CLIMATE POLICY INITIATIVE

Economic Impacts of Green Finance: Is it possible to measure the productivity of Green Bonds in China?

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1. Introduction

Since the first issuance in 2007, the green bond market has grown from a niche US$1.5 billion in 2007 to mainstream, with US$258 billion of issuance in in 2019[1]. Green bonds are fixed income instruments dedicated for projects and activities that promote climate or other environmental sustainability purposes. They typically have reporting requirements for use of proceeds and the green nature of projects. Investors find them attractive as green bonds integrate environmental, social and governance outcomes in fixed income portfolios. They are thus catalysing sustainable capital markets in spite of their small size, green bonds made up c.2% of the global bond market in 2019[2].

In 2007, the European Investment Bank (EIB) issued the Climate Awareness Bond, pioneering the ring-fencing of bond proceeds for climate action in renewable energy and energy efficiency. Less than a year later in 2008, the World Bank issued the first 'green bond'. The first corporate green bond was issued by SEB, SEK1.3 billion (~US$203 million) for Vasakronan, the Swedish housing company. By 2014, the market had taken off, trebling issuance value in one year to US$36.6 billion and it surpassed US$100 billion issuance in 2019. The market is growing with a higher number of issuances, larger sizes, a broader group of issuers, and a wider investor base. With the green bond market firmly established, it is time to ask whether green bonds are achieving their objective of shifting finance and promoting green, sustainable projects.

By one measure, the green bond movement has been a clear success: it has created a splash that has raised awareness about sustainability and the investment part of the sustainability equation. But beyond the useful publicity, to have real and measurable impact, we need to be certain that the projects being financed are in fact greener than the alternatives. Furthermore, we need to see whether there has been an impact on investment in delivering (1) better financing terms (a lower cost of capital, longer tenor or larger financing); (2) encouraging greater environmental integrity for projects and (3) additionality, in enabling green projects and infrastructure otherwise not possible without the attraction of green finance options.

Understanding how, when, and where green investment products are both reaching investment targets that are truly green and achieving one of the three investment impacts will help the green finance industry fine tune its offerings, as well as its measurement and definition of what is green finance, in ways that will increase and concentrate its impact.

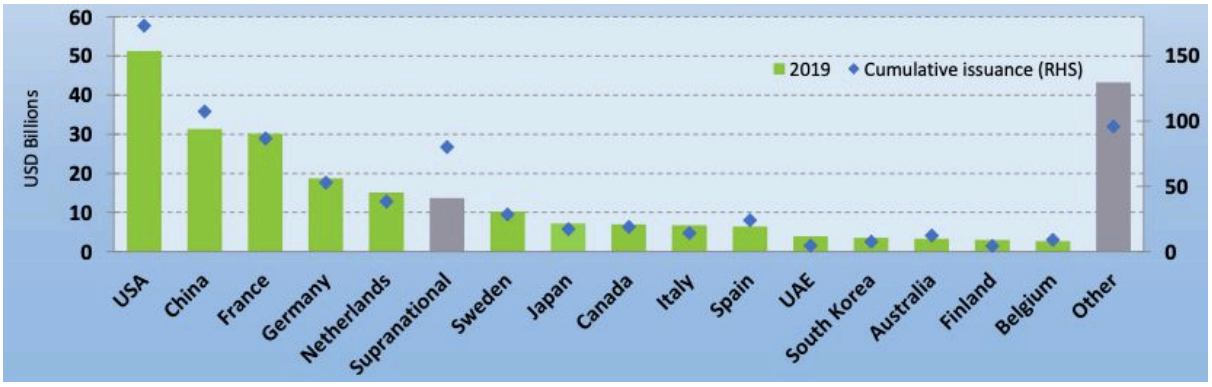
1.1 China Green Bond Market

China, the largest emitter of greenhouse gas (GHG), is one of the leading players in the global green bond market. The development of the Chinese Green Bond market is an important part of China's ambitions to transition towards sustainability, a shift that needs an additional US$6.4 – 19.4 trillion in investment. China's domestic green bond market has more than tripled from US$29 billion in 2016 to US$98bn by April 2019, representing 30% annual growth rate in issuance. Including offshore issuances, China issued US$55.5 billion of

[1] 2019 Green Bond Market Summary from Climate Bonds Initiative, February 2020
[2] Refinitiv 2019

green bonds in 2019, with US$31.3 billion of that aligned with international definitions of green, reflecting 12% of the global green bond issuance, 2nd only behind the US.

Figure 1. 2019 Green bond issuances – top 15 countries



Source: Climate Bonds Initiative, 2019 Green Bond Market Summary

The green bond market in China operates under a framework of regulators, which developed independently, and the market hence displays several unusual characteristics.

- Complex regulatory framework with oversight from multiple regulatory authorities and jurisdictions, resulting in inconsistent policies and standards on both the definition of green as well as green reporting standards
- Voluntary nature of green characteristics
- Misalignment with international standards as China allows clean coal, efficient utilisation of fossil fuels and nuclear for green bond financing and accommodates for allocation of greater than 5% of the capital raised to working capital and debt repayment
- Lack of meaningful engagement from international investors
- Inflated credit ratings, with 95% of Chinese green bonds receiving AA and above, compared with 6% in the US bond market
- Low liquidity in secondary markets, limiting their efficiency
- Absence of comprehensive monitoring, reporting and verification procedures regarding use of proceeds and environmental impact of investments

The People's Bank of China ("PBOC") and the National Development and Reform Commission (NDRC) published their guidelines for issuing green bonds in China at the end of 2015, along with policy endorsements from other official bodies. On 29th May 2020, PBOC, NRDC and the China Securities Regulatory Commission (CSRC) jointly issued the draft for public consultation of the "Green Bond Endorsed Project Catalogue (2020 E) which excluded "clean coal"[3]. The consultation finished on 12 June 2020 and the publication of the final guidelines are awaited.

Our report presents the methodology for a desktop-based assessment of the productivity of green bonds in China. It presents a framework for this assessment, results from our analysis of select issuers and a guide for future research and analysis. Ultimately, we hope that our assessment can help investors and policymakers evaluate the mission impact of green bonds to inform guidelines, market structures and investments in green bonds in China.

2. How do you measure the productivity of green bonds?

As the green bond market matures, the conversation has shifted from the ability of green bonds to raise capital to their productivity, in other words, what is the additionality of green vs. non-green bonds in helping to tackle climate change and sustainability? At the core of this, is the question, how do you define additionality of green bonds?

2.1 Framework for measuring effectiveness and additionality

Going by existing literature, there are multiple, interlinked and interdependent measures that could constitute 'additionality', a mixture of hard and soft approaches (Table 1):

- Hard factors influence the feasibility, size, type or financing of green investments and can be measured, recorded and quantified
- Soft factors are the intangible benefits of greening the bond market, financial system and economy through development, application and promotion of green bonds

Table 1. Hard and Soft factors of additionality

'Hard' factors of additionality		'Soft' factors of additionality	
Financing of projects	Improvement in the terms and conditions of finance, i.e., funds raised, tenor, cost to issuers	*What constitutes 'green'*	Building an understanding of and consensus around what 'green' means
Project design	*Encouragement for more ambitious projects and deepening their environmental integrity or 'greenness'*	*Green visibility*	Upscaling and improvement of perceptions regarding opportunities in the financial sector
Project execution	Enabling green and sustainable projects, that would not otherwise would not have gone ahead	*Engagement tool*	Using bonds to talk with investors, companies and the public sector
		Influencing other financial asset classes	Combining above to push developments in other forms of financing to expand options for the low carbon transition

Although we acknowledge the value of soft factors, our work here focuses on the hard factors, whether they are measurable and if so, whether they are material in the context of China green bonds. The hard factors can deliver the metrics for the additionality and effectiveness of green bonds for stakeholders, investors as well as project developers, gathering quantitative and qualitative evidence for their decision making.

2.2 Hypotheses for effectiveness and additionality of green bonds

In the previous section, we considered the link between productivity of green bonds and financing, design, and the execution of projects.

We have used the following three hypotheses to focus our analysis and assess the productivity of green bonds in China:

1. *There is no clear and obvious benefit in financing terms for green bonds over non-green bonds issued in China.*
2. *The China green bond market and its standards encourage greater environmental integrity of projects.*
3. *The green bond market in China has encouraged some (a limited number) but not many of environmentally positive and sustainable projects to be implemented that otherwise would not have gone ahead.*

In this section we examine the background research for these hypotheses for productivity which we will look to prove or disprove in section 4 by assessing three case studies of green bonds in China.

