Do Shareholders Benefit from Green Bonds?

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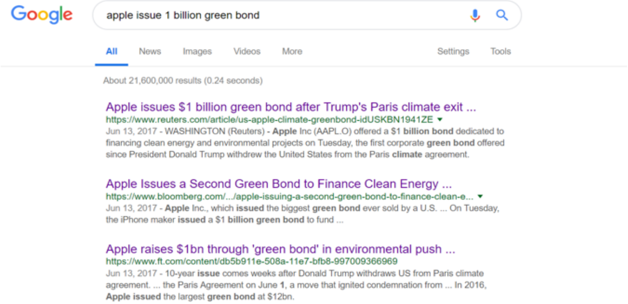
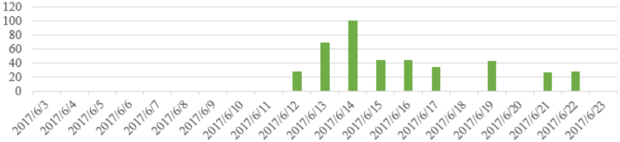
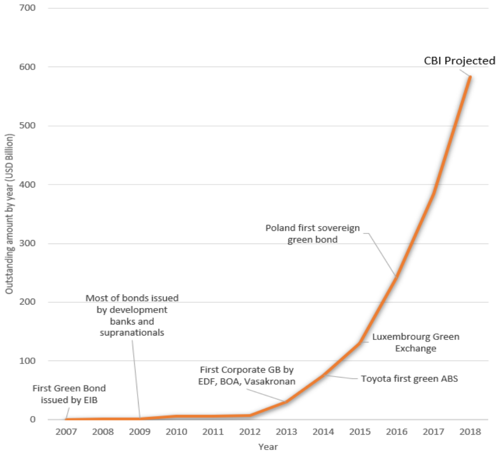
Apple issues $ 1 billion green bond after Trump's Paris climate exit



Google search intensity of "Apple Green Bond"



Green Bond Rapid Growth



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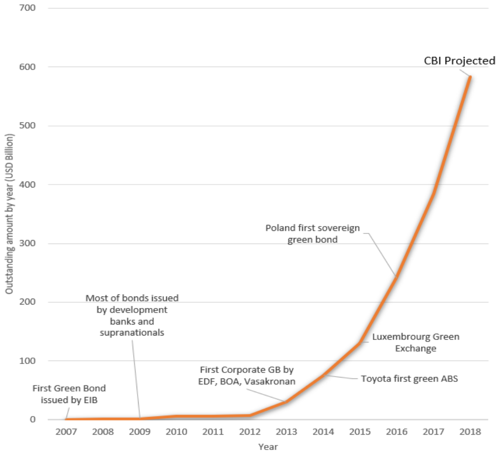

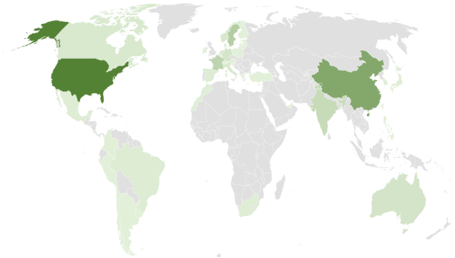

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- Can firms obtain additional benefits from green bond financing activity, which incentivize firms at a better position to conduct environmental friendly projects and improve social welfare in the broader context.

MTR Green Bond Case

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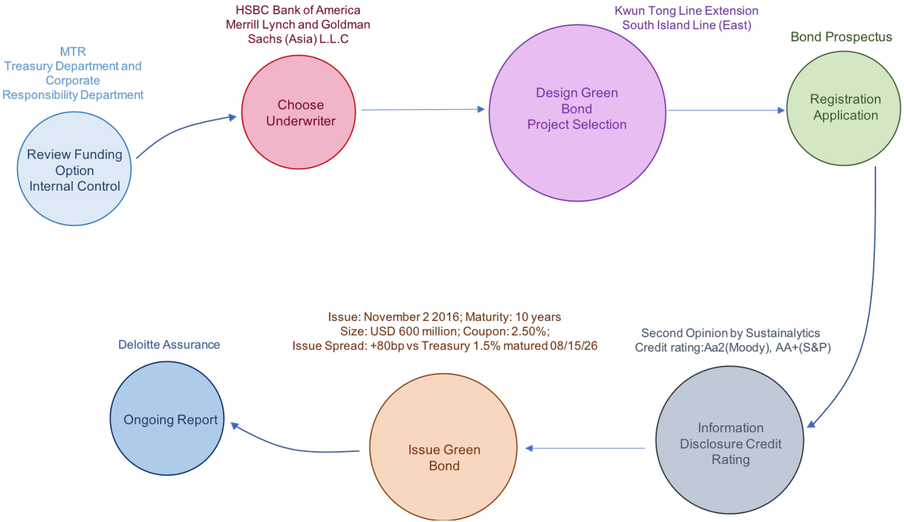

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- We are among the first to study international green bond announcement effect and shareholders benefits from it based on a comprehensive green bond dataset.
- Implication: Shareholders benefit from issuing green bonds.

