

**A Comparative Analysis of the Institutional Impact on the  
Green Bond Markets in India and China**

**by**

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## **Author's Declaration**

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

## Abstract

**Introduction:** Climate finance has played a crucial role in addressing climate change impacts through the funding of various adaptation and mitigation efforts around the world. One such tool that has mobilized vast amounts of money in the climate finance markets, has been the green bond. Green bonds are specifically used to raise capital to channel funding into green or climate-friendly projects – thereby filling a significant funding gap when it comes to infrastructure and climate finance. Furthermore, it is now evident that these bonds are being issued in national interest of a country’s growth and transition to a low carbon and climate change resilient (LCR) economy. That is why governments around the world have a key stake in ensuring that this market succeeds and grows.

**Research Objective:** The need for LCR investment is especially strong in emerging economies like India and China, which are highly vulnerable to climate change impacts. However, research related to institutional impact on the green bond market is currently limited. The research objective of this paper is to provide the basis for understanding how emerging country governments can potentially harness market growth, by maintaining the optimal balance of institutional pressure and regulatory policies in the market.

**Methods:** A convergent parallel mixed method approach is used to fill the gaps in qualitative and quantitative data. Quantitative analysis includes descriptive statistics using excel, whereas qualitative analysis involves interviews with high-level market players in the Indian and international green bond markets.

**Results:** Regulators are seen to be integral in growing the market in emerging economies like India and China. Their existing role and ability to influence the market depends on prevailing norms and field logics. For China, the institutional pressure exists in the green bond market due to the presence of regulators. For India, the institutional pressure is not completely there, as the regulatory priority is on other economic and governance issues. The growth in both markets is also driven by stakeholders like investors and industry associations, as well as due to international best practices.

**Conclusion:** In order to support growth, regulators need to coordinate with other regulators to set out clear and harmonized definitions of green, enable the creation of market infrastructure

and engage high priority social actors to implement the institutional changes in the green bond market.

**Key Words:** Green bonds, climate finance, project finance, institutional pressure, regulation, low carbon climate resilient economy (LCR), developing and emerging countries, India and China.

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## List of Abbreviations

LCR	Low-Carbon Climate Change Resilient
DFI	Development Financial Institutions
MDB	Multilateral Development Bank
SEBI	Securities and Exchange Board of India
RBI	Reserve Bank of India
PBoC	People’s Bank of China
CSRC	China Securities and Regulatory Commission
NDRC	National Development and Reform Commission
PSL	Priority Sector Lending
IPCC	Intergovernmental Panel on Climate Change
GBP	Green Bond Principles
ICMA	International Capital Markets Association
CBI	Climate Bonds Initiative
OECD	Organization for Economic and Development
PPP	Private-Public Partner

## Chapter 1. Introduction

While the public sector plays an important role in financing climate change action, many consider private sector participation critical in achieving the large-scale transition to a low-carbon, climate resilient economy (Jachnik, Caruso & Srivastava, 2015). A low-carbon, climate resilient (LCR) economy is one that adapts to climate change impacts and is less carbon-intensive as compared to existing economies. According to the latest IPCC report, the global need for investment into transitioning towards LCR economy is significant, and the world has only 12 years to do so in order to avoid catastrophic climate change impacts (IPCC, 2018).

In order to have an LCR transition, it also means that climate change mitigation and adaption will present huge challenges for various sectors in both developed and developing countries. Among developed economies, countries like United States, Canada, Japan and other OECD countries<sup>1</sup>, face massive infrastructure upgrades in the near future (OECD, 2014; Climate Bonds Initiative & UNEP Finance Inquiry, 2016) and also have to sustain financial returns on their long-term investments. On the other hand, densely populated and emerging economies, like India and China, face the need to develop their economies and build extensive infrastructure from scratch. However, they are also the most vulnerable to impacts from climate change (IPCC, 2018), even with the 2-degree threshold being met. Given the strong economic links to how infrastructure is financed and how long-term investments are sustained, it becomes imperative that countries involve their financial systems in the transition towards a LCR economy.

In order to do so in time, each country must also re-examine their efforts in scaling up the transition to a low carbon economy. However, due to government balance sheets being stretched and bank capital becoming constraint (Climate Bonds Initiative & UNEP Finance Inquiry, 2016), it becomes important for the public sector to tap into new sources of capital. This is where the option of having large-scale private capital from institutional investors becomes an attractive avenue of financing the LCR transition. In fact, the growing trend of the private sector (in both developing and developed countries) contributing to the LCR transition has become pivotal in the growth of climate finance markets like the green bond market (Climate Bonds Initiative & UNEP Finance Inquiry, 2016).

Private finance can not only provide a bigger source of capital for LCR transition, but also reduce the inefficiencies in investment that are sometimes created by a public sector actor. Inefficiencies in investment conditions in the public sector can often include over-investment in order to maintain or strengthen political support. In other cases, political processes can also lead to a misallocation of resources to particular regions or sectors at the expense of others that have potentially higher socio-economic returns (Kennedy & Corfee-Morlot, 2012). On the other hand, even private sector actors can bring different types of inefficiencies to the table – including the inability to coordinate projects across various sectors, investment in public goods, a lack of incentives to do so for a diverse range of stakeholders, inability to look beyond short-term profit

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<sup>1</sup> For a complete list of OECD countries, visit <http://www.oecd.org/about/membersandpartners/list-oecd-member-countries.htm> (OECD, 2014).

and the regulatory oversight to ensure that fiduciary duty is kept (Kennedy & Corfee-Morlot, 2012). Hence, a balanced and incentive-based approach is required from both set of actors to reduce such inefficiencies created in any transition.

This research aims to identify ways that public actors like regulators are currently using their institutional power to initiate greater private sector investment into financing the LCR transition using the green bond market. The green bond market is a debt-capital market that allows issuers, in public and private sectors, to borrow money from investors for a definite period of time and at variable interest rates for specific investments into green projects or assets (Climate Bonds Initiative, 2015). However, in order to do so effectively, certain public policy interventions and instruments are needed to encourage the market to grow at the scale it needs to in order for this transition to occur within the established timeframe of action (IPCC, 2018). Furthermore, these interventions and policy instruments need to be tailored to meet the needs of investors and issuers spanning various countries and this is where the challenge emerges for those that are either implementing the intervention or designing it.

Public sector actors can mobilize private finance through two broad categories: public finance interventions (through direct financial support) or through other public policy interventions (through a broad set of policy interventions) (Jachnik, Caruso, & Srivastava, 2015). In order to effectively get the private sector to do so, the government can use public policy interventions to create the necessary incentives for investment into such projects. However, these policy interventions can vary in scope and type and are broadly categorized into three categories: regulatory, fiscal and informational policies (Jachnik, Caruso & Srivastava, 2015, p. 27).

This study looks specifically at the regulatory policy interventions and analyzes the potential role that institutional pressure can have in delivering these interventions more effectively in the green bond market. For instance, by providing regulatory incentives for green bonds, public sector actors can direct private capital towards investment into these projects. This paper will showcase that LCR projects that are being funded through climate finance instruments like the green bonds, can increase market participation in this space by using optimal regulatory support.

In the context of emerging economies, there are incremental business and socio-economic opportunities that lie in the growth of the green bond market for public as well as private sectors. For public sector actors like regulators and governments, these opportunities include institutional capacity-building as well as sectoral financing for LCR infrastructure. For private sector actors like investors and issuers, this market provides a long-term investment opportunity and the access to a diverse investor mix for project finance.

However, there are two main challenges that are currently stunting the growth in the market. Firstly, there is no uniform regulator-backed definition as to what is “green” and this impacts how various stakeholders react to the market (Stadelmann, Michaelowa, & Roberts, 2013). Secondly, the lack of research on impact of investment and key regulatory instruments is further hampering government and investor involvement in this market (Stadelmann et al., 2013). This study will look to examine these two challenges from an emerging country perspective by comparing green bond markets in India and China. It will seek to do so by first focusing on key investment trends in either country’s green bond market. This will be followed

by analyzing how regulators are reacting to this market and understanding what is driving regulation growth in either country. It will then address the second challenge by contributing to the academic literature on this market through an institutional theory lens. In doing so, this paper will look at the relevance of the green bonds as a tool for catalyzing climate finance investment into the transition of either country's economy into becoming a low-carbon and climate resilient one.

The next chapter explains the background climate finance and how the green bond market plays a pivotal role in the LCR transition.

## Chapter 2. Background

This chapter focuses on providing a brief history of the geopolitics of climate change and highlights the rise of international climate finance as well as regulations as tools that can be used to address climate impacts.