2.2.1 Are green bonds improving the terms and conditions for financing of green and sustainable projects?

A key marker of effectiveness for the green bond market would be demonstrating that environmentally friendly projects could secure favourable financing, consequently accelerating their development and deployment to fulfil transition needs. In the case of green bonds, this would pertain to one or more of:

- increase in the debt amount raised
- increase in the tenor of debt raised, ie longer-term to maturity;
- reduced financing cost for bond issuers

Besides the prestige of an environmental and sustainability certification, these benefits are key for compensating for the extra administrative costs associated with ensuring the 'greenness' of a proposal through third party certification and verification. Greater due diligence and transparency regarding the use of proceeds in order to meet industry standards means there is less perceived risk for bond investors. In addition, popularity of green bonds drives oversubscription amongst investors and therefore a competitive pressure enables issuers to issue green bonds under more favourable terms than non-green bonds.

We now look at some studies done on the additionality of green bonds. We summarise four studies here (Table 2 on the next page).

Table 2. Sample studies on additionality of green bond financing of projects

Authors	Year	Geography	Sample
Zerbib (Tillburg University)[4]	2018	Global	Examined 1,065 green bonds complying with the Green Bond Principles indexed by Bloomberg on December 30, 2017, out of which 110 were analysed Each green bond matched with a synthetic conventional bond, with the same currency, rating, bond structure, seniority, collateral and coupon type, but maturity 2 yrs before or after green bond
Results			
• There exists a small, albeit significant, negative green bond premium of -2 bps for the sample • Sector and the rating are significant drivers of the green bond premium: the negative premium is greater for financial bonds and low-rated bonds			
Authors	**Year**	**Geography**	**Sample**
Hyun, Park and Tian (Yonsei University; Asian Development Bank)[5]	2018	Global	Publicly issued bonds sourced from Bloomberg paired according to similar characteristics (issuer, currency, credit rating, maturity, structure, issue date) Each green bond paired with a conventional bond – 60 pairs of labelled green and non-green bonds
Results			
• Overall a small but close to zero premium on green bonds in general. • For those green bonds that secured independent, third-party verification or certification there was a discount of 7-9 basis points.			
Authors	**Year**	**Geography**	**Sample**
Dou and Qi (School of Economics and Management, Southwest Jiaotong University; Cogent Business and Management)[6]	2019	China	Publicly issued Chinese bonds (2016-2018) 104 labelled green bonds and 204 non-labelled green bonds
Results			
• Issuing rate of labelled green bonds is lower. • Mean of maturing of labelled green bonds is shorter (but not significantly).			

[4] Zerbib, Olivier David, Is There a Green Bond Premium? The Yield Differential Between Green and Conventional Bonds https://ssrn.com/abstract=2889690

[5] Hyun, Park and Tian, 2018, The Price of Going Green: The Role of Greenness in Green Bond Markets. Available at: http://www.apjfs.org/resource/global/cafm/2018-1-1.pdf.

[6] Dou and Qi, 2019, The choice of green bond financing instruments. Available at: https://www.tandfonline.com/doi/pdf/10.1080/23311975.2019.1652227?needAccess=true.

- The lower the share of long-term debt in its capital structure, more likely for the company to issue a labelled green bond.
- Those eligible to issue enterprise bonds take advantage of the higher stake that can be used for working capital than for normal bonds (50% vs 40%) to issue labelled green bonds even though use of proceeds is often less green.

Authors	Year	Geography	Sample
Bachelet, Becchettim and Manfredonia (University of Rome Tor Vergata)[7]	2019	Global	Publicly listed bonds on secondary markets matched by key characteristics (amount issued, coupon rate, maturity date, currency, issuer, credit rating, structure) 89 each of green bonds that meet CBI use-of-proceeds requirements and non-green bonds

Results

- Green bonds have higher yields, higher liquidity and slightly lower volatility, than non-green
- Institutional investors (supranational, national governments, municipalities) demonstrate a negative premium but higher liquidity
- Private issuers (corporates, private financial institutions) demonstrate a positive premium but much narrower liquidity, more for non-certified categories.
- To access the cost advantage, an established reputation or an official green verification is necessary to reduce asymmetrical information disparities and guarantee environmental integrity

From a global perspective, results from secondary research are inconclusive, with at best a marginal yield advantage for green bonds. Liquidity advantages do exist, but dependent on the type of investor, on the issuer and certification of the bonds. Possible drivers for the failure of green bonds to deliver a consistent set of advantages over non-green bonds:

- as a growth stage product, green bonds are still issued under multiple standards thus undermining the ability of investors to effectively benchmark risk factors
- labelling of relatively standard, pre-existing investments (such as working capital) as 'green' meaning there is a smaller spread between maximum and minimum costs, rather than riskier, game-changing projects;[8] and
- countervailing pressure from investors who are looking for high yields

Hypothesis 1	*There is no clear and obvious benefit in financing terms for green bonds over non-green bonds issued in China.* Based on our review of the existing research on the global green bond market, we arrive at the first of three hypotheses, for the specific assessment of the Chinese green bond market. We will test this hypothesis through an issuer sample analysis in Section 4, to refine it and set the outlines for a potential broader-based study with in-country engagement and interviews.

[7] Bachelet, Becchettim and Manfredonia, 2019, The Green Bonds Premium Puzzle: The Role of Issuer Characteristics and Third-Party Verification, Sustainability 2019, 11, 1089.
[8] Kidney, Climate Bonds Initiative, 2018, Green Bond Additionality: The Big Picture. Available at: http://www.bondsloans.com/news/article/2023/green-bond-additionality-the-big-picture.

2.2.2 Are green bonds encouraging more ambitious green projects and deepening of environmental integrity of projects?

One of the key arguments that cuts across the 'soft' factors of additionality is that by understanding what defines green, stakeholders will be able to develop more environmentally rigorous proposals. Setting out standards and certifying eligible green bonds builds both awareness and expertise in considering the environmental impacts of projects and investments. In turn, this should lead to greater capabilities and demands for stronger environmental integrity, in effect leveraging the maxim: what is measured, is managed.

However, evaluating the material significance of this maxim can be a challenge. To begin with, our analysis to date demonstrates that the measurement process itself can be found wanting, especially in China.[9] Whilst Monitoring, Reporting and Verification (MRV) on the use-of-proceeds is required for all non-enterprise issuers, the level of compliance is far from uniform. From our research on another stream of this project, almost one-third of green bonds issued to date do not specify, or have not allocated, their use-of-proceeds. Furthermore, MRV for actual environmental impact is merely encouraged rather than required, resulting in only 121 out of 347 issuances to date providing publicly available ex-post reporting on environmental impacts. Even for those 121 that do, not all have been independently verified.

These deficiencies in data quality represent a challenge for understanding how influential the green bond market has been in improving the environmental credentials of projects. A large-scale, quantitative study is therefore problematic. First, it requires identifying a baseline case to compare it to. However, it is unknown whether there are green and non-green bonds with sufficiently similar characteristics to test this quantitatively. Moreover, as aforementioned, environmental impact reporting has been cited as a common shortcoming within the Chinese green bond market, therefore adequate data may be inaccessible. However, these issues should not preclude a case study based qualitative analysis, to test whether a large-scale review on this topic is possible for China.

Hypothesis 2	This takes us to the second of three hypotheses for the specific assessment of the Chinese green bond market. *The China green bond market and its standards encourage greater environmental integrity of projects.* We will test this hypothesis qualitatively as part of the sample issuer analysis for China in Section 4, to refine it and set the outlines for a potential broader-based study with in-country engagement and interviews.

[9] Green bonds in China: the state and effectiveness of the market, Climate Policy Initiative, June 2020

2.2.3 Are green bonds enabling projects that otherwise not go ahead?

This final piece of analysis will bring the previous two sections together. It is a synthesis in that it will investigate whether projects with stronger environmental credentials go-ahead thanks to favourable financing terms. The key is whether the green bonds were a catalyst, increasing environmental integrity of pre-existing proposals, or a cause, triggering new ideas and projects that were not in the pipeline.

Our understanding of the market from our research on another stream of this project, leads us to conclude that a small, but not insignificant, proportion of green bonds fund new ventures. Among the issuances that specified their use-of-proceeds, 28% were designated for new projects, whilst 11% were for working capital, 10% for debt refinancing and 51% were unknown.8

Another way of looking at this issue is by evaluating new entrants to the green bond market and their motivations for joining. Since 2016, 84% (USD 82.6 bn; 14% of the entire Chinese green bond market) of all labelled green bonds were issued by new entrants. However, a significant caveat here is that the largest contributors to this growth have been financial institutions, which presents two problems: i) tracking their use-of-proceeds is more difficult as they are intermediaries in terms of actual project execution; and ii) there is a tendency for financial institutions to use the proceeds to re-finance parts of their pre-existing portfolios that qualify for green bonds.

