Risk Forum 2022 - Bond Risk Session

Discussion

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• **Goal:** Identify if corporate bonds bear a climate change risk premium proxied by firms’ exposure to sea-level rise.

• **Methodology:** OLS regressions, robustness tests (Sensitivity to SLR specificities; Placebo test to control spurious results; Inverse propensity weighting to account for endogeneity) and sensitivity analysis to firms characteristics (spatial dispersion; industry heterogeneity; investor horizon) and market changes (Paris Agreement).

• **Data:** All fixed coupons bonds issued in the US between 2010 and 2018 (FISD); merged with firms financial and physical characteristics (Compustat, SRAF & Infogroup) → 6223 observations. Sea-level rise exposure (SLR) is computed following Painter (2020).

• **Results:** Corporate bonds yield spread increase by 3% on average when SLR increases by one standard deviation while credit ratings are not sensitive to SLR.
"ESG and Sovereign Risk: What is Priced in by the Bond Market and Credit Rating Agencies?"
by Raphaël SEMET, Thierry RONCALLI and Lauren STAGNOL

• **Goal:** Assess ESG features’ materiality on countries creditworthiness proxied by yield spreads and credit ratings.

• **Methodology:** Lasso regression to examine yield spread sensitivity to ESG features and Logit regressions to estimate the probability of being well or poorly scored based on ESG metrics. Single-factor analysis for feature selection and multi-factor analysis to rank and interpret features effects.

• **Data:** 269 ESG indicators (Verisk, World Bank, UN) merged with 10 years bond yield (Bloomberg, Eikon-Datastream) and macroeconomic indicators (IMF, World Bank). Period ranges from 2015 to 2020 with a total of 402 observations encompassing 67 countries.

• **Results:** ESG features explain both yield spread (R-squared ≈ 70% and ∆R ≈ 13.5%) and credit ratings (Accuracy ≈ 95%). But, selected themes differ, with $E \succ G \succ S$ for the yield analysis while $G \succ S \succ E$ for credit ratings.
Comparative analysis

For differences: first comes the paper written by Elsa ALLMAN and second the one written by Raphaël SEMET, Thierry RONCALLI and Lauren STAGNOL.

Similarities
- Close subject of analysis: extra-financial risk on bonds
- Y targets: yield spread & credit ratings
- Linear regressions

Differences
- E(SG) Metrics: single vs. many
- Period: 2010-2018 vs. 2015-2020
- Y transformation: level vs. log and binary
- X transformation: level vs. scaled
- model: OLS vs. Lasso and Logit
- Robustness tests: many vs. none
Pros of each paper

"Pricing Climate Change Risk Corporate Bonds"
- A new segment of the literature: Examine the consequences of firms’ physical exposure to climate change with innovative metrics (SLR, following Hallegate (2013) & Painter (2020));
- Many robustness check to strengthen the findings;
- Provide a solution to companies to mitigate their exposure to climate change and encourage policymakers to promote climate change integration in credit ratings’ methodologies.

"ESG and Sovereign Risk: What is Priced in by the Bond Market and Credit Rating Agencies?"
- A didactic narrative with a focus on helping investors better assess countries overall risk;
- A global analysis with remarkable efforts to build a large and comprehensive database;
- A selection of easy but powerful models to deliver straightforward conclusions.
The SLR measure and control variables

- Only a small set of counties concerned → small dispersion; size effect.
- Confounding: ROA and constant seem to be the two most explaining variables. Further investigation could be relevant (e.g. descriptive statistics of decile portfolios).
- Small R-square of regressions (≈ 45%). Why not include firms capacity to repay its debt: \( \frac{\text{EBITDA}}{\text{Debt service}} \).

Methodology

- Observation period: is it relevant to go back to 2010?
- Sensitivity analysis: most observations seem to belong to Coastal with SLR counties (≈ 95% based on table 7). Why?
- Following Gelman & Stern (2006) "The difference between “significant” and “not significant” is not itself statistically significant. Other procedure with robust statistics like Diff-in-Diff could be relevant?"
Questions - "ESG and Sovereign Risk:
What is Priced in by the Bond Market and Credit Rating Agencies?"

The Lasso model

- Limited with correlated variables. Might be the case between ESG features and control variables like macro-economic ones (e.g. Income in the Social pillar)?
- Challenging features selection procedure with machine learning (Variable importance, Shapley-values…).
- What justifies the selection of 7 variables per model?
- Group-Lasso for estimating the importance of E, S and G pillars.

ESG and Credit Ratings Forecasts

- ESG features successfully explain Credit ratings. One could question if they are good to forecast changes in Credit ratings? Following downgrades/upgrades and controversies.
Sustainable finance and market awareness

...do you believe the IPCC report on global warming?..it seems exaggerated...

Bond Investor

Credit Rating Agency
Congratulations for your remarkable work!
Many thanks for your attention.