### 2.1. The Geopolitics of Climate Change

A key focus of all international climate change negotiations has been the ability to ensure adequate financing for mitigation and adaptation work across various developing and developed countries. However, due to historical emissions debate on who is more responsible for anthropogenic climate change (Gomez-Echeverri, 2013) – financial tension exists between countries. This tension often brings up the debate on the common-but-differentiated-responsibility (CBDR) and financial capabilities (Gomez-Echeverri, 2013), that each country has to offer. Since not all countries are on the same spectrum of development, there is a tangible need to address who is more ‘responsible’ for contributing towards climate change.

For developing countries, the ‘right to emit’ or economically achieve the same level of standard of living as developed countries, has been a paramount topic in international negotiations. This demand becomes stronger when developed countries are unable to meet their promised financial contributions towards development aid or climate-related programs. For instance, in 2017, the Trump administration withdrew the United States from contributing the pledged USD \$3 billion towards the Green Climate Fund (GCF)<sup>2</sup>. The unexpected withdrawal left a \$2 billion gap in the already stretched fund (Pardo, 2017). Given that the US had been a major contributor to the GCF, the withdrawal also left several climate development projects in standstill and created a wider gap in climate finance (Pardo, 2017).

Such actions by developed countries can really impact vulnerable developing nations that are significantly dependent on this funding for their climate adaptation and mitigation. This lack of promised funding further spurs the development demand of the ‘right to emit’ and grow their economies through a carbon intensive or business-as-usual route. However, a business-as-usual approach results in a highly unsustainable growth for any country’s contribution to greenhouse gas (GHG) emissions. As pointed out by IPCC’s latest report, the current rate of warming the world is likely to reach 1.5 degrees of warming between 2030 and 2052 (IPCC, 2018). Although we have almost reached the 1-degree threshold, the world is already experiencing climate impacts like rise in extreme weather events, threats to water, food and human life as well as significant impact on economic growth and well-being (IPCC, 2018). Given that these impacts are becoming more evident every year, governments are recognizing that the pressure to transition to a low-carbon and climate resilient (LCR) economy is now a tangible need.

These impacts are even worse in developing and emerging countries, where population growth is rising, and more vulnerable communities are getting exposed to the adverse consequences of climate change (IPCC, 2018). Furthermore, with globalization in the picture,

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<sup>2</sup> GCF was originally set up in 2010 to raise funds from private and public actors in developed countries to finance climate projects in developing countries (Pardo, 2017).

nations are no longer a closed system and mass climate migrations threaten to occur all over the world unless each government can take action to curb its country's GHG emissions. However, one positive aspect of globalization is that it does allow for greater interactions with countries or other civil society actors, on transboundary issues like climate change (Gomez-Echeverri, 2013). Due to visible climate impacts, collaborative solutions are now being found in various sections of society, including those in the private sector. This is leading to new opportunities as well as creating cross-boundary alliances in actions related to climate change and its impacts (Gomez-Echeverri, 2013). One such opportunity has been in the evolution of climate finance, a market which finances climate adaptation and mitigation projects around the world.

## **2.2. International Climate Finance: Why Is It Important?**

With public funding already being stretched on existing projects, it has become imperative to explore other options such as private sector financing, in order to meet the targets of the Paris Agreement (Xu, Dong, & Wang, 2016). In efforts to fulfill the CBDR targets, each country has released a set of nationally determined contributions (NDCs), which allows them to set specific targets for greenhouse gas (GHG) reductions as well as prepare for climate adaptation (Xu et al., 2016). International climate finance looks to tap into the targets of these NDCs by financing the LCR projects that are required by these countries to adapt and mitigate climate change impacts.

According to the IPCC (2014), international climate finance can be perceived as the cross-border financial flows that are aimed to reduce net GHG emissions and/or to enhance climate change adaptation. These flows can include both public sector (bilateral official development aid, export credits and multilateral concessional and non-concessional flows) and private sector flows (carbon market finance, REDD+<sup>3</sup>, green bonds, foreign direct investment and others). Given that this market has grown out of international climate agreements among various countries, there is no clear definition for what constitutes and is tracked as, public and private climate finance (Buchner, Brown, & Corfee-Morlot, 2011).

The following inverted triangle (in Figure 1) summarizes the usual dimensions of climate finance – starting top-down with the origin of the finance, then focusing on more specific geographical flows, followed by the type of instrument used by the issuers (further categorized into the private and public types) and ending with the specific targeted recipient (Buchner et al., 2011). As we can see, usually the type of finance is quite broad in terms of its scope and activities – with public, private and PPPs being the source of this finance. However, by the time it reaches the targeted recipient, the finance flows are quite specific to the project or its targeted impact. The geographical areas can also reflect the purpose of the finance – for example, public sector North-South finances are usually classified as official development aid or concessional

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<sup>3</sup> REDD is an international framework through which developing countries are rewarded financially for any emissions reductions achieved associated with a decrease in the conversion of forests to alternate land uses (the REDD desk, 2018). REDD+ is the next version of this framework, which not only helps with climate change mitigation and biodiversity conservation, but also with poverty alleviation (the REDD desk, 2018) through various mechanisms.

loans. However, South-South finances or even private North-South finances can be looked upon as foreign direct investment. Domestic markets, on the other hand, can address export credits, capital markets or even climate change policies (Buchner et al., 2011).

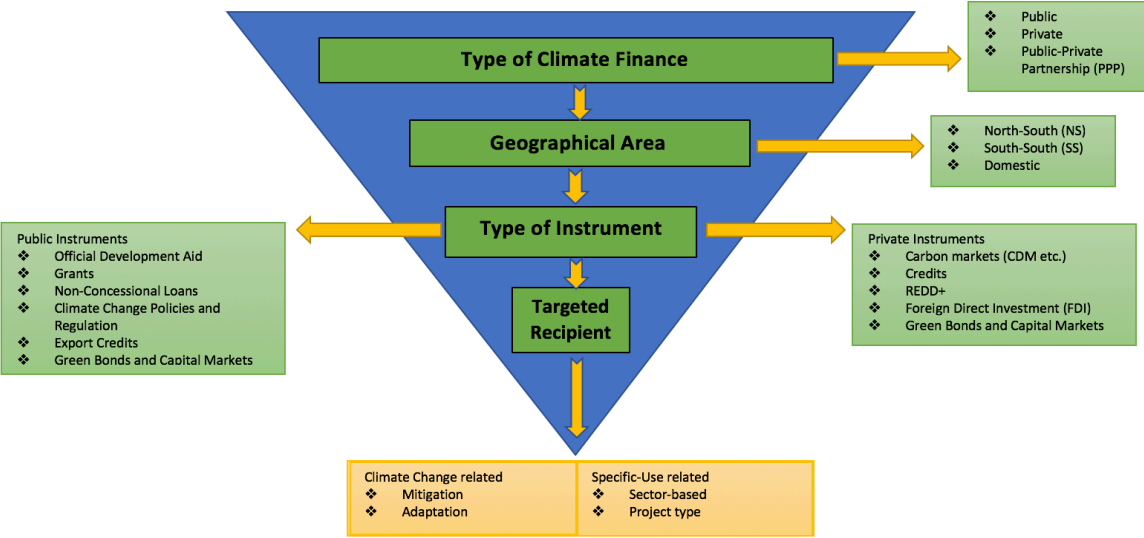


Figure 1: Various dimensions of climate finance flows (Source: Author’s adaptation of a figure from OECD Climate Change Expert Group Paper No. 2011(3)).

Private climate financial flows such as green bonds and carbon markets are still in their nascent stage. This brings about other challenges such as the gross vs. net flow of these finances, the lack of established systems for measuring, reporting and verification (MRV), confidentiality issues with sharing of financial information, double counting of flows and the lack of clarity between public and private climate finance (Stadelmann et al., 2013). However, the most significant challenge seems to be the lack of internationally agreed upon definition of what exactly constitutes climate finance (Bowen, Campiglio, & Herreras Martinez, 2017). Given that such a definition is the underlying foundation of the overall market, not having a standardized version is what makes it hard to track and document the exact growth or flow in this market. Although there is growing interest in creating a standardized definition, the market faces the challenge of lacking data that can accurately identify the various types of climate finance flows (Stadelmann et al., 2013).

It is important to track private flow of investments as it helps mobilize all the sectors of the economy in a way that does not draw extensively on public finance – thereby making it sustainable in the long run (Stadelmann et al., 2013). According to estimates made by the International Energy Agency (IEA), OECD and World Economic Forum (WEF), green sectors such as clean energy, building efficiency, green infrastructure, water and pollution treatment will require several trillion dollars in global investments in the coming decade (Yao & Zadek, 2017), with significant investment expected to come from the private sector. With the intention of filling the funding gap, the G20 committee chaired by China in 2016, proposed including green



finance<sup>4</sup> as a financial solution and secured consensus on jointly promoting the further development of such financial flows (Yao & Zadek, 2017) by both private and public actors.