In sum, extracting meaningful insights from this high-level quantitative data – either on new projects or entrants – is impossible without complementing it with stakeholder engagement to uncover the motivations driving these numbers. On paper, the increased number of projects and issuers suggests that the green bond market may be encouraging novel activity in China. We also suspect that the broader definition of green in China could also provide additionality.

Hypothesis 3	Our final of the three hypotheses for the specific assessment of the Chinese green bond market. *The green bond market in China has encouraged some (a limited number) but not many of environmentally positive and sustainable projects to be implemented that otherwise would not have gone ahead.* We will test this hypothesis qualitatively as part of the sample issuer analysis for China in Section 4, to refine it and set the outlines for a potential broader-based study with in-country engagement and interviews.

3. Approach and methodology

This report focuses on the productivity of the green bond market in China, aiming to answer the following questions:

- Can we trace the direct use of the proceeds of the green bond?
- How did the cost of financing change for the green bond issuer? What happened to the leverage and debt duration as a result of the issuance?
- How did the overall investment portfolio of the issuer change from historical investment patterns?
- How did the overall business strategy of the issuer change from the pre-green bond issue phase?
- Are there different conditions, covenants and restrictions on the green bonds and do these affect behaviours?

3.1 Research approach

This report is primarily based on desk research and follows a four-step approach to analysing productivity of green bonds in China.

- Setting of hypotheses. Based on secondary research, we have set out three hypotheses for the analysis in Section 2.2
- Market assessment. A high-level assessment of green vs. non-green bonds issued in the Chinese market based on green labelling by third party reviewers[10]. The idea is to identify any trends in the primary or secondary market that indicate that the green label allows sectors and issuers to attract larger amounts, longer terms or lower cost investment. The comparators are bonds with the same rating.
- Sector assessment. Breakdown of the green bond market by sector, to identify the sectors that are at the forefront of the green bonds issuance in China. Selection of individual issuers for deep-dive analysis.
- Issuer deep dive / case studies. The focus in this phase on select issuers is shortlisted. The objective is to verify the green productivity hypotheses made in the beginning. This can be done in two ways:
    a. Studying the issuer yield curve for green vs non-green instruments in the primary and secondary market, for impact on financing cost and duration

Tracking use of proceeds, linking proceeds from green bonds to financing of projects vs working capital (an allowable use of proceeds for green financing in China). Where we can track the use of proceeds, we assess how green issuance has impacted the issuer.

[10] Green Bond issuers in China are subject to different green bond guidelines based on their sector. Green bonds issued by financial entities are subject to the guidelines of the People's Bank of China (PBOC) Green Bond Endorsed Project Catalogue. Green domestic corporate bonds (and in general non-listed companies), are subject to the National Development and Reform Commission (NDRC) Green Bond guidelines. Green bonds issued by listed companies and corporate asset-backed securities are subject to the China Securities Regulatory Commission (CSRC) Guidelines for Supporting Green Bond development.

3.2 Data collection

For Phase 2 and 3, we relied on data gathered from two financial data providers, FactSet and Win.d. Both have advantages and disadvantages but overall, we found that Win.d provides the most comprehensive dataset for Chinese bonds.

In the Win.d database, bonds are classified as corporate debt, financial debt, enterprise debt, international debt, medium-term notes and asset-back securities (ABS). This classification is most significant from the perspective of the type of investor allowed to purchase and trade respective securities. Corporate debt is intended for institutional investors, while commercial paper and medium-term notes are mainly sold on the interbank bond market[11]. Enterprise bonds (mainly issued by state-owned utilities) and financial bonds are sold to both interbank market members and institutional investors.

For Phase 4, we found the FactSet database complimentary to Win.d, for individual securities. For example, we were able to get information on the top debt security holders, which is useful for qualitatively building the assessment of the green bonds' issuer. Apart from these databases, we also referenced bond prospectuses, press releases and other information available in the public domain to track use of bond proceeds, status and the outcome of the projects.

3.3 Limitations

Limitations in data were primarily due to lack of a standard reporting framework and limited transparency in the Chinese bond market. Availability of information varies issuer by issuer. Some of the challenges include:

- While post-issuance reports have more granularity than the pre-issuance reports, neither have sufficient individual project level data. The large number of issuances by intermediaries, especially financial institutions
- For environmental impact, the data are at the bond level instead of the project level
- Overall limited disclosure on Chinese debt instruments across Win.d and FactSet, especially the security investors

These data limitations significantly limit our ability to carry out project level verification and provide conclusive assessment on the use of proceeds and additionality of the Chinese green bonds.

Increasing the availability and improving quality of green bond reporting would be significant in effective assessment of the green bonds in China and their productivity. In the meantime, we would suggest that a fully fledged productivity review of the Chinese green bond market will need to incorporate in-country interviews to fill the gaps in information, disclosure and inconsistencies of the reporting.

[11] The interbank market is biased towards shorter maturities when compared with corporate bonds

4. Productivity review of green bonds in China

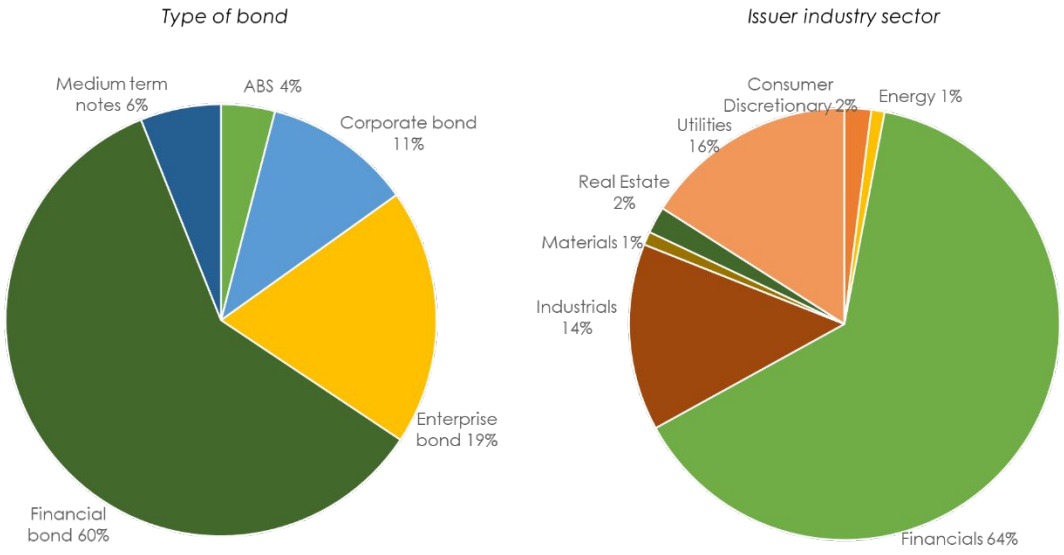
The Chinese green bond market accelerated from US$29 billion in 2016 to US$55.5 billion in 2019. In the first four months of 2020, China has issued a total of US$2.6 billion of green bonds. Some 99% of green bonds issued are in CNY, therefore the focus of this analysis is on bonds issued in the domestic currency.

To understand the productivity of green bonds in China, we did a top down review of the Chinese bond market, with a focus on sectors that dominate in the issuance of green bonds. We then looked at a sample of issuers across different sectors to test against the framework and hypothesis laid out in Section 2.

4.1 Market assessment

The green bond market in China is composed of different types of bonds, but financial bonds dominate the mix with almost 60% of the issuance. The rest of the issuance is comprised of enterprise bonds (19%), corporate bonds (11%), medium term notes (6%) and asset-based securities (ABS – 4%). In terms of issuer sector, financial institutions, utilities and industrials dominate (Figure 2).

Figure 2. Green bonds by bond type and issuer industry, 2010-19



The Chinese green bond market currently represents c.2% of the overall bond market, in the country, based on issuances between 2010 and 2019 (Feb 2019)[12]. When looking at green bonds as percentage of total bond market, bonds classified as financial, enterprise and ABS show the highest proportion of green. Meanwhile, financials, utilities, consumer discretionary, materials and energy sectors dominate bonds issuance with green labelling, suggesting decarbonisation in these sectors may be at a more advanced stage (Table 3).