Data Construction

We choose Climate Bond Initiative (CBI) as our baseline data source:

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- Provide approvement for third party verifier.
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We augment CBI with Bloomberg labelled green bonds.

- We identify bonds using ISIN with issue date and issue amount information. When there is a disagreement, we use web search.
- We validate our sample using conservative data and results are same.
- Announcement date and bond characteristics comes from Bloomberg.

Green Bond Summary

	Development Bank	Municipal	Commercial Bank	Corporation	State	ABS	Sovereign	All
2007	1	0	0	0	0	0	0	1
2008	1	0	0	0	0	0	0	1
2009	4	0	0	0	0	0	0	4
2010	57	5	0	0	0	0	0	62
2011	33	3	0	0	0	0	0	36
2012	23	3	2	0	0	0	0	28
2013	29	4	11	3	2	1	0	50
2014	65	24	28	43	3	7	0	170
2015	105	46	21	178	2	13	0	365
2016	80	59	62	103	9	41	1	355
2017	91	82	85	129	25	23	3	438
Total	489	226	209	456	41	85	4	1510

Bond Characteristics

	Mean	Median	Std.	N
All Green Bonds				
Coupon (Percent)	3.3	2.8	2.4	1510
Maturity (Year)	7.62	5	6.45	1510
Amount (million)	286	75	575	1510
Public Issuers Green Bonds				
Coupon (Percent)	3.2	2.9	2.2	241
Maturity (Year)	6.56	5	4.21	241
Amount (million)	369	153	552	241

Market Reaction: First Time vs. Subsequent

	First time issue		Subsequent issues	
	(1)	(2)	(3)	(4)
Event Window	[-10,10]	[-5,10]	[-10,10]	[-5,10]
CAPM_CAR (%)	1.39**	1.04**	0.12	0.61
	(2.36)	(2.12)	(0.21)	(0.99)
P(Sign-test)	0.0171**	0.0303**	0.5661	0.8667
FF3_CAR (%)	1.41**	1.06**	0.10	0.31
	(2.42)	(2.24)	(0.14)	(0.60)
P(Sign-test)	0.0247**	0.0225**	0.7723	0.7846
FF5_CAR (%)	1.29**	1.01**	0.50	0.23
	(2.19)	(2.07)	(0.76)	(0.40)
P(Sign-test)	0.0513*	0.0492**	0.3014	0.7253
Observations	132	132	109	109

Market Reaction: Financials vs. Corporations

	Corporate		Financial	
	(1)	(2)	(3)	(4)
Event Window	[-10,10]	[-5,10]	[-10,10]	[-5,10]
CAPM_CAR (%)	1.88**	1.51**	0.44	0.15
	(2.40)	(2.22)	(0.55)	(0.26)
P(Sign-test)	0.0132**	0.0264**	0.5962	0.5962
FF3_CAR (%)	1.96**	1.59**	0.36	0.09
	(2.54)	(2.42)	(0.45)	(0.15)
P(Sign-test)	0.0160**	0.0152**	0.6820	0.6114
FF5_CAR (%)	1.86**	1.53**	0.22	0.04
	(2.36)	(2.25)	(0.27)	(0.08)
P(Sign-test)	0.0302*	0.0342*	0.8741	0.8058
Observations	86	86	46	46

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Financing Cost Channel: Yield Analysis