### 2.3 Role of Regulation in Climate Finance

With increasing climate impacts, governments are now acting on and issuing regulatory controls on GHG and climate change. However, this regulatory action is something that concerns investors, as it impacts their investments in carbon-intensive sectors such as energy or manufacturing. That is why regulatory risk emerges as an important concern when addressing long term investments in relation to climate change (Richardson, 2009; Richardson, 2011; Richardson, 2013). Furthermore, with climate regulation in the picture, traditional industries such as oil and gas, manufacturing and transport are becoming competitively disadvantaged (Richardson, 2009). Due to this, returns on financial investments in these sectors keep getting affected. Having continually low returns is especially concerning for institutional investors such as pension funds and insurance companies (Richardson, 2009, p. 602) – many of whom are invested in conventional fossil fuel sectors (Weber & Hunt, 2018). Although from a low-carbon future perspective, recent studies show that institutional investors are exposed to notable financial risks from all sectors of the economy, and not just the traditional fossil fuel ones (Ritchie & Dowlatabadi, 2015). This systemic risk is due to the high carbon-intensive nature of our society and implies that it will take more than just divestment from fossil fuels sectors to transition to a low-carbon future (Ritchie & Dowlatabadi, 2015).

The first step in this transition involves taking this climate or ‘carbon bubble’ risk into account – especially when calculating investment performance (Weber & Hunt, 2018). In addition, it becomes a necessary step for institutional investors to being in line with their fiduciary duty (Hebb, 2016). Fiduciary duty of any institutional investor is to act in the best interest of their clients’ money and invest in projects that will balance the risks with the rewards (Richardson, 2009). For any long-term investor, this risk gets magnified as the impacts of climate change grow every year and their mitigation goes unaddressed in a country’s policies or in the economy. This is evident in how our mainstream financial markets still lack the ability to reduce or be resilient to systemic economy-wide risks from climate change (Bloomberg, Pavarina, Thimann, Pitkethly, & Sim, 2017).

Here is where the role of climate finance becomes especially important, as it provides investors the greener alternative to traditional investments. The increasing popularity of this type of finance is visible in the growth of markets like the green bond – which not only allow for portfolio diversification, but also encourage investors to use environmental, social and governance (ESG) considerations when investing. In order to highlight how impactful this market has been in increasing the overall climate finance flows, the next chapter provides a literature overview on the green bond market.

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<sup>4</sup> Green finance is the overarching umbrella under which climate finance exists (Lindenbarg, 2014). It can include projects that are broader in scale and have wider environmental impacts, than just climate-related mitigation or adaptation. Its main intention is to transform the economy towards a green one and not just address climate impacts.

## Chapter 3. Literature Review<sup>5</sup>

This chapter first provides a brief overview of the international green bond market and outlines the various challenges faced by stakeholders in scaling-up the market. It then delves into providing a background for China and India’s financial markets as well as highlighting important events and stakeholders in their respective green bond markets. Finally, the chapter ends by explaining the role of the regulator in scaling the green bond market as well as ensuring that it stays accountable to its stakeholders.

### 3.1. International Green Bond Market Overview

This sub-section will briefly discuss labelled green bonds, their issuance process, the various types of green bonds as well as the significant stakeholders involved in the market.

#### 3.1.1. “Labelled Green Bonds”

Similar to their regular counterparts, “labelled green bonds” are a debt finance instrument that are used to raise long-term capital from various investors to either finance new or refinance old assets and projects. However, the caveat is that their use-of-proceeds go specifically towards green projects or assets (International Capital Markets Association, 2018). Although they are comparably priced to traditional bonds, some studies show that green bonds might have a lower risk-return profiles due to their emphasis on environmental diligence (Allen, 2017). Furthermore, they can also increase overall capital flow by providing issuers access to finance at various stages of their project’s lifecycle (USAID, 2015). The majority of green bonds issued are green “use-of-proceeds” or asset-linked bonds (Climate Bonds Initiative, 2018d), and this refers to the detailed information for investors on how their investment will be put to use. Beyond the concept, however, the reality of what constitutes a green bond becomes rather fuzzy, as investors consider restrictions on the use of proceeds and lack a universal definition of what constitutes a “green project” (Nanji, Calder, & Kolodzie, 2014).

#### 3.1.2. The Green Bond Process

The process of how labelled green bonds get issued is outlined as follows:

##### Pre-Issuance

- Step1: Prior to the issuance of the green bond, the issuer discloses the “use of proceeds” categories or eligible project types that it will use. In other cases, the issuer can identify its existing green assets and projects in order to refinance them using a green bond. The issuer then establishes a formal (and many times public) framework to showcase how these “use of proceeds” will be tracked and monitored.

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<sup>5</sup> Parts of this chapter have been used in a forthcoming CIGI policy report on the green bond market, which was submitted in September 2018.

- Step 2: After this framework is established, an independent second opinion is usually provided by an environmental think-tank (such as CICERO<sup>6</sup>), investor-focused non-governmental organization (NGOs such as Climate Bonds Initiative), other private ESG rating companies (like Sustainalytics or Vigeo Eiris<sup>7</sup>) as well as a number of domestic rating companies in countries like China.

#### Issuance

- Step 3: The next step for the issuer is to issue the green bond.
- Step 4: Once the second opinions are made public and upon further discussions with the issuers, investors will assess whether the bond meets their ESG and responsible investment mandate (Nanji, Calder, & Kolodzie, 2014) and proceed to put an order for the bond.

#### Post-Issuance

- Step 5: In the post-issuance stage, the issuer starts to review the progress of projects (on an ongoing basis) that meets its outlined green bond framework. It will use third-party auditors and verifiers (like those mentioned above) to provide periodic reporting of these “use of proceeds” (Nanji, Calder, & Kolodzie, 2014) either annually, semi-annually or quarterly, depending on where the issuer is located and what regulations it falls under. The purpose of post-issuance reporting is for the benefit of the investor. However, due to a lack of standardization in the market, this reporting process can vary in its time frame and the amount of disclosure is dependent on the issuer.

### **3.1.3. Types of Green Bonds**

Based on an Institute for Climate Economics (2016) report, green bonds can fall into seven types of categories, which are quite similar to their ‘vanilla’ or traditional counterpart types (Shishlov, Morel, & Cochran, 2016):

- The first type of green bond is a corporate bond or a ‘use of proceeds’ bond that is backed by the corporate’s balance sheet.
- Bonds that are project bonds get backed earnings from a single or multiple project, and the proceeds of this bond can be disbursed through a special purpose vehicle (SPV)<sup>8</sup> (Bloomberg New Energy Finance, 2014).
- If multiple projects are grouped together and collateralized, this type of green bond is called asset-backed securities (ABS) and are usually used to fund projects

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<sup>6</sup> One of the world’s biggest provider of third-party reviews and verifications of a green bonds “use of proceeds” is CICERO, a Norwegian research institute on interdisciplinary climate research (Clapp, 2016).

<sup>7</sup> Both are research and rating agencies that evaluate an organization’s integration of environmental, social and governance (ESG) factors into their strategies, operations and management (Vigeo Eiris, 2018; Sustainalytics, 2018). Both have separate methodologies and criteria for evaluating these factors.

<sup>8</sup> A special purpose vehicle or entity (SPV/SPE) is usually a subsidiary of the issuer (public or private) that has a legal status which allows it to fulfill its obligations even if the parent issuer goes bankrupt (Bloomberg New Energy Finance, 2014).

like wind farms or energy efficiency assets like solar panels (Nanji, Calder & Kolodzie, 2014).

- On the other hand, covered bonds are issued by an issuer and backed by a pool of underlying assets that will cover the bond in case the issuer becomes insolvent (Shishlov et al., 2016).
- Smaller institutions usually use financial sector bonds to finance ‘on-balance sheet’ lending (Bloomberg New Energy Finance, 2014).
- Multilateral issuers like development banks or supranational agencies issue bonds called as supranational, sub-sovereign and agency (SSA) bonds, which are usually used to fund projects across a variety of countries and currencies (Shishlov et al., 2016).
- The last type of bond is that issued by regional governments, municipalities or cities and are called municipal bonds. These can be used to fund a wide range of regional projects, including infrastructure as well as various innovative initiatives (Bloomberg New Energy Finance, 2014).

### **3.1.4. Stakeholders in the Market**

Over the past few years, there has been exponential growth in this market and this is attracting interests from various sectors of global society. In order to understand the different types of interests in the green bond market, the following figure summarizes the various stakeholders and key players in the market. As seen in Figure 2, the primary stakeholders for this market include four main categories of issuers, investors, government and other non-governmental stakeholders (like industry associations, third-party verifiers and academia). Although all stakeholders influence the market, primary stakeholders like investors and issuers can be especially instrumental in determining the future direction of this market. This is due to the more direct and ‘on-the-ground’ role they play in growing the market. The next sub-section will further delve into their role and its market significance.