[12] Green bond market as percentage of total market peaked at 3.7% in 2017 and was close to 2% in 2016 and 2018. It stands at 1.7% as of Feb 2019.

Table 3. Green bonds as a percentage of total bond market, 2010-19

Green bond as a % of total bond market	ABS	Commercial paper	Corporate bond	Enterprise bond	Financial bond	Medium term notes
Consumer discretionary				32%		
Consumer staples						5%
Energy	11%		1%			1%
Financials				1%	100%	3%
Healthcare						
Industrials	6%		1%	3%		
Information technology						1%
Materials				22%		
Real estate				5%		
Telecommunication services						
Utilities	18%		10%	18%		3%

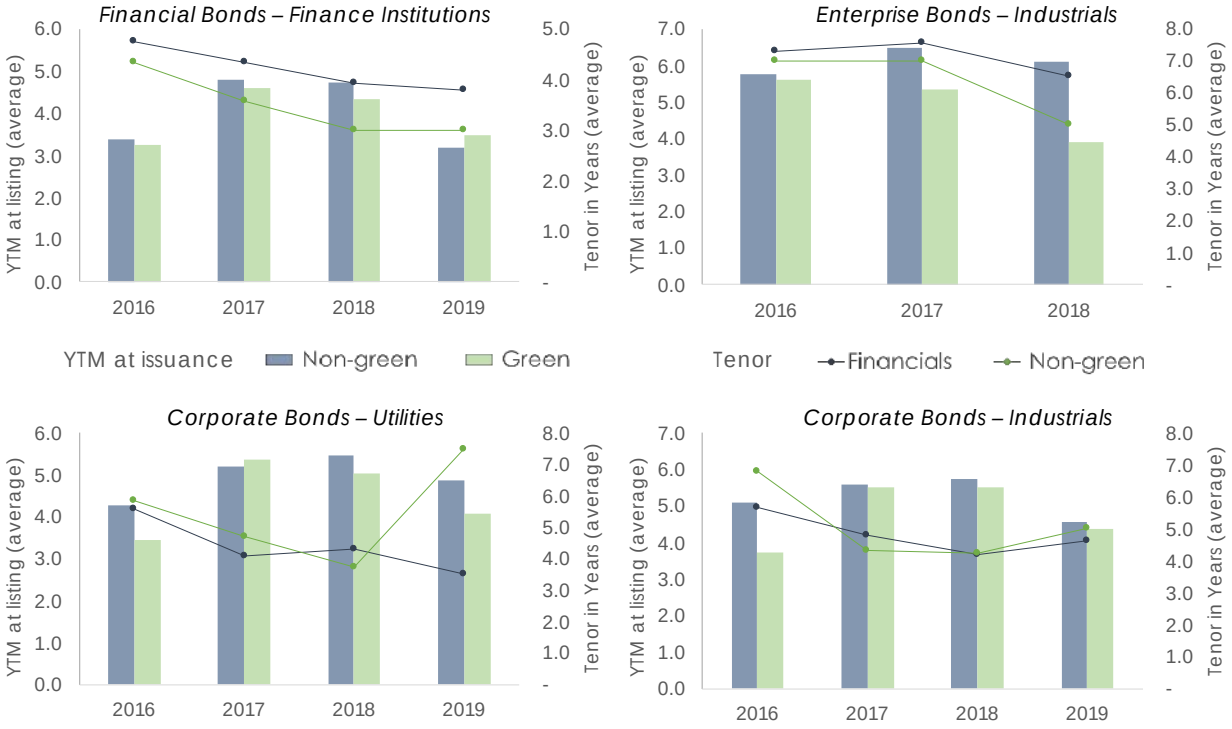
We then focus on those sectors and bond types that have seen the largest green issuance as a percentage of the total market (>2%) for the green bond productivity assessment. We looked more closely at the AAA rated bonds issued in China in the last four years, the average yield to maturity (YTM) for the primary and secondary markets, average size of the issue and the average term of bonds issued. The focus is on financial, enterprise and corporate bonds. For YTM we present results for the primary and secondary market.

The evidence on the productivity of green bonds is mixed. Green bonds typically show a lower cost than their non-green counterparts for some of the largest pockets of green bonds; enterprise and corporate bonds issued by Industrials were on average cheaper than non-green bonds in primary and secondary markets in every year analysed (Figure 3 and 4); the average size of the issuance by Industrials was higher than non-green only in 2019; analysis of bond term does not suggest that issuers of green securities were able to issue on average longer-term debt instruments than non-green.

Utilities' enterprise and corporate green bonds were also able to attract lower cost of debt at issuance (Figure 3 and 4), in all years except 2017 but the analysis of YTM in the secondary markets does not exhibit any clear trends to conclude a price advantage for green bonds; on average; Utilities had higher size issuances in the green bond markets than non-green in all years except 2019; analysis of bond term shows that Utilities were able to issue longer-term bonds than non-green, except enterprise bonds in 2016 and corporate bonds in 2018.

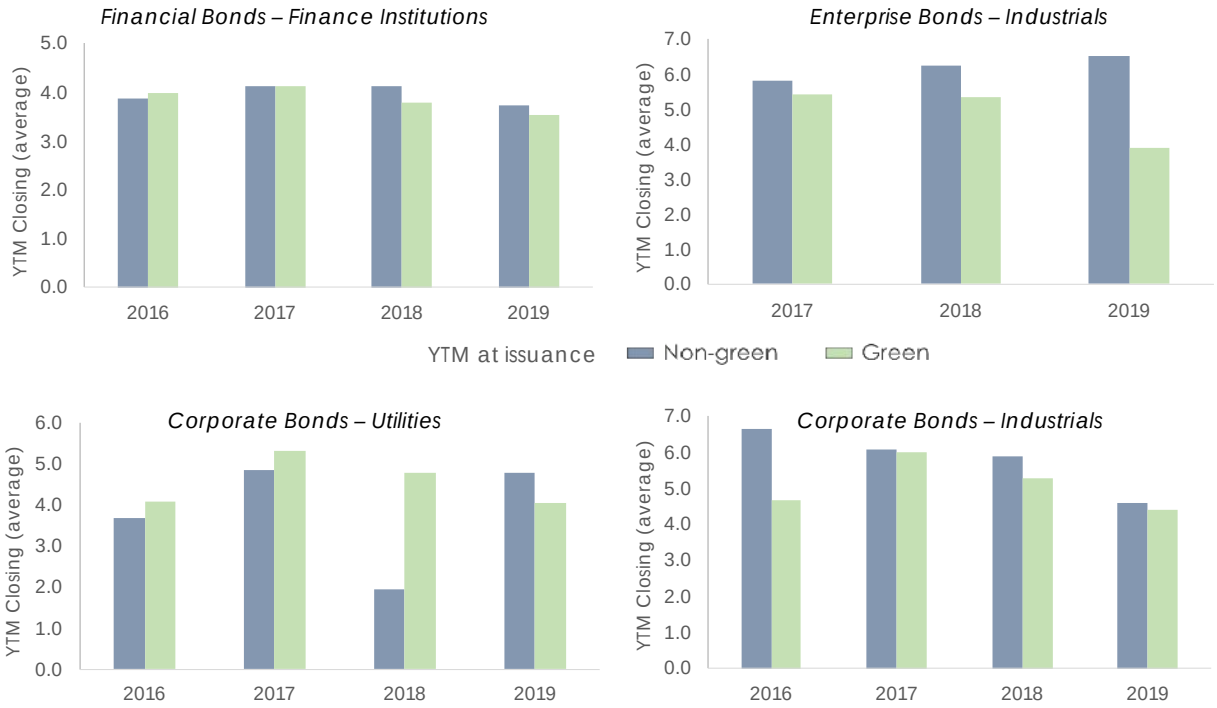
The analysis of green bonds issued in the energy, materials and consumer discretionary sectors were inconclusive, with lack of clear trends on any of the parameters.

Figure 3. Average YTM and bond term at issuance for AAA rated bonds, 2016-19



Our analysis shows that the green label allowed financial institutions to access lower cost debt, both in the primary market except 2019 as we see in the YTM at issuance bars in Figure 3; as well as the secondary market except 2016 as we see in the bars in Figure 4. On average, green bonds issue greater size tickets than non-green bonds, except 2019 but greenness has a cost for tenor, as bond terms were typically lower for green than non-green bonds as seen in the line graphs in Figure 3.

Figure 4. Average YTM at closing for AAA rated bonds, 2017-19



4.2 Sector assessment

In the previous section, we assessed the broad trends across sectors for green vs non-green bond issuances since the green bond market took off in 2016. In this section, we look deeper into the three sectors that show recurring trends of additionality and effectiveness of green bonds and to identify the top AAA-rated green bond issuers across each of these sectors.

