Is Carbon Risk Priced in the Cross-Section of Corporate Bond Returns?

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Road Map

The Paper

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The Paper in a Nutshell

The pricing of a firm's carbon risk in the corporate bond market.

Key Measurement

- CEI (carbon emissions intensity): carbon dioxide (CO2) emissions per $million of revenues.

Findings

- Bonds of high CEI (brown bond) firms are riskier on average than those of low CEI firms (green bond).
- Bonds of high CEI firms underperform bonds of low CEI firms.
- This result is puzzling because it is contradictory to the classic risk-return tradeoff theory.

How to explain this puzzling finding?

- Investor Preference (Pastor et al. (2020)): lower demand for high CEI bonds. – Not fully explain.
- Investor Underreaction: lower CEI is related to strong firm fundamentals but market underreacts to this.

A Well Executed Paper

Robustness Checks (Set 1)

- Factor Models: 5-factor model of Pastor and Stambaugh (2003), 4-factor bond market model of Bai, Bali, and Wen (2019), and 9-factor model combining the above two.
- Controlling for the bond market beta, downside risk as proxied for by 5% value-at-risk (VaR), bond-level illiquidity, credit ratings, time-to-maturity, bond size, and the one-month-lagged bond return; the term beta, the default beta, macroeconomic uncertainty beta, and climate change news beta.

Robustness Checks (Set 2)

- CEI measure scope 1 and 2 (Bolton and Kacperszyk (2021)); excluding the most carbon-intensive industries; aggregate multiple bonds to the same firm; addressing the concern on correlation between firm-level characteristics; subsperiods.

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Comment 1 – Positioning in the Literature

There is a rising large literature about climate finance. Understanding how one study contributes to the literature is therefore essential.

- Why is carbon risk (as compared to other environmental/climate related factors) important?
  - Other measure of carbon risk?
  - Relation to other environmental/climate measures, such as ESG, impact?
- How are the findings in this paper on corporate bond related to findings in other environmental/ESG/climate risk pricing? The same as in other setting? Different?
- How the findings in terms of the pricing of bonds related to other dimensions of bonds (e.g., demand and investor-taste (Liying Wang and Julie Wu (2022)).
  (In the paper, they discuss why studying corporate bond is important!)

Comment 2 – Economic Mechanism

- The finding that green bond outperfom is very interesting!
- Related to the "predictability of fundamentals" story in the paper, one story in my mind: green firms $\Rightarrow$ higher sustainability $\Rightarrow$ higher long-term revenue. However, to achieve it, firms adopt new technologies that might be harder to understand.
  - Who buy the green bonds? Investors more likely to appreciate the long-term return? Understand new technology?
  - Is the way of measuring risk (using traditional measures) inappropriate for carbon risk? i.e., maybe there is no puzzle if using some risk measures that can capture policy and technology uncertainty?

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- Very interesting paper, important topic, cool data, well execution.
- Minor Comments
  - Heterogeneous effects over different bond/investor groups?
  - What is the response to some shocks, such as environmental policy changes or ESG disclosure policy changes?
- Good Luck!