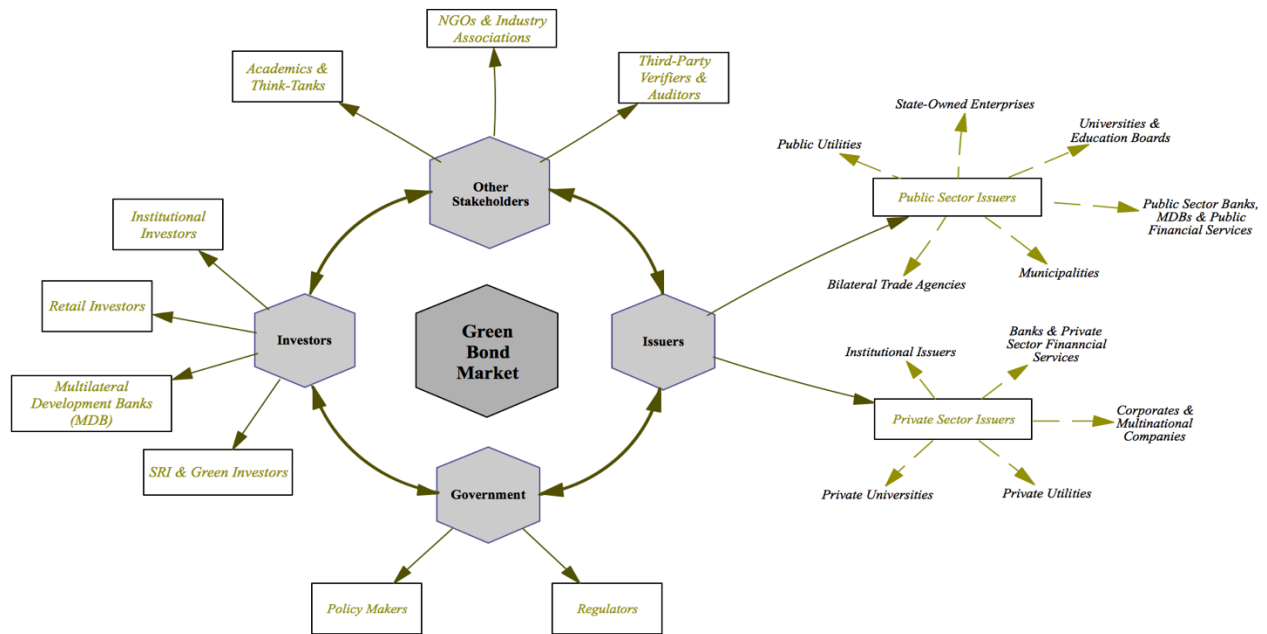


Figure 2: Stakeholder type and relationship map in the green bond market (Source: Author’s construction using VensimPLC software and based on primary and secondary data obtained from CBI’s database).

### 3.1.4.1. Issuer Significance in the Market

The first primary stakeholder in this market is the issuer and Table 1 briefly summarizes the various issuer types that exist in the market. It categorizes them based on whether they represent private or public interests. For example, institutional issuers can fall into either category of public or private, as this is dependent on whose pensions they are representing. A recent case of this was when the Canada Pension Plan Investment Board (CPPIB), issued its inaugural green bonds priced at USD \$1.15 billion in June 2018 (EY & Corporate Knights Inc., 2018). The CPPIB green bonds were the first of its kind in terms of issuance from a public pension fund in Canada (CPP Investment Board, 2018). Similarly, other issuers like universities, utilities, financial services firms and power producers can fall into either category.

Table 1: Various types of issuers of “labelled” green bonds (Source: Authors’ construction based on an analysis of the Climate Bonds Initiative’s green bond database).

Private Sector Issuers of Green Bonds	Public Sector Issuers of Green Bonds
Institutional Issuers (private pension funds, insurance companies etc.)	State-Owned or Public Sector Banks
Corporates or Multinational Companies	Municipalities and State-Owned Utilities
Commercial and Private Sector Banks	Bilateral Trade Agencies and Development Banks
Private Universities	State Universities and Education Boards
Private Utility Companies	Other State-Owned Enterprises
Private Sector Financial Services	Multilateral Development Banks (MDBs)
Private Power and Renewable Energy Producers	State-Owned Financial Services and certain Institutional Issuers (public pension funds etc.)

**3.1.4.1.1. Cost and Benefit for Issuers**

Issuers are in a unique position to determine the level of transparency in the market. They can do so by having greater verification and reporting on the use of proceeds and therefore leading to more positive accountability in the market. However, having such third-party verifiers and auditors comes with a monetary cost and this is not fully covered by the investors (Climate Bonds Initiative, 2017). Having such additional checks in place do tend to create tangible costs and this can be a hindrance for current issuers as well as potential issuers trying to enter the market. This system of frequent reporting on use-of-proceeds is also creates a business opportunity for green verifiers and auditors among the consultancy firms (such as EY, KPMG, Sustainalytics etc.) worldwide. However, it is important to note here that without an emphasis on reporting, the green bond market will resemble any other bond market and lose some of its unique appeal to investors.

Table 2: Benefits of green bonds for various issuer types (Source: Williams, Jones & Pickin, 2017, p. 9).

Benefits	Government	Development Banks	Commercial Banks	Corporates
Investor diversification			✓	✓
Investor engagement and longevity			✓	✓
High demand and oversubscription			✓	✓
Aligning internal sustainability and financial strategies	✓	✓	✓	✓
Reputational benefits (demonstration of commitment to environmental initiatives)	✓		✓	✓
Demonstrating the understanding of this innovative market		✓	✓	
Freed up balance sheet	✓	✓	✓	✓
Increased liquidity in the market	✓	✓		
Raised awareness levels with domestic and international investors	✓	✓		
Demonstration of the green bond concept	✓	✓	✓	
Alternative to raising finance internationally	✓			
A tool to manage macroeconomic and fiscal risks	✓			

However, in terms of benefits across all issuer types (see Table 2) this market includes alignment of sustainability and financial strategies and freeing up balance sheets for projects. In terms of specific issuer types, there are several other benefits as well (Williams, Jones & Pickin, 2017). For example, corporates and commercial banks can get investor diversification, stakeholder engagement, oversubscription and reputational benefits (Williams et al., 2017). For government and development banks, highlighted benefits include increasing liquidity in the market, raising awareness with domestic and international investors, policy signal to the market and a tool to manage some macroeconomic and fiscal risk (Williams et al., 2017).

### 3.1.4.2. Investor Significance in this Market

Given the long-term nature of investment into projects like infrastructure, it requires ‘patient capital’ (The Global Commission on the Economy and Climate, 2016) – one that can receive returns over a period of time, rather than just in the short term. Here is where long-term investors in the private sector – such as institutional investors – can play an important role in providing the necessary capital to build the LCR economy. Institutional investors include pension funds, insurance companies, hedge funds, mutual funds, sovereign wealth funds and endowments (Williams et al., 2017). They usually pool their capital to invest into tangible assets like securities, real-estate and more recently into infrastructure (Williams et al., 2017).

With public sector facing constraints on balance sheets, the ability to fulfill the current LCR infrastructure gap using private sector capital can be found in financial assets held by such institutional investors. However, their climate-related investment is currently very low due to a number of constraining factors such as low liquidity, uncertainty in policy environment for infrastructure, risk-return profiles of projects, shortage of quality data on transactions and low amounts of disclosure from the issuers (The Global Commission on the Economy and Climate, 2016, p. 55).

However, a good case for this market to capture the attention of institutional investors lies in their sizeable and growing assets, as visible in Table 3 below. Just OECD institutional investors have assets of an estimated US\$80 trillion as per 2015, and these will need to show consistent financial returns in the future (The Global Commission on the Economy and Climate, 2016). Furthermore, institutional investors like to invest infrastructure projects that already operational and have a stable cash-flow (The Global Commission on the Economy and Climate, 2016) – here is where having low-risk financial instruments like green bonds can be beneficial when financing or refinancing large capital projects.

Table 3: Overview of institutional investors’ assets under management as of 2015 (Source: The Global Commission on the Economy and Climate, 2016, p. 56)

<b>Institutional Investors</b>	<b>Assets under management (\$ trillion)</b>	<b>Current investment in infrastructure (\$ billion)</b>	<b>Current investment in emerging markets and developing countries</b>
<b>OECD institutional investors</b>	80	800	Approx. 10 percent
<b>Emerging market institutional investors</b>	5	25	High percentage
<b>Sovereign wealth funds</b>	4	80	Relatively high
<b>Other global institutional capital</b>	20	200	Low

Given the complexity of infrastructure projects and their reliability on stable local conditions, most institutional investors prefer familiar markets (The Global Commission on the



Economy and Climate, 2016). However, given that infrastructure growth and upcoming projects are more common across emerging and developing markets, here lies an opportunity for investors to diversify their investment based on geographical areas. Currently, an estimated 10 percent from OECD investors invest a very small percentage towards infrastructure in emerging and developing markets (The Global Commission on the Economy and Climate, 2016). Institutional investors, however, might start looking towards emerging markets as potential investment destinations, if certain investment conditions are met by issuers.