Table 4.Green bonds by sub-sectors for Industrials, Utilities and Financial Institutions, 2016-19

Industrials		Utilities		Financial	
Construction & engineering	18%	Electric utilities	60%	Consumer finance	1%
Environmental & facilities services	9%	Gas utilities	1%	Diversified banks	70%
Highways & railtracks	23%	New energy power producers	21%	Regional banks	30%
Industrial conglomerates	21%	Water utilities	18%		
Railroads	20%				
Trading companies & distributors	3%				
Trucking	5%				

For Industrials, Highways & railway tracks (23%), Railroads (20%) and multi-sector Industrial conglomerates (21%) were the dominant issuers. Table 5 shows a list of the top Industrials' AAA-rated green bond issuers by name.

Table 5. Top Industrials issuers, AAA-rated green bonds, 2016-2019

Beijing Infrastructure Investment Co, Ltd.	19.5%
China Energy Conservation and Environmental Protection Group	16.3%
China Everbright Water Limited	4.6%
China Gezhouba Dam group Luyuan Technology Co.,Ltd.	3.9%
Danyang Investment Group Co.,Ltd	4.9%
Guangzhou Metro Group Co.,Ltd.	9.8%
Huafa Comprehensive Development Co.,Ltd.	3.3%
Hunan Provincial Expressway Group Co.,Ltd	8.7%
Inner Mongolia M-Grass Ecology and Environment(Group)Co.,Ltd.	0.8%
Jiangsu Xianxing Construction Co.,Ltd.	1.0%
Jingjiang Riverside Park Investment Development Co.,Ltd	3.2%

Liuyang Modern Manufacturing Industry Construction Investment Development Co.,Ltd.	2.9%
Pingxiang City Of Hsbc Investment Co.,Ltd.	6.5%
Poten Environment Group Co., Ltd.	1.0%
Qingdao Conson Development (Group) Co.,Ltd	4.7%
Shandong Lipeng Co., Ltd	0.8%
Shanghai Lingang Economic Development (Group) Co.,Ltd	3.3%
Urumqi City Traffic Investment Co.,Ltd	4.9%

For Utilities, electric utilities dominated the issuance league tables with 60% of the AAA-rated green bonds over the last four years. Table 6 shows a list of the top Utilities' AAA-rated green bond issuers by name.

Table 6. Top Utilities issuers, AAA-rated green bonds, 2016-2019

Beijing Capital Co Ltd	5.8%
Beijing Enterprises Water Group (China) Investment Limited	5.4%
Beijing Enterprises Water Group Limited	1.3%
CECEP Wind-Power Corporation	1.9%
China Datang Corporation Renewable Power Co Limited	1.9%
China Huadian Corporation Ltd	9.6%
China Longyuan Power Group Corporation Limited	15.4%
China Suntien Green Energy Company Limited	1.1%
China Three Gorges Corporation	36.5%
Guangzhou Water Investment Group Co Ltd	3.1%
Huaneng Renewables Corporation Limited	2.2%
Shenzhen Energy Group Co Ltd	1.9%
State Grid Corporation of China	9.6%
Xinhua Hydropower Company Limited	1.9%
Yunnan Water Investment Co Limited	2.3%

For Financial Institutions, 70% of the issuers are classified as diversified banks. Banks mostly issue labelled green bonds and also act as intermediaries, raising green finance to fund

green and sustainability projects in their portfolio. Table 7 shows a list of the top Utilities' AAA-rated green bond issuers by name.

Table 7. Top Financial Institutions issuers, AAA-rated green bonds, 2016-2019

Bank of Beijing Co., Ltd.	11.6%
Bank of Chongqing Co., Ltd.	2.3%
Bank of Communications Co.,Ltd.	19.3%
Bank of Dalian Co.,Ltd.	0.8%
Bank of Guiyang Co.,Ltd.	1.9%
Bank of Hebei Co.,Ltd.	1.9%
BANK OF KUNLUN CORPORATION LIMITED	0.2%
Bank of Nanjing Co.,Ltd.	1.9%
Bank of Ningbo Co.,Ltd	1.2%
Bank of Zhengzhou Co.,Ltd	1.2%
China Huarong Financial Leasing Co.,Ltd.	0.8%
Dongguan Rural Commercial Bank Co., Ltd.	0.8%
Harbin Bank Co.,Ltd.	1.9%
HUARONG XIANGJIANG BANK CORPORATION LIMITED	1.4%
Huishang Bank Corporation Limited	1.9%
Industrial Bank Co.,Ltd.	38.7%
Shanghai Pudong Development Bank Co.,Ltd.	11.6%
Zhongyuan Bank Co.,Ltd	0.6%

4.3 Issuer deep dive / case studies

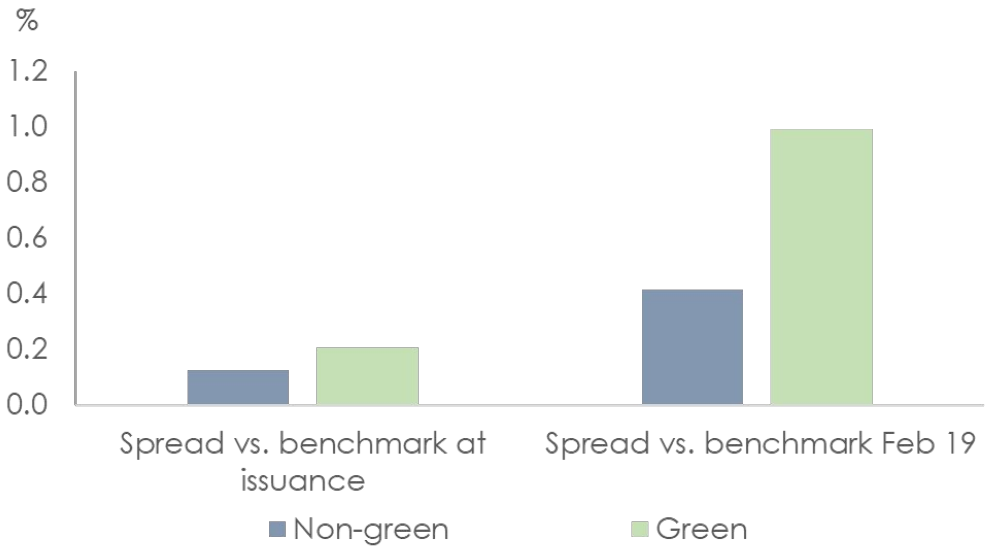
In this section, we verify the high-level results from the market assessment in Section 4.1 and use case studies to generalise China green bond principles and issues. Our selection of companies for the case studies here are driven by the availability of relevant information and disclosures, on comparable instruments and use of proceeds. We will use these case studies to test the hypotheses our framework in section 2.2 and set the outlines for a potential broader-based study with in-country engagement and interviews.

4.3.1 Utilities case study – State Grid

We start with utilities. We present results below of the analysis for State Grid Corporation of China which represents approximately 10% of the corporate and enterprise green bonds issued between 2016 and 2019.

Our analysis of State Grid's cost of debt suggests that there was no green price negative premium at issuance and that the company's green securities are not being traded at a lower yield vs its non-green securities as of February 2019 (Figure 5).

Figure 5. State Grid Corporation of China; average spread over 10-year China government bond, for securities issued in 2016



Source: Based on Win.d data

These results are in contrast to the overall sector conclusions from our market assessment; however, we did find that the conclusions did not hold universally, especially for 2016. Not surprising, given State Grid's significant role in the green bond market that year, where the company's CNY10 billion made up 5% of all the green bonds issued in the year.

In terms of investors, 54% of non-green bonds issued by State Grid have been sold in the Interbank market, 39% to investors classified as *domestic legal person* and the remaining 7% to institutional investors. No green securities have been sold to institutional investors. We found limited information on this from FactSet, as shown in Table 8.

Table 8. Green Bonds issued by State Grid Corporation, 2016

Security	Top 20 Institutions	Activism	Ownership	Maturity	Coupon
STATE GRID B211020 (2016)	Neuberger Berman Investment Advisers LLC	Medium	0.20%	5 years	2.99%
STATE GRID B191020 (2016)	FIL Investment Management HK	Very low	0.56%	3 years	2.80%
	FIL Investment Advisors UK	Very low	0.04%		
	FIL Gestion SASU	Very low	<0.001%		

One possible takeaway from the lack of uptake from institutional investors would be that green bonds were not a route for expanding or diversifying State Grid's sources of capital.

