# Going Green – Evidence from the fixed income market

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# Motivation

- Green Bonds
  - > Identical characteristics as conventional bonds
  - > Premise to invest eco-friendly projects/companies
  - > 89% are externally review

- Market Overview (CBI, 2019)
  - > Green Bond Issuance (2018):

    USA (20% m. share), China (18%), France (8%), Germany (5%)
  - > From below 50bn USD (2014) to over 167.6bn (2018)
  - > Already over 200bn USD in 2019
  - > Corporate and sovereign
  - > Institutional clients: high demand for green bonds

# Motivation

- External Review
  - > No compulsory standard (to date)
  - > Second Party Opinion (SPO), e.g. Cicero, Sustainalytics
    - » “external assessment of the issuer’s green bond framework, confirming Green Bonds Principle (GBP) compliance” (Climate Bonds Initiative, 2018)
  - > Cost are about 0.4 - 0.6 bps of issuing amount
  - > Risk reduction, higher transparency, greater reputation
  - > Improve the corporate sustainability of low-ESG companies

# Motivation

- Preclaw and Bakshi (2015)
  - > Negative green bond premium -17bps
  - > Explained by lower volatility
- Karpf and Mandel (2018)
  - > U.S. green municipal bonds
  - > shift over time from positive to a negative premium
- Hachenberg and Schiereck (2018)
  - > Negative yield premium
  - > observe that green bond trade tighter than conventional bonds (not sign.)
- Febi, Schäfer, Stephan, & Sun (2018)
  - > Test how liquidity affects bond yields
  - > Find negative premium for green bonds
- Zerbib (2019)
  - > Matching of green bond and two conventional bonds (110 pairs)
  - > July 13 - Dec 17, negative premium for green bonds, -2 bps
  - > Reason: non-pecuniary motives

# Research Question and Hypotheses

- Research Gap:
  - > No critical view on the concept of green bond
    - » Negative premium justified, when issued by the same company
  - > Not control for the issuer's ESG rating nor for an external review

- Research Questions:
  - > Is there a green bond yield premium?
  - > To what extent does the Second Party Opinion (SPO) influence the green premium?
  - > Do high-ESG companies have a premium on green bonds?

# Research Question and Hypotheses

- Hypothesis 1:

  Green Bonds have a negative premium, i.e. lower yield to maturity, compared to their conventional counterparts.

- Hypothesis 2:

  The Second Party Opinion influences positively the green bond premium.

- Hypothesis 3:

  Green bonds, issued by high-ESG companies, do not experience a premium in contrast to conventional bonds.

- Hypothesis 4:

  Green bonds, issued by low-ESG companies, experience a negative premium.

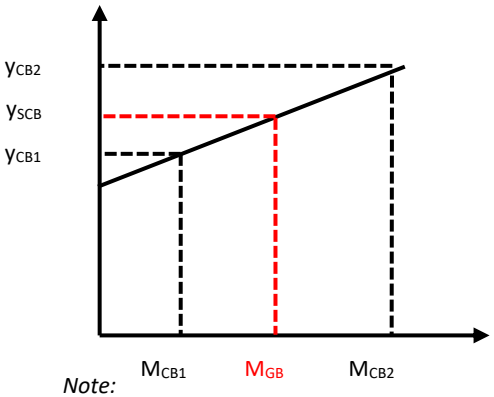
# Methodology

- 1. Matching (Zerbib, 2019)
  - > assign two conventional bond to one green bond (issuer, currency, maturity, size)
  - > automatically controlled for tax and credit risk (same issuer)

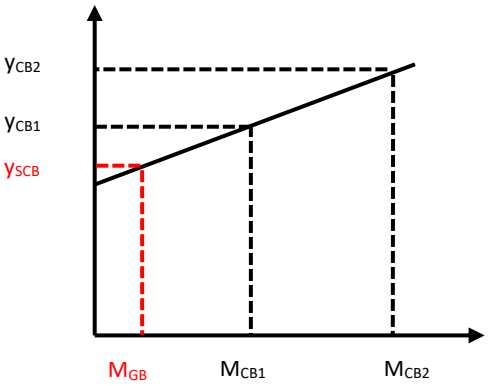
➢ Yield to maturity

*y=ax+b*

*Interpolation*




*Extrapolation*




*Note:*
*$y_{CB}$: the yield to maturity of conventional bond, $y_{SCB}$: the yield to maturity of synthetic conventional bond*
*$M_{CB}$: the maturity of conventional bond, $M_{GB}$: the maturity of green bond*