Furthermore, having any infrastructure investment be LCR becomes especially crucial with extreme weather events increasing around the globe. This means that future investment will need to keep in mind the impact that it has towards climate change and avoid the high carbon lock-in as well as the impact climate change might have on the investment (Climate Bonds Initiative, 2016). One way of looking at the climate change-investment challenge is by investing into relatively new asset classes (like LCR infrastructure) and spreading it over different geographical areas and projects. Such change in strategy is possible through the flexibility and geographical diversification that new and innovative financial tools can bring to the table (Saravade & Weber, forthcoming).

#### **3.1.4.2.1. Current Investors in the Market**

As the following Figure 3 highlights, current investors in the market can be mapped into various types based on their point of focus (local vs. international). Given that they come with different mandates, investors play a crucial role in defining the growth of domestic as well as international green bond market. For example, local investors such as retail or treasuries can reduce risks in the capital markets by allowing borrowers to borrow in the domestic currency (Williams et al., 2017). This can also encourage various new local issuers to enter the market as investor confidence in the market can be a key driver. On the other hand, international investors like sovereign wealth funds or development banks, are useful in encouraging other investors into emerging and developing market. They do so by providing credit enhancement at various risk levels, establish a governance framework and reinforce the commitment to climate change at the institutional level (Williams et al., 2017).

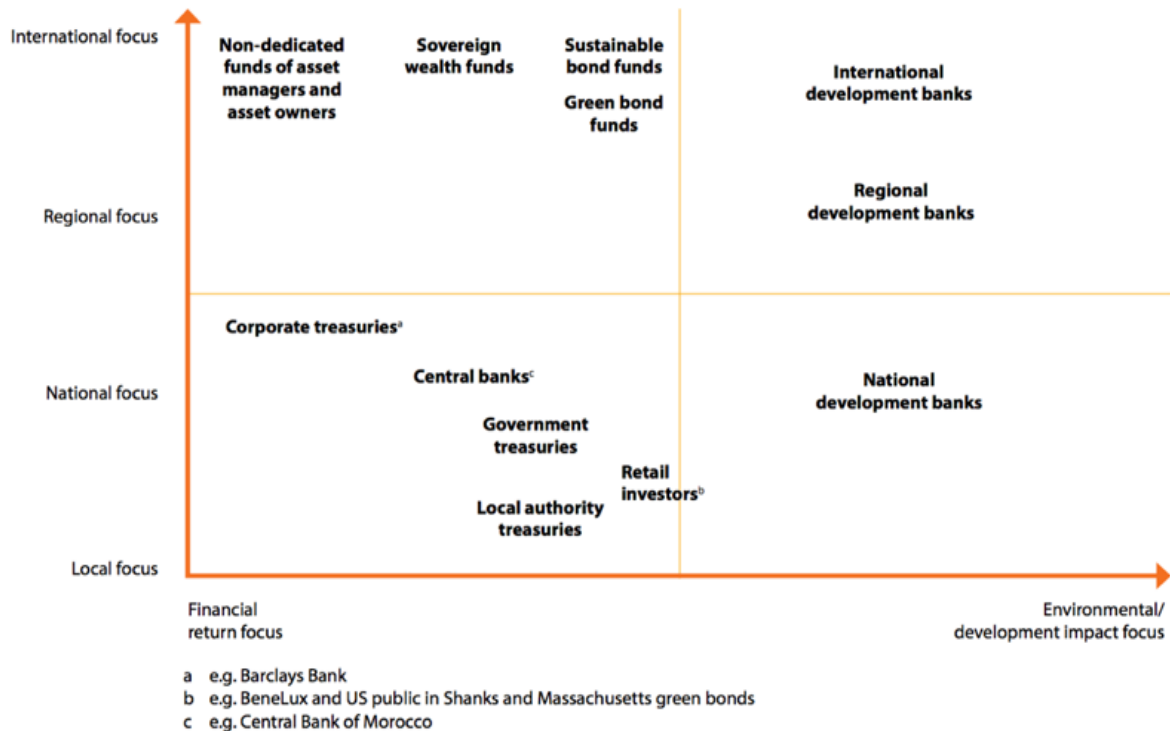


Figure 3: Different profiles of investors in the green bond market (Source: Williams et al., 2017, p. 6).

In the context of the international green bond market, having a uniform focus on what is defined as “green” and what reduces risks across projects and geographies, might allow for greater levels of investor participation and mainstreaming in this market.

### 3.1.5. Market Characteristics and Development

Since its inception, the green bond “use of proceeds” market has developed around the idea of flat pricing, where the bond price is same as a regular bond (Climate Bonds Initiative, 2018). Prices are said to be flat at issuance because the credit profile of a green bond is the same as any other regular bond from the same issuer. This means that there is no difference in pricing because investors are not willing to take lower than expected returns on the green bond issuance, thereby making green bonds equally attractive to investors as regular bonds (OECD & Bloomberg Philanthropies, 2015), but with a “bonus” moral return of investing in green projects. However, as mentioned earlier, this pari passu or equal pricing of green bonds with regular bonds can be a challenge for issuers, as they have to incur additional costs of certification and third-party reviews.

Other comparable characteristics of green bonds is their investment grades or ratings that are similar to regular bonds. These ratings indicate the level of risk for defaulting and is determined by bond rating firms like Standard and Poor’s among others. High quality bonds are usually given a ‘AAA’ or ‘AA’ rating. Medium credit quality is ‘A’ and ‘BBB’ and still considered investment grade (Standard and Poor’s, 2016). The lowest credit qualities are ‘BB’, ‘B’ or ‘CCC’ etc. and these are referred to as “junk bonds” (Standard and Poor’s, 2016).

Although this study does not explicitly refer to the bond ratings of any particular green bond, it seeks to educate the readers that higher investment grade bonds are much more valuable to investors than lower investment grade bonds. This means that established market players, like developed countries and multilateral development banks (MDBs), that have higher ratings and a well-known reputation in the regular bond market, will usually show oversubscription or greater investment demand for any of their bonds (Osterland, 2018).

Oversubscription in the regular bond market is common as fixed income investors always have the capital to invest. So far, oversubscription has been a consistent trend in the green bond market as well, and most green bonds are in high demand as investors are looking to diversify their portfolio. For example, when Xinjiang Goldwind Science & Technology (a Chinese wind energy firm based in Hong Kong) issued its first labelled green bond in 2015, it was oversubscribed almost five times. Consequently, their USD\$300 million green bond received orders of USD\$1.4 billion from investors, thereby showing massive demand and leading to oversubscription (Climate Bonds Initiative, 2015a).

Investor appetite or demand in the regular bond market are dependent on factors like size of bond, timing of issuance, tenor or time-to-maturity, credit quality, price and supply in the market (Climate Bonds Initiative, 2017). In the green bond market, these factors can vary, given that the market is still its formative stages and oversubscription might be driven by the tight supply. However, what differentiates the oversubscription in the green bond market as compared to the regular bond market, is that there is an added investor base of green investors or SRI-focused investors (Climate Bonds Initiative, 2017). Given this diverse investor base, the appeal of a green bond is broader than that of a regular or vanilla bond. Having a diverse investor base also offers more stability during volatile times (Climate Bonds Initiative, 2017) and therefore can contribute towards its popularity.

Another recent development in the market has been the evolution of specific green bond rating frameworks by various rating agencies. For example, S&P's green rating framework has two types of assessments of green projects being financed by green bonds. Their green evaluation framework is categorized either on a carbon or water hierarchy and is based on three components of governance, transparency and environmental impact (Wilkins, Petkov, de la Gorce & Williams, 2017). The standing of the green project (and in extension the green bond that is funding it) is determined by factors like significance of its environmental contribution, level of climate change mitigation and the location of these projects in conjunction with the local environmental stresses (Wilkins et al., 2017). For example, a water reuse project in New York would receive a higher net benefit score than in Chicago, because the level of water stress in New York is much higher than that in Chicago (Wilkins et al., 2017). However, a renewable energy project in New York is more likely to receive a lower net benefit than in Chicago due to their different carbon intensities of the electricity grids (Wilkins et al., 2017). Based on these frameworks, it is evident that a green bond's impact will vary based on the location of where its green projects are located and how this investment will improve the local environment or mitigate climate change impacts.