Other issuers / securities may have better coverage but for some issuers, this assessment may have to be gathered through direct engagement with issuers and in-country interviews.

The two green bonds issued by State Grid in 2016, one with a 3-year maturity and another with a 5-year maturity were underwritten by six firms, with 13 financial institutions acting as distributors.

For State Grid, we found that tracking use of proceeds is possible, at least in part. Of the CNY10bn raised by the 2016 green bonds, CNY5bn were deployed in the construction of ultra-high-voltage (UHV) transmission projects and the remaining CNY5bn to supplement working capital. Details of the projects funded by the green bonds are accessible from the prospectus in original language and we share the summary in Table 9 below.

Table 9: Use of proceeds of green bonds issued by State Grid Corporation, 2016

Project name	Total investment (CNY million)	Funds from the 2016 green bond proceeds (CNY million)	Approved by the National Development and Reform Commission	Year of Commission
Ximeng~Shandong 1000 kV UHV AC transmission and transformation project	17,820	1,800	Development and Reform Energy No. 1643, 2014	2016
Mengxi ~ Tianjin South 1000 kV UHV AC transmission and transformation project	17,520	600	Development and Reform Energy No. 88, 2015	2016
Ningxia Ningdong-Zhejiang Shaoxing [13]±800 kV HVDC power transmission and transformation project	23,732	1,200	Development and Reform Energy No. 88, 2015	2016

[13] http://www.xinhuanet.com/2017-12/26/c_1122168764.htm

Jiuquan-Hunan ±800 kV UHV DC project (Hunan company undertakes part)	19,648	1,400	Development and Reform Energy No. 1089, 2015	2017

Source: Bond Prospectus, FactSet, Development of UHV Power Transmission in China, Sun, Yuan, Qiu.

China has increasingly relied on UHV technology to send electricity from remote regions with excess supply to areas of higher demand. The UHV projects are part of the nation's strategy to shift electricity from the west to the east to ease electricity surplus in the west, with the assumption that such infrastructure investments can drive the economy. For State Grid, which covers 88% of China's territory, verifying greenness of the investment is possible if we can monitor renewable power transmitted through the UHV lines, funded by the green bonds.

The National Energy Administration publishes an annual report Monitoring & Evaluation of Renewable energy Power Development which recently started to report UHV delivery capacity by line. The 2018 report which reports on year 2017 suggests no renewable power was transmitted through the Ximeng-Shandong (number 2 below) and only 17% of total electricity transmitted through the Ningxia-Shaoxing (number 9 below) network in 2017.

Figure 10: Transmission of renewable energy by UHV Transmission Projects in China, 2017

Note: Projects 1 – 9 are State Grid projects

表 6　2017 年特高压线路输送电量情况

序号	线路名称	年输送电量(亿千瓦时)	可再生能源电量(亿千瓦时)	可再生能源电量在全部输送电量占比	同比百分点
1	长南线	65.5	37.0	56%	21
2	锡盟-山东	64.8		0%	
3	皖电东送	594.5		0%	
4	浙福线	40.2		0%	
5	复奉直流	324.0	320.3	99%	-1
6	锦苏直流	387.1	384.6	99%	
7	宾金直流	389.6	389.6	100%	
8	天中直流	359.7	152.6	42%	19
9	灵绍直流	201.3	34.4	17%	-12
10	楚穗直流	282.2	282.2	100%	
11	普侨直流	297.5	297.5	100%	
12	新东直流	1.4	1.4	100%	
全国		**3007.5**	**1899.6**	**63%**	**-11**

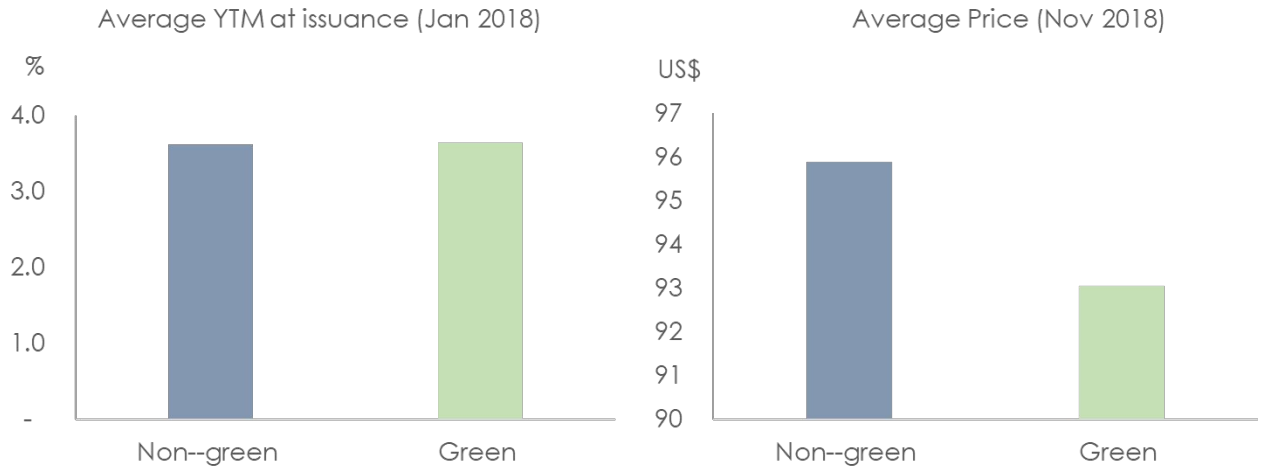
注：1-9 项数据为国家电网公司报送，10-12 项数据为南方电网公司报送。新东直流于 2017 年 12 月投产。

4.3.2 Industrials case study – Swire Properties

Swire Properties is a real estate company based in Hong Kong with a real estate portfolio (development and management) across Mainland China, Hong Kong, Singapore, and the US. The company issued its first green bond in 2018 as part of its 2030 Sustainable Strategy. The bond was the first to receive the HKQAA Green Finance Certification. While not a typical Chinese issuer with majority domestic subscribers, we have picked this issuer because of the ability to track the use of proceeds.

Our analysis of Swire Properties shows that there was no negative premium for green at issuance, resulting in the green bond being priced at a YTM close to the average YTM of Swire's non-green portfolio. By the end of 2018, this bond was trading at a price c.3% lower than the non-green bonds, suggesting demand not high for green bonds over non-green bond (Figure 6).

Figure 6. YTM at issuance and trading price for bonds issued by Swire Properties



In terms of the investors, a substantial portion of the bond was placed with institutional investors with a commitment to green and sustainable financing. A possible takeaway from this strong engagement with green institutional investors would be that green bonds allow Swire properties to expand and diversify its investor base.

The net proceeds from the green bond have been allocated to fund and refinance the company's new or existing green projects, relating to green buildings development, energy efficiency, renewable energy, sustainable water and wastewater management (Figure 7).

Figure 7. Allocation of green bond proceeds, Swire properties

Category	Projects	Green Bond Proceeds Allocated	
Green Buildings	One Taikoo Place and Two Taikoo Place	US$478 million	95.6%
Energy Efficiency	Cityplaza, Pacific Place and Taikoo Place	US$19 million	3.8%
Renewable Energy	One Taikoo Place	US$1.6 million	0.3%
Sustainable Water and Wastewater Management	Taikoo Place, including One Taikoo Place	US$1.4 million	0.3%
Total allocated proceeds		US$500 million	100%

Considering the international profile of this company, we found greater engagement with international standards and certifications. Eligible building projects include "Projects relating to Green Buildings that have received within the last two years, or that receive during the tenor of the Green Bond(s), a third-party-verified green building certification such as LEED, BEAM Plus or other equivalent green building certifications. Part of the green buildings' development proceeds was used to finance works at One and two Taikoo Place."

Eligible energy efficiency projects include "Projects relating to Energy Efficiency, such as adoption of smart technologies and/or systems for optimizing energy management in our new and existing developments. In addition, the net proceeds may also be used to upgrade the existing equipment (for example, lighting or chillers) in such developments to higher efficiency models to achieve at least a 10% improvement in energy efficiency."