	Yield Spread				
	(1)	(2)	(3)	(4)	(5)
Green	-0.0695*	-0.1333**	-0.1318**	-0.0985*	-0.05
	(-2.21)	(-2.86)	(-2.65)	(-1.99)	(-0.95)
Equity volatility	41.59***	54.35***	53.51***	23.80	32.05
	(5.10)	(5.55)	(4.88)	(1.91)	(1.79)
Bond rating(BBB or worse)		0.599*	0.13	0.25	-0.44
		(2.06)	(0.39)	(0.76)	(-1.33)
Maturity		0.0631***	0.0596***	0.0679***	0.0671***
		(6.59)	(5.60)	(6.45)	(6.54)
Issue Size		-0.311***	-0.328***	-0.271***	-0.270***
		(-11.45)	(-10.96)	(-8.68)	(-8.88)
Size			-0.857***	-4.208***	-0.93
			(-4.04)	(-8.04)	(-1.45)
Leverage			0.789***	0.575**	-0.25
			(4.22)	(2.68)	(-1.09)
Controls	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	No	No
Month FE	Yes	Yes	Yes	Yes	Yes
Issue Year	No	No	No	No	Yes
Issuer FE	No	No	No	Yes	Yes
N	2455	1671	1671	1492	1492

Investor Attention Channel: Institutional Ownership

	(1)	(2)	(3)	(4)	(5)	(6)
	IO	IO_dollar value	Domestic	Domestic_grey	Foreign	Foreign_grey
Green*Post	0.0756**	0.0189**	0.0148**	0.0928***	0.0410	-0.0149*
	(2.33)	(2.22)	(2.27)	(4.66)	(0.71)	(-1.81)
Size	1.083*	0.103**	0.105***	-0.114	-0.0129	0.00940
	(1.78)	(2.30)	(3.04)	(1.08)	(-0.04)	(0.22)
Leverage	0.761	-0.134*	-0.963***	-0.188***	-0.0381***	-0.663***
	(0.534)	(-1.77)	(-6.86)	(-4.40)	(-3.06)	(-3.76)
ROA	21.21***	-0.0698	-0.145***	-0.113	0.138***	0.587
	(3.13)	(0.16)	(-4.47)	(-1.41)	(4.79)	(1.43)
Cash	-19.37***	-0.148**	0.113***	0.163***	0.0348**	-0.623***
	(-3.02)	(-2.17)	(6.03)	(2.85)	(2.08)	(-2.63)
R&D	-4.194	-0.949***	-0.554***	-0.138***	-0.395***	-0.0847***
	(-1.51)	(-2.25)	(-3.23)	(-2.64)	(-2.59)	(-3.93)
Sale	1.487*	0.494***	0.163	0.723**	0.0330***	0.268*
	(1.83)	(3.27)	(1.41)	(2.05)	(3.20)	(1.84)
Dividend	4.500**	0.379***	-0.461***	-0.220	0.819	0.0169
	(2.11)	(2.98)	(-4.71)	(-0.74)	(0.94)	(0.14)
Firm FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Robust	YES	YES	YES	YES	YES	YES
R-squared	0.849	0.954	0.976	0.840	0.873	0.810
Observations	4,961	4,961	4,961	4,961	4,961	4,961

Firm Fundamental Channel: Green Bond and Stock Liquidity

	Quoted Spread		Amihud	
	(1)	(2)	(3)	(4)
	All sample	All sample	All sample	All sample
Green*Post	-0.0672*	-0.0561**	-0.0110**	-0.0123**
	(-1.968)	(-2.549)	(-1.962)	(-2.054)
Post	0.122	0.0816	-0.0476***	-0.0469***
	-0.37	-0.389	(-12.57)	(-11.65)
Green	1.091	0.951	0.0863	0.102
	-1.345	-1.047	-0.482	-0.577
Control	NO	YES	NO	YES
Year FE	YES	YES	YES	YES
R-squared	0.012	0.246	0.024	0.483
Observations	5,824	2,878	5,824	2,878

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  - Many governments are stepping in and facilitating the green bond market
    - Green Bond Grant Scheme launched by the Singapore in June 2017 will reimburse "Eligible Expenses" including arranger fees, auditor's fees, credit rating fees, legal fees and listing fees.
    - Three-year Green Bond Grant Scheme from Hong Kong, which will provide up to HKD 800,000 (USD 102,000) in subsidies for green bond issuers.

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- Possible market development:
  - More green securitization (Fannie Mae issued USD24.9bn of Green MBS at the end of 2017)
  - Surge in nonfinancial corporate green bond issuance
  - Subsidy and tax benefits

Summary

- We construct a comprehensive international green bond dataset and study stock market reaction.
- The short-term market reaction is significant positive.
- There are little direct benefits (cost of debt) to issue green bonds.
- But there are other externalities to issue green bonds.
  - Institutional ownership increases
  - Stock market liquidity improves after issuance.
- Shareholders benefit from issuing green bonds!