### **3.2. Significance of the Green Bond Market**

In 2018, bonds aligned with the climate change agenda were an estimated US\$895 billion, however, only \$221 billion were “labelled green bonds” (Climate Bonds Initiative, 2018a). Although this has been an increase by \$201 billion from the previous year, the market still needs to grow in order to fill the gap required to transition towards a global LCR economy. However, the green bond market looks promising as it has been growing exponentially every year and in 2017 alone surpassed \$155 billion (Climate Bonds Initiative, 2017). This is substantially more money than that flowing across borders as official development aid or even public sector financing for tackling climate change (Kato, Ellis, & Clapp, 2014, p. 32). Furthermore, as previously shown in Figure 1, capital market instruments like green bonds can be used by both public and private sectors to target financing towards either climate-related or green-related projects. This cross-sector aspect of the market has been important, as it has allowed greater public and private partnerships to flourish domestically as well as internationally.

Climate finance via green bonds has allowed countries to address environmental issues and climate change impacts by meeting their INDC targets (Climate Bonds Initiative & SBN Green Bond Working Group, 2018). It also opens up the domestic financial sector to greater foreign direct investment flows as well as diversifies risk given this market’s emphasis on frequent reporting. This universal appeal of the market is visible in the following map of top country issuances of the green bond market around the world. As we can see below in Figure 4, high issuances (greater than \$6.5 billion) stem from either developed countries or emerging economies based in North America, Europe and Asia. Furthermore, mid-range issuing countries (between \$1-6.5 billion) also consist of growing and advanced economies like Brazil, South Africa, Poland, United Kingdom, Belgium, Finland, Norway Italy, South Korea, Indonesia and Australia. This suggests that the green bond market growth is happening across all types of economies around the world.

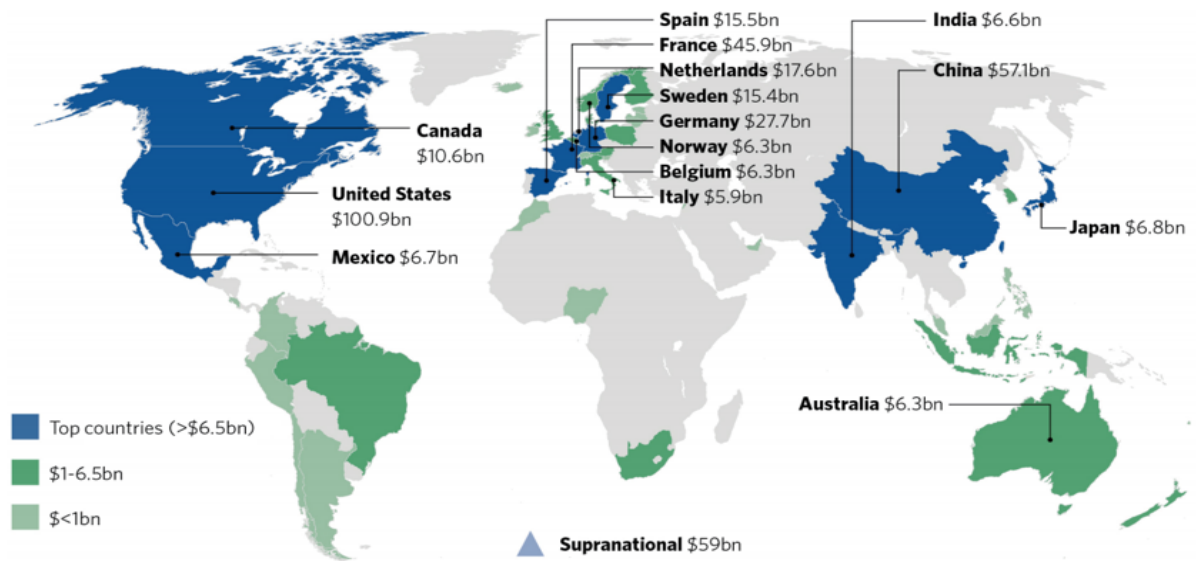


Figure 4: Various climate-aligned bond countries in 2018 (Source: Climate Bonds Initiative’s 2018 report).

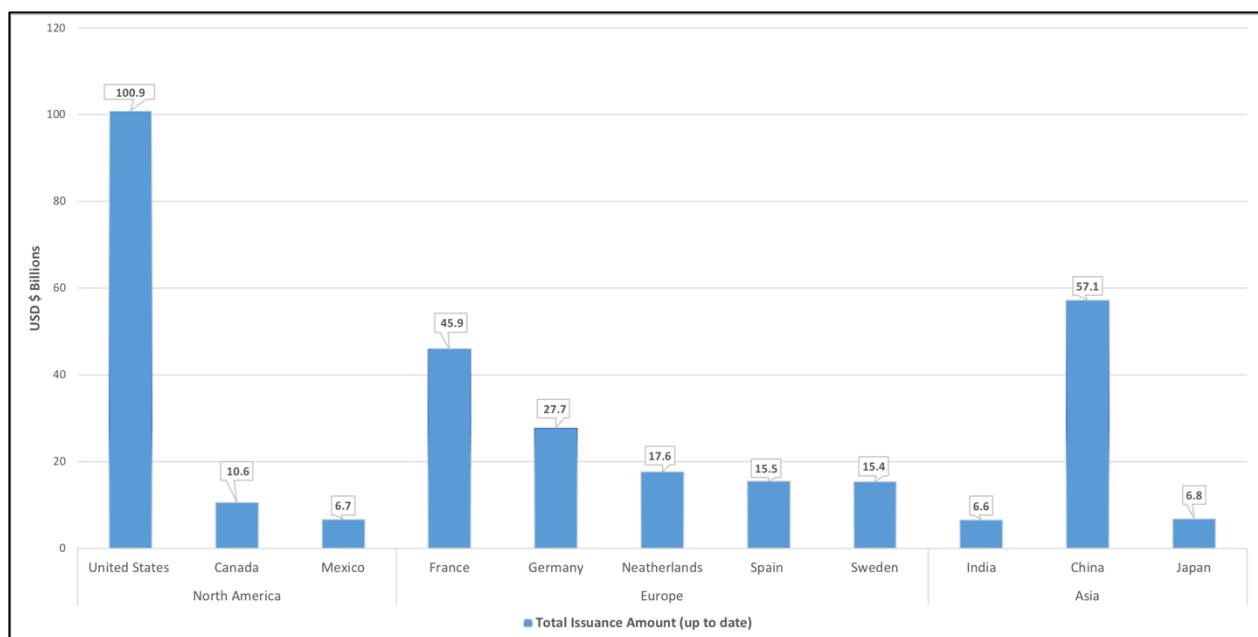


Figure 5: Top country green bond issuances up to date (Source: Author’s construction using Climate Bonds Initiative’s 2018 report).

As Figure 5 further highlights, in terms of top issuing countries in this market – China and the United States have been dominating up to date. In the United States’ case, the high issuances can be attributed to their booming municipal green bond market. However, as an emerging economy, China has been the absolute leader in terms of the number of green bonds issued across various sectors and issuer types. As we can see in Figure 5 there is demand for green bonds across 6 continents, with an increasing number happening in emerging market like Mexico, India and

China. As of the latest reports, total number of “green bond” countries are now at 47 (Climate Bonds Initiative, 2018a).

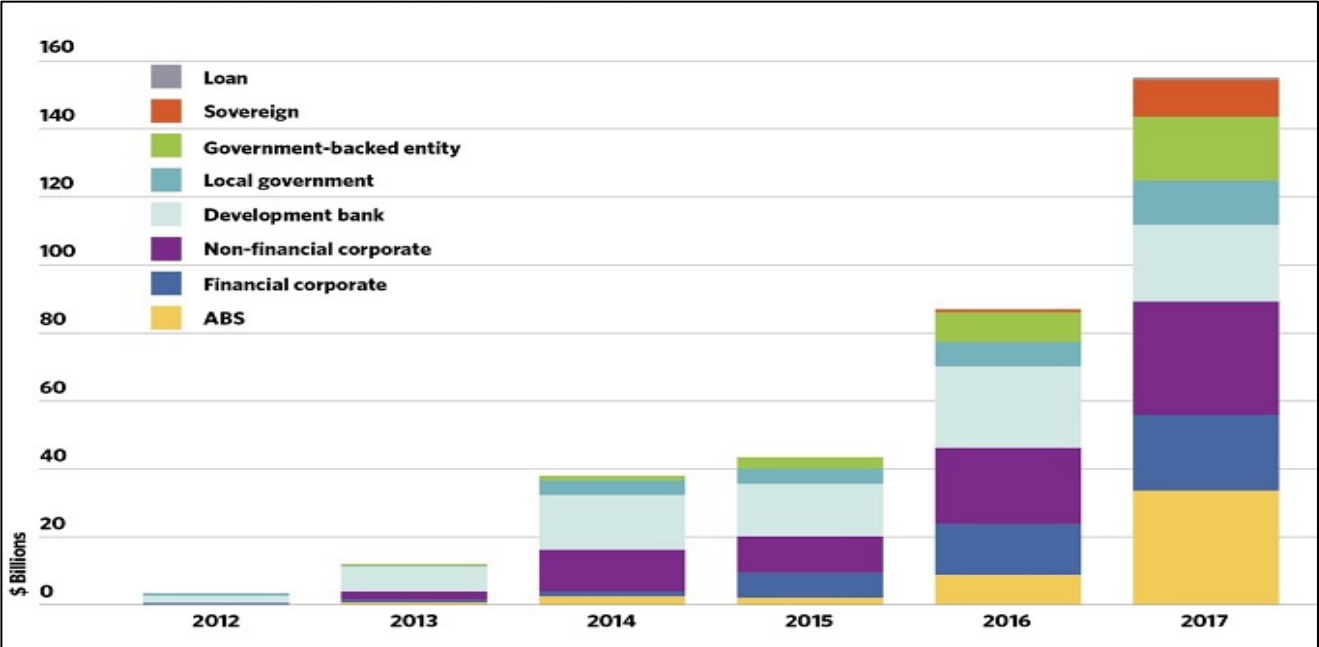


Figure 6: Share of issuance based on issuer types in the green bond market from 2012-2017 (Source: Climate Bonds Initiative, 2017).