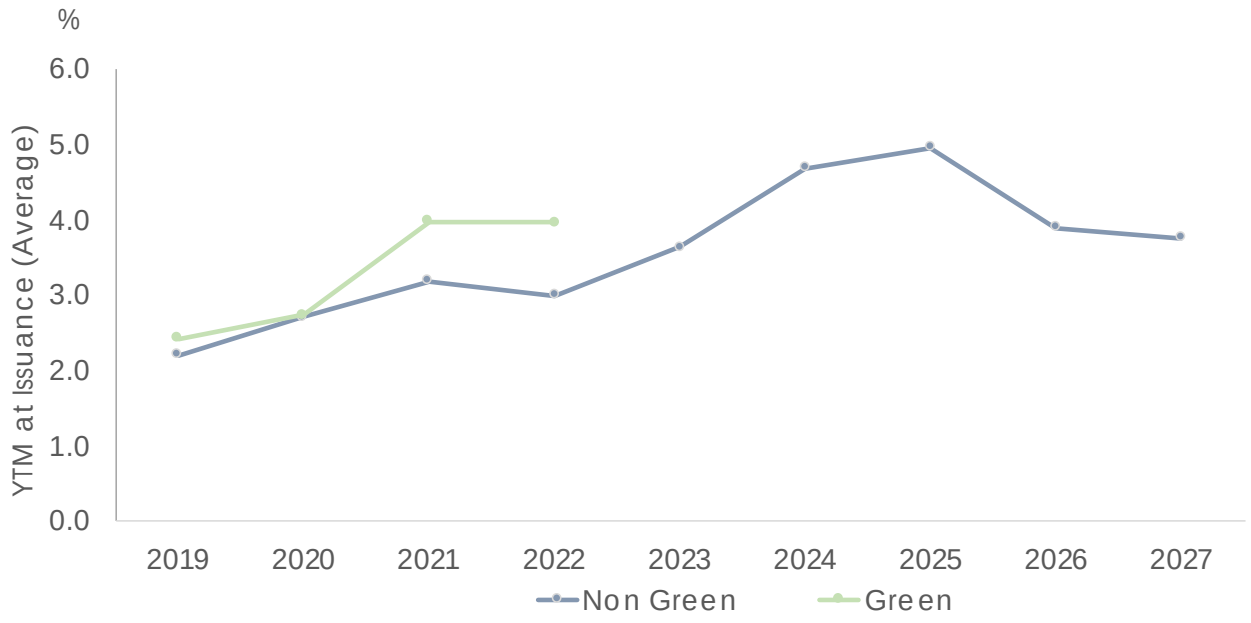
4.3.3 Financial institutions case study – ICBC

We present results below of the analysis for Industrial and Commercial Bank of China (ICBC) which issued the largest green bond listed on the London Stock Exchange and the first Chinese issuance on the International Securities Market.

In 2017, ICBC issued their first Certified Climate Bond for US$2.1 billion in tranches of three and five years. In 2018, the second issuance of the Certified Climate Bond was released, US$1.58 billion (US$1 billion + EUR500 million) again in three- and five-year tranches. Both the bonds were issued under ICBC's Medium Term Note programme rated A2 by Moody's. This green issuance represented 10% and 16% of the total bonds issued in 2017 and 2018.

Our analysis for ICBC debt costs suggest that there was no negative premium for green at issuance, as Figure 8 shows that green bonds are more expensive than their non-green counterparts for similar maturities.

Figure 8. ICBC; average YTM of green and non-green bonds



With its Green Bond Framework (certified 'Dark Green' by Cicerco), along with HKQAA's pre-issuance certificate, ICBC's green bonds have aligned with various widely recognized international and Chinese green bond standards, and attracted a wide range of institutional investors and has been hence able to expand and diversify ICBC's sources of capital, especially for its green projects.

Under the HKQAA Green Finance Certification Scheme, an applicant may apply for either (i) a pre-issuance stage certificate or (ii) a post-issuance stage certificate. ICBC (Asia) as the first local licensed bank in Hong Kong to obtain pre-issuance green finance certification from HKQAA, it attracted a wider range of international investors.

ICBC's green bonds are classified under the Solar, Wind and Low Carbon Transport Criteria and marine renewable energy criteria. We are able to clearly trace proceeds from ICBC's green bonds and observe that it funds many sectors with environmental and sustainability impacts, across different geographies globally, though a significant share of capital is deployed in China. Details of the projects funded in Table 11 below.

Table 11: Use of proceeds of green bonds issued by ICBC, 2017 and 2018

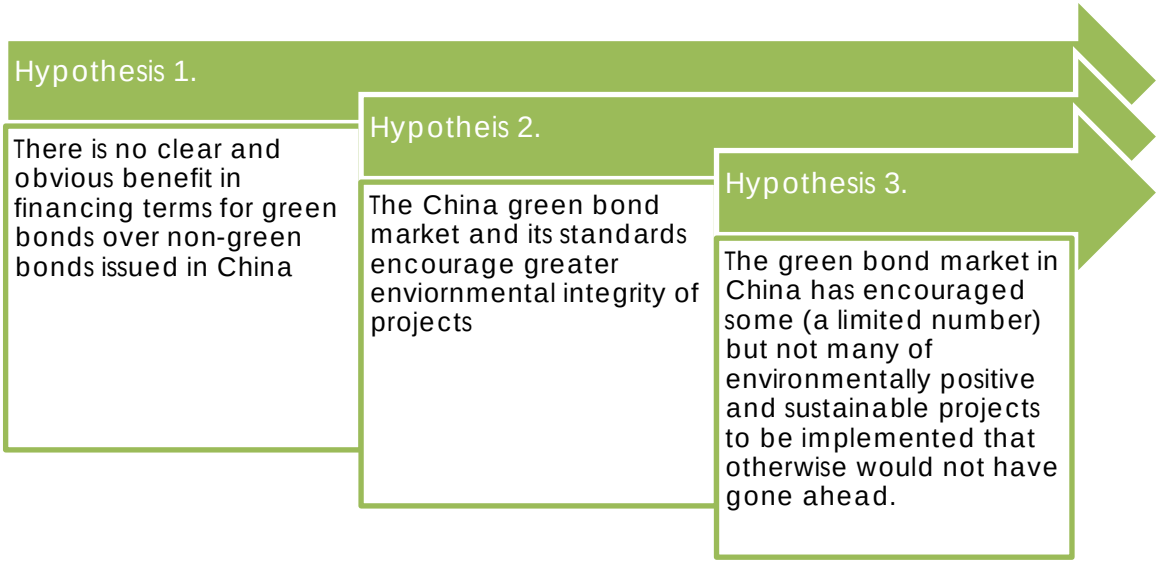
Project location	Technology	Allocated amount (US$ mn)	Installed Capacity (MW)	GHG Emission Avoided per year (ton)
Jiuquan, Gansu, PRC	Wind	1.1	400	752
Nantong, Jiangsu, PRC	Wind	1.0	300	604,950
Hami, Xinjiang, PRC	Wind	0.9	200	391,419
Hami, Xinjiang, PRC	Wind	0.7	200	327,000
Taizhou, Jiangsu, PRC	Solar	0.6	80	75,864
Suqian, Jiangsu, PRC	Solar	0.6	100	95,239
Ouarzazate, Morocco	Solar	132	200	450,045
Saraburi, Thailand (X3)	Solar	11	27	23,821
Yongzhou-Guilin-Liuzhou, PRC	Railway Transport	4.8	-	818.798
Lanzhou-Chongqing, PRC	Railway Transport	10.4	-	647,200
Total		21.5	1,506	1,969,090

4.4 Evaluating green bond productivity hypotheses for China

In this section, we verify the high-level results from the market assessment in Section 4.1 and use case studies to generalise China green bond principles and issues. Our selection of companies for the case studies here are driven by the availability of relevant information and disclosures, on comparable instruments and use of proceeds. We will use these case studies to test the hypotheses our framework in section 2.2 and set the outlines for a potential broader-based study with in-country engagement and interviews.

Considering the market assessment and the case studies for green bonds in China, it is now useful to evaluate the hypotheses for the productivity of green bonds that we had introduced at the beginning of the report (Figure 9).

Figure 9. Three hypotheses to assess productivity of green bonds in China



Testing hypothesis 1: *There is no clear and obvious benefit in financing terms for green bonds over non-green bonds issued in China.*

When evaluating the portfolio of all AAA rated green bonds issued by China between 2016 and 2019 (Feb 2019), we found three sectors dominated the issuer market, and observed the following trends (Table 12):

- Industrials, Utilities and Financial Institutions have lower costs (YTM at issuance) for green bonds than non-green bonds;
- Industrials and Financial Institutions also find lower costs for green bonds in secondary markets;
- Utilities and Financial Institutions raise larger amounts on individual issuance through green bonds;
- No clear trends observed in the term of bonds issued as green vs non-green;
- Inconclusive results from energy, consumer discretionary and materials sectors.