**Maturity bias** is reduced by unifying green bond's maturity with synthetic conventional bond's maturity

➢ Liquidity (bid-ask spread)

*Distance-weighted average*

$$BA_{i,t}^{CB} = \frac{d_2}{d_1 + d_2} BA_{i,t}^{CB1} + \frac{d_1}{d_1 + d_2} BA_{i,t}^{CB2}$$

$d_1$ = Green bond maturity – Conventional bond 1 maturity

$d_2$ = Green bond maturity – Conventional bond 2 maturity

**Maturity bias** is further reduced by using green bond's maturity as the weights

# Methodology

– 2. Two-step regression (Zerbib, 2019)

➢ Panel regression (Control for liquidity bias)

$$\Delta y_{i,t} = p_i + \Delta Liquidity_{i,t} + \xi_{i,t}$$

$\Delta y_{i,t} = y_{i,t}^{GB} - y_{i,t}^{CB}$

Premium, fixed-effect

$\Delta Liquidity = Liquidity_{i,t}^{GB}(BA_{i,t}^{GB}) - Liquidity_{i,t}^{CB}(BA_{i,t}^{CB})$

# Methodology

- 2. Two-step regression (Zerbib, 2019)

➢ Panel regression (Control for liquidity bias)

$$\Delta y_{i,t} = p_i + \Delta Liquidity_{i,t} + \xi_{i,t}$$

$$\Delta y_{i,t} = y_{i,t}^{GB} - y_{i,t}^{CB}$$

Premium, fixed-effect

$$\Delta Liquidity = Liquidity_{i,t}^{GB}(BA_{i,t}^{GB}) - Liquidity_{i,t}^{CB}(BA_{i,t}^{CB})$$

➢ OLS regression

$$p_i = \alpha_0 + \beta_1 rating_j + \beta_2 sector_j + \beta_3 currency_j + \beta_4 Maturity + \beta_5 log(IssueAmount) + \beta_6 SPO_j + \psi_j$$

**Second party opinion**

# Methodology

- Assumption: ESG rating of companies have an impact on the perception of investors

- Test hypotheses 2 - 4
  - > Divide the sample
    - » High ESG (75% quartile)
    - » Low ESG (25% quartile)
  - > Run 2 step regressions

# Possible Results

- Hypothesis 1:
  - Overall significant negative premium (lower yield to maturity).
- Hypothesis 2:
  - SPO has a positive impact on the premium.
- Hypothesis 3:
  - No significant premium for high-ESG companies
  - Investors do not differentiate green and conventional bond
  - Expectations that conventional bond are green
  - SPO has no impact on the yield spread
- Hypothesis 4:
  - Negative premium
  - SPO has a positive impact on the yield spread
  - SPO helps investors to detect sustainable investments

# Robustness Checks

- Robustness:
  - > Advanced liquidity measurements
    - » Limited dependent variable model (LOT) (Chen, Lesmond & Wei, 2007)
  - > Alternative matching methods
    - » Propensity score matching (Gianfrate & Peri, 2019)

- Contribution:
  - > Control for Second Party Opinion
  - > Control for ESG Rating of the issuer

# Thank you.

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# Green Bond Review

| Pre-issuance review | Scope | Providers |
|---|---|---|
| **Assurance** | Positive or negative assurance on compliance with the Green Bond Principles (GBP) or the Green Loan Principles (GLP) | EY, Deloitte, KPMG, etc |
| **Second Party** | Confirm compliance with GBP / GLP. Provide assessment of issuer's green bond framework, analysing the "greenness" of eligible assets | CICERO, Sustainalytics, Vigeo-Eiris, DNV GL, SynTao Green Finance, CECEP Consulting, etc |
| **Green bond rating** | Rating agencies assess the bond's alignment with the Green Bond Principles and the integrity of its green credentials | Moody's, S&P, CCX (China), ChinaBond Rating, R&I and JCR (Japan), RAM (Malaysia) |
| **Pre-issuance verification** | Third party verification confirms that the use of proceeds adheres to the Climate Bonds Standard and sector specific criteria | Approved verifiers under the Climate Bonds Standard scheme |
| **Post-issuance review** | **Scope** | **Providers** |
| **Assurance or SPO** | Assurance of allocation of proceeds to eligible green projects | Audit firms, ESG service providers, scientific experts |
| **Impact report** | Reporting that seeks to quantify the climate or environmental impact of a project/asset numerically | As above |
| **Post-issuance verification** | Assurance against the Climate Bonds Standard, including allocation of proceeds to eligible green projects and types of green projects | Approved verifiers |

Source: CBI, 2019