It is not only the number of green bonds that are growing across countries, but also the types of issuers that are now participating in this market. The private sector has increasingly become active with regards to climate change and is looking for opportunities related to the LCR transition (Saravade & Weber, forthcoming). This trend is visible in the green bond market as well (see Figure 6) – where most private issuers entered the market in 2013 and have been growing in scale every year. Not only is the total amount of green bonds increasing, but the issuer types and investor mix is also increasing (Climate Bonds Initiative, 2018a) As seen in Figure 7, multilateral development finance institutions drove the market in the early stages of its inception. However, with entry of corporate and government-backed issuers, the market changed in 2013. Since then, issuers like non-financial corporates, local governments and sovereigns have also contributed to the market (Climate Bonds Initiative, 2018a). Given that most of this growth in recent years has been driven by private sector and sovereign-backed entities (Climate Bonds Initiative, 2018a), the market is now moving towards a mainstream one.

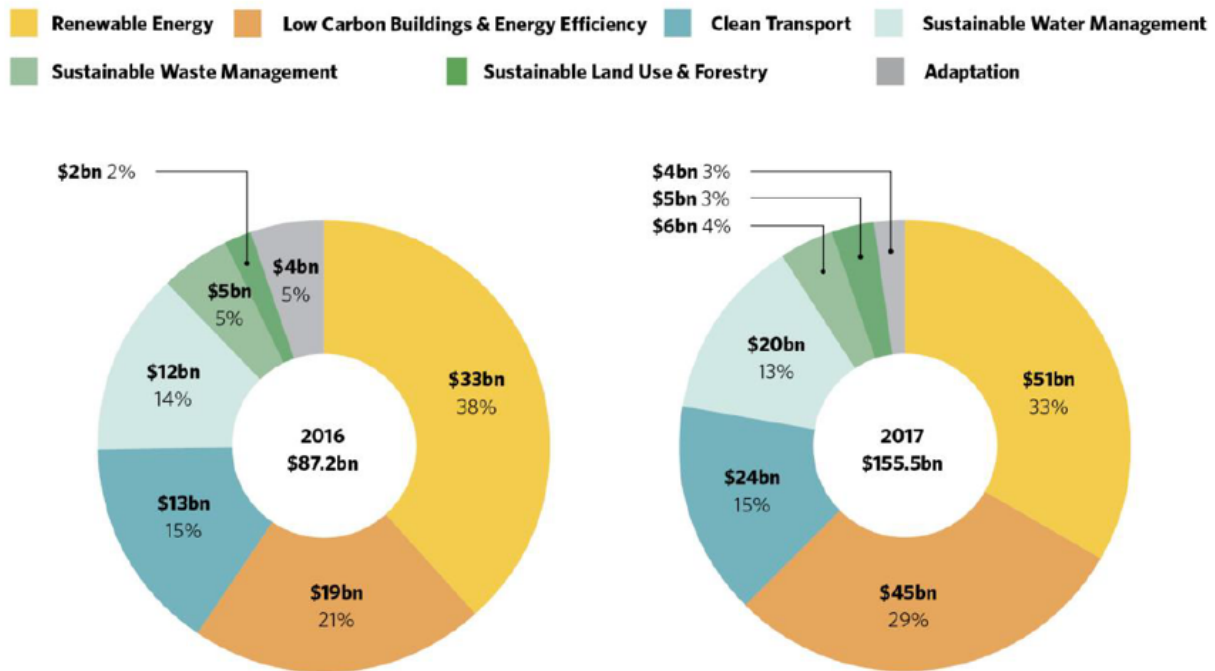


Figure 7: Green bond issuances based on sectors in 2016 and 2017 (Climate Bonds Initiative, 2018a).

In terms of sectors that are being addressed by this market, there seems to be a variety with many countries are tapping into the market for reaching their NDMC targets (Climate Bonds Initiative & SBN Green Bond Working Group, 2018; Climate Bonds Initiative, 2018a). As seen in Figure 8, renewable energy investment has been the most popular sector in the market throughout. However, now sectors like low-carbon building and energy efficiency have risen in popularity in recent years and are showing growth of almost 2.4 times higher (Climate Bonds Initiative, 2018a). Other sectors like transport have doubled in volume and this is due to issuances from a large number of public issuers like municipal transit and the automotive industry. More innovative sectors like waste, land-use and adaptation are also on the rise, however, the lack of clear standards, definitions and project experiences in these sectors is restricting their potential (Climate Bonds Initiative, 2018a).

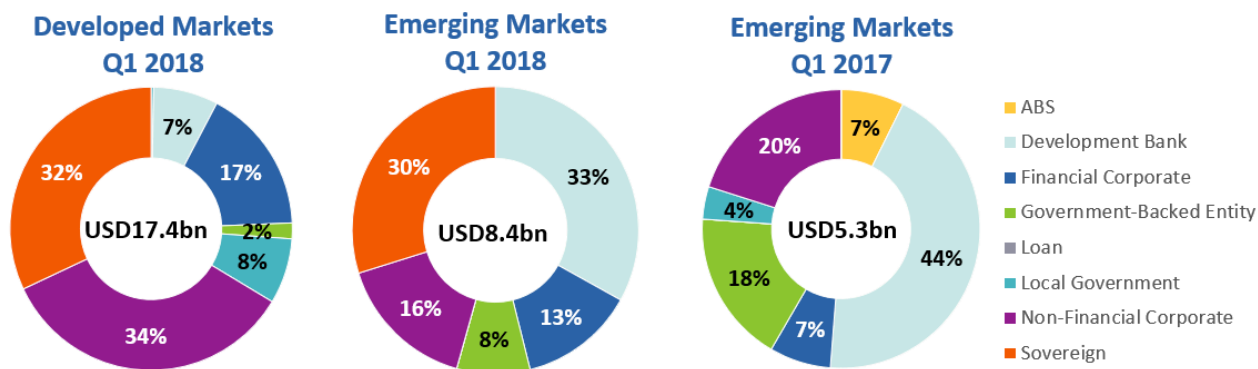


Figure 8: Green bond market summary for Q1 of 2017 and 2018, based on developed and emerging market share (Source: Green Bond Market Summary Q1 2018, Climate Bonds Initiative, 2018a).

The strong business case for green bonds is especially visible with issuances coming from the emerging markets. For example, as seen in Figure 8, in the first quarter (Q1) of 2017, global contribution of emerging markets was 15%, whereas in first quarter of 2018 this contribution doubled, and stood at 32% of global Q1 issuance (Climate Bonds Market, 2018a). Furthermore, development banks were the prominent issuers in emerging markets in both years, but there was also emergence of other issuer types in 2018. This was evident in the fact that more than a third of issuances in the first quarter of 2018 was from sovereign issuances in both emerging and developed markets (Climate Bonds Initiative, 2018a). Furthermore, two new sovereign issuers (Indonesia and Belgium) brought the total number of sovereign issuers to 6 in the first quarter of 2018 (Climate Bonds Initiative, 2018a).

Although this growth has been encouraging, there is an urgent need to green the regular bond market, especially given the increasing number of extreme weather events linked to climate change. As these extreme impacts grow, certain industries and sectors will be impacted the worst. For example, the insurance sector is less likely to take on clients or insure assets that do not meet climate change resilience standards (Scism & Friedman, 2017). This is one big sector where having green bond investments into LCR infrastructure will make a big difference.



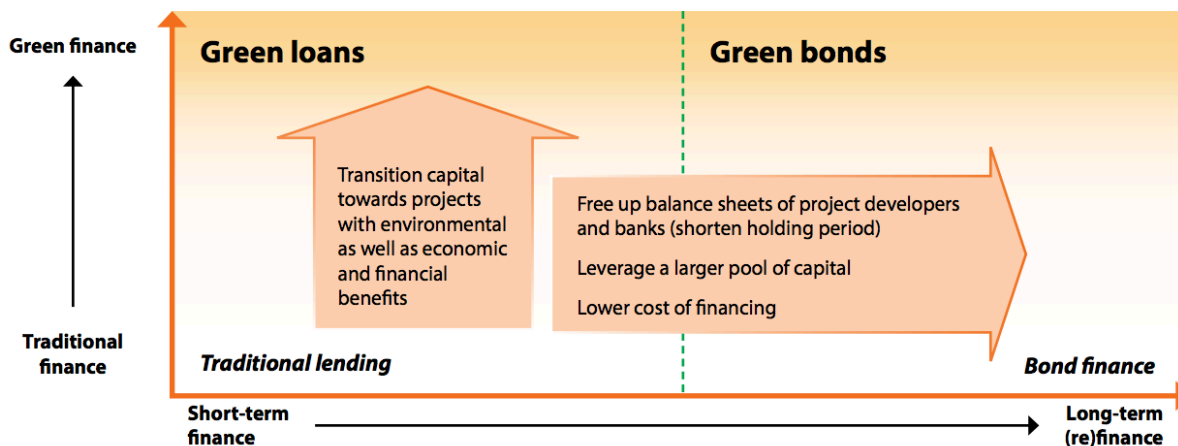


Figure 9: Role of green bonds in the overall financial system (Source: Williams et al., 2017, p. 3).

As seen in Figure 9, by encouraging green finance, the green bond market can provide various countries with the opportunity to diversify their financial system and hedge the risks associated with climate change impacts (Williams et al., 2017). For the issuers, it does so by not only freeing up balance sheets, but also leveraging a larger pool of capital and lowering the cost of financing (Williams et al., 2017). This can be particularly useful for issuers based in emerging and developing economies, that are looking to tap into financing for their large LCR infrastructure gaps. In terms of benefits for investors, green bonds provide long-term competitiveness on green assets, high bond market liquidity and lower ESG risks – making it an especially attractive investment option for institutional investors that are looking to fulfill their long term fiduciary duty (Ordonez, Uzsoki, & Dorji, 2015).

### 3.3. Challenges in the Market

#### 3.3.1. Greenwashing

As more issuers enter this market every year, the need for greater accountability and reducing fears of greenwashing has also increased. In order to tackle this issue, market indices from S&P Dow Jones, Bank of America Merrill Lynch, Barclays MSCI and Solactive have emerged as an important feature for issuers to benchmark their performance on the green bond market (Ehlers & Packer, 2017). By providing granularity and global coverage of green bonds, these indices help various investors locate which type of green bond they would like to invest into (Ehlers & Packer, 2017). They do so by allowing investors the ability to build green portfolios that can accommodate financial and geographical preferences in investment. Showcasing such green bonds is especially useful for those niche or SRI investors that are specifically looking for such green fixed-income investments (HSBC, BNP Paribas & ICMA, 2017). Given the emphasis of stakeholder needs and risk mitigation, green bonds can preemptively incorporate ESG criteria into their project selection.

Having green bond indices also serves as a type of check and balance on the market and are reflective of how the broader market reacts to the reputation of the green bond issuer (HSBC,

BNP Paribas & ICMA, 2017). This was seen in the case of a Spanish oil and gas company called Repsol, which issued a EUR 500 million self-labelled green bond in May 2017, to finance and refinance energy efficiency in their chemical and refinery facilities in Spain and Portugal (Climate Bonds Initiative, 2017a). However, this bond's self-labelled green tag sparked controversy as it was excluded by major green bond indices (Climate Bonds Initiative, 2017a). This exclusion was done to reflect the market opinion that improving efficiency of fossil fuel plants is not the primary motive of a green bond – rather it meant going further and helping similar brown issuers transition towards a low-carbon balance sheet by investing more into renewables (Environmental Finance, 2017).

This 'brown to green' model can be seen in the case of India's biggest power utility, NTPC Ltd, when it issued INR 20 billion green "Masala" bond in August 2016, but yet got its certification from the Climate Bonds Initiative (Climate Bonds Initiative, 2016a). This certification was warranted due to the fossil fuel company harnessing the existing strength of its 'brown' balance sheet to fund expansion of clean energy generation. Similar instances of other 'brown to green' issuers have been seen to gather greater market support than just purely brown issuers that are looking to improve energy efficiency through baseline changes (Environmental Finance, 2017). Such has been the evolution of what constitutes a green bond, and this has provided some level of consensus among various investors around the world.

### **3.3.2. Other Types of Risks**

When it comes to investment in emerging and developing markets, the investment guarantee and stable policy regulation conditions required by investors in developed markets, sometimes do not exist (World Bank Group, 2018). According to several bilateral trade agencies and other investment-focused organizations based in developed markets, similar risk is created for private sector investments that are not constrained within developed markets (Henisz & Zelner, 2010). For example, a Canadian institutional investor might find it risky to invest into a wastewater treatment project happening even in an emerging economy like India. This might be due to a number of reasons such as lack of enabling policy conditions, regional social turmoil (BBC News, 2016) or political and regulatory instability (Henisz & Zelner, 2010). This is an issue that comes up not only in the green bond market, but also in the overall financial market stability of that country. For example, India's banking sector faced almost \$2.5 billion losses in 2018 due to bank frauds and scams, leading to widespread public outrage (Anand, 2018). Although bad loans occur in almost every country, the perceived levels of lack of accountability and fluctuating levels of stability are bound to have an impact on the levels of foreign direct investment (Henisz & Zelner, 2010).

There is also a high level of currency risk in emerging markets and this can impact financial investment flowing in from developed markets. Currency exchange rate fluctuations make returns volatile and can potentially undermine the profitability of an investment (UNEP & Partners, 2009). Furthermore, a lack of collaboration in the policy making process at the national and international levels can prove to be a hindrance for new issuers that are looking to issue green bonds internationally or investors that are looking to invest in different countries.

In order to address such types of risks, the literature outlined four criteria required for private investment to flow into climate finance markets (Jachnik, Caruso & Srivastava, 2015). These criteria highlighted that in order to be sustainable over the long-run, any private financial instrument should; 1) accurately reflect the available practical incentives, 2) leverage the use of public interventions to scale up, 3) have the potential for standardization and 4) should be practicable in its use of data and expertise available, especially in terms of time and cost-effectiveness (Jachnik, Caruso & Srivastava, 2015).

The green bond market fits these criteria by providing financial stability by investing in projects (like infrastructure) that are not sensitive to economic cycles. Given that they not only lower financial risk but also address long-term stability, they are popular among most investors. This popularity is visible in the high levels of oversubscription present across various issuances in the market. However, there is a lack of green bond project pool among issuers and this can be a hurdle when the market requires more issuers or a greater number of issuances to meet the significant demand that exists (Climate Bonds Initiative, 2016). Although this market is able to leverage public support through various public-private partnerships (PPPs)<sup>9</sup>, sometimes it can be a challenge when new private sector issuers are trying to find projects that qualify for their green bonds. In order to address this challenge, there is a need for greater government intervention, especially if they can mandate potential issuers in having green asset pools or green project pipelines and increasing collaboration between market stakeholders through PPPs (Climate Bonds Initiative, 2018a).

### **3.3.3. Lack of Standardization**

When different countries get involved, the harmonization a green definition and what it means for the international green bond market, becomes especially complex. For example, China's definition of green may include "clean coal", whereas this would be unacceptable by a number of purely green or SRI investors in developed countries (Lee, 2017). The lack of a universal definition of green has further raised investor concerns around the risk of 'greenwashing', where bond proceeds get allocated to assets that have little or doubtful environmental value and this shakes market confidence (Climate Bonds Initiative, 2017). This was visible to an extent in the Repsol case, however, the market corrected itself and over the past few years it has encouraged the establishment of green bond standards to tackle this issue (Flood, 2017).

In terms of efforts towards standardization, the first type of standardization in the market was through the Climate Bonds Standard and Certification Scheme (latest version being V2.1), which also includes a taxonomy of the various eligible investment areas in green sectors

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<sup>9</sup> For example, in 2014, Tandem Health Partners, a PPP made up of equity sponsors and construction contractors, which was selected by the Province of British Columbia in Canada to deliver their first green bond to finance a Canadian infrastructure project (Ordonez, Uzsoki & Dorji, 2015). The issue size was CAD\$231.5 million and was in heavy demand by investors ranging from insurance companies to fund managers (Ordonez, Uzsoki & Dorji, 2015). This bond aimed at funding the designing, building and maintenance of two "green" hospitals based in North Island, British Columbia, that had LEED