Table 12. Summary of results for key sectors on Hypothesis 1

Market Assessment	Hypothesis 1		
Key sectors	Cost	Volume	Term
Industrials	Cost ✓ ✓	Volume ✗	Term ✗
Utilities	Cost ✓ -	Volume ✓	Term ✗
Financial Institutions	Cost ✓ ✓	Volume ✓	Term ✗

We then evaluated a sample of issuers, State Grid from Utilities sector, Swire Properties from the Industrials sector and Financial institution ICBC; to evaluate if the sectoral trends carry universally across the issuers and observed the following (Table 13):

- No cost advantages were observed for green bonds over non-green bonds in case of each of the three issuers;
- As each of the issuers had only issued 1-2 green bonds, it was not possible to observe trends with respect to the size of the issuance;
- Swire Properties' green bonds had comparable bond terms to that of non-green bonds however, both State Grid and ICBC had lower terms for green bonds which were typically only issued in three- and five-year tranches.

Table 13. Summary of results from issuer deep dive / case studies

Case Studies	Hypothesis 1	Hypothesis 2	Hypothesis 3
State Grid	✗	-	-
Swire Properties	✗	✓	?
ICBC	✗	✓	?

The observations from our market assessment and the issuer deep dive continue to show mixed results, as was also concluded from the secondary research in earlier sections. With no clear evidence to assert that green bonds consistently have better financing terms over non-green bonds, we persist with Hypothesis 1, There is no clear and obvious benefit in financing terms for green bonds over non-green bonds issued in China.

To unpick this hypothesis further, we would recommend a broad-based study, starting with a more comprehensive database of issuers, along with tracking pre-issuance commitments and post issuance use of proceeds.

From this sample, a selection and matching process between green and non-green bonds (taking account of issuer, maturity, credit rating, structure, issue date) would enable a statistical comparison between the two groups. Although exact matching would likely be impossible, setting acceptable ranges or thresholds for key variables is a method chosen by previous studies. The aim would be to uncover the range and average difference between the matched green and non-green bonds in terms of financing cost, length of term and size of ticket by running a statistical model that works out the significance of the green, or not, nature of the bond (independent variable) in relation to these dependent variables.

The empirical evidence accumulated would be the first step to testing a potential relationship between green bonds and improved financing in the Chinese market. For deeper explanations as to why these relationships exist, or not, and crucially if they are influential in catalysing the low carbon transition, there needs to be an investigation into why issuers choose green projects, and whether green finance encourages investment in green projects. Such information will be gathered through direct engagement and in-country interviews with issuers.

Testing hypothesis 2: The Chinese green bond market and its standards encourage greater environmental integrity of projects.

Each of the issuers from our case studies, had different approaches to deployment of proceeds of the green bonds raised:

State Grid, whose issuance in 2016 represented 10% of the green bonds issued that year split the proceeds 50:50 between ultra-high voltage (UHV) projects and working capital. For the UHV projects we observed that less than a fifth of the infrastructure built served green energy. To truly understand whether green bonds encouraged greater environmental integrity, it would be important to investigate any further energy efficiency impacts of the UHV project as well as unpick the utilization of 'working capital'. For both of these, access to the utility is necessary. With the publicly available information, we can deduce that this State Grid's green bonds did not encourage additional environmental integrity.

Swire Properties utilized a substantial portion of its green bond proceeds to fund green projects related to green building development, energy efficiency, renewable energy, sustainable water and wastewater management, or climate change adaptation. To truly understand the additionality of the green bond, we would need to engage directly with Swire Properties to understand (1) how would the costs of energy efficiency of its buildings, especially in Taikoo Place, have been otherwise funded and (2) how would investments in smart technologies and broader energy efficiency measures be otherwise funded.

However, based on the available information, we note Swire Properties adheres to international standards and measures on green finance and also that building energy efficiency initiatives are in essence additional environmental integrity activities, to the core actions on decarbonisation. With the publicly available information, we deduce that Swire Properties' green bonds did encourage additional environmental integrity but would need primary investigation for a firm conclusion.

ICBC's green bonds represented 10% and 16% of the funding raised by the company in 2017 and 2018 respectively. ICBC has made concerted efforts to adopt international standards on green finance and its bonds are classified under the solar, wind and low carbon transport criteria, and marine renewable energy criteria. Based on the available information, we note a positive impact on the low carbon transportation and potential for marine renewable energy, considering both having potential to encourage additional environmental integrity. However, this deduction, while positive, will need to be supported by direct engagement with the bank to investigate the full scope of its additionality especially: (1) alternative routes for ICBC to fund low carbon and energy efficiency measures; and (2) timeline if any of ICBC's initiatives on marine renewable energy.

Consolidating our observations from the issuer deep dive, we see a case to be made for greater environmental integrity being delivered by Swire Properties energy efficient buildings work and ICBC's low carbon transportation. However, both need further investigation with stakeholders for conclusive evidence. We thus persist with Hypothesis 2: The Chinese green bond market and its standards encourage greater environmental integrity of projects

To fully substantiate this hypothesis, we recommend a follow-up with issuers shortlisted from a more comprehensive database of pre- and post-issuance, to identify atypical decarbonisation, renewable and energy efficiency projects which had funding from green bonds.

Stakeholder engagement with the project developers, investors and other key parties would be a critical part of the analysis in order to capture their insight on the influence of the green bond market on their decisions and what alternative funding options existed for them and at what cost. This process could take the form of a survey, interviews and/or focus groups in order to extract answers on how important, or not, green bonds were when considering the environmental impact of their projects.

Testing for hypothesis 3: *The green bond market in China has encouraged a limited number of environmentally positive and sustainable projects to be implemented that otherwise would not have gone ahead.*

Green bonds must overcome barriers to projects that can facilitate environmental friendly consumption and sustainability. From our observations in the three case studies, funding for energy efficiency measures for existing building stock, green building development and decarbonisation of transport are atypical of the use of green bond proceeds but each of them further the sustainability agenda. Whether these projects would have happened without the green bonds is a question we can only partly answer with publicly available information. ICBC's low carbon transport project is only partly funded by the green bond so there is a possibility that it could have been funded irrespective of the green bond. Likewise, for Swire Properties' building and energy efficiency measures, funding could potentially also be raised through all purpose bonds. In both cases this is conjecture that cannot be ascertained with any degree of certainty without feedback from the issuers themselves.

With the available information, we can only determine that green bonds have benefited from some of the novel actions related to sustainability in China. Hence, we persist with Hypothesis 3: *The green bond market in China has encouraged a limited number of environmentally positive and sustainable projects to be implemented that otherwise would not have gone ahead.*

However, for a comprehensive analysis, this hypothesis (if not more than the first or second) will require insights from both issuers as well as investors, on whether these projects would have been launched or funded without the green certification and how the lack of green certification would have impacted the funding cost. Any increase in funding cost for projects that are not certified as green could substantially decrease their ability to meet investment return hurdles and hence make them non-feasible.

5. Summary and recommendations

Ultimately, the long-term aim of a productivity analysis for green bonds is to ascertain that funds raised are able to effectively deliver environmental and sustainability impacts and accelerate low carbon transition.

This report laid down a hypothesis-based framework for this assessment, with three primary hypotheses.

Evaluation of the green bond portfolio of China over the period 2016 to 2019 (Feb 2019) revealed that Industrials, Utilities and Financial Institutions have been the dominant issuers of green bonds in China. We noted that some sectors see an average cost benefit from issuing green bonds and some also benefit from increase in the average ticket size of issuance but these advantages are not universally carried, not even in these sectors where individual issuers failed to consistently gather these benefits in financing terms.

We also noted that there is potential additionality in the ability of green bonds in delivering greater environmental integrity and additionality of sustainability related projects but the results on this are also inconclusive. Identifying the extent and the scale of this impact is an inaccurate target without direct insight from both issuers and investors, especially in the absence of robust monitoring, reporting, and verification (MRV) systems and standards.

With available information from public sources and paid databases, we find that there is insufficient information to conclusively prove the productivity of green bonds in China.

Recommendations

For a more comprehensive productivity analysis of green bonds in China, we would suggest a future project including wider engagement with issuers and investors and in-country primary research. This would be essential to break through the barriers of information paucity, multi-standard framework and understanding drivers of a primarily domestic investor base.

For the medium term, we would also recommend standardisation of the monitoring, reporting, and verification (MRV) to develop robust systems and standards that can be adopted across the multi – regulatory set-up of China. Measuring productivity is just the first step but delivering higher productivity from green finance requires issuers are incentivised and evaluated against comparable standards and consistent reporting requirements.