scores contain relevant information for corporate bond spreads: firms with high ES-scores tend to issue bonds at lower spreads compared to similar bonds with low ES-scores.
- ES-scores matter in default and downgrade prediction models.
- ES-scores are more relevant for lower ratings that are more exposed to credit risk.
- We find a strong increase in the supply of G-Bonds that would be consistent with the observed shift in investor preferences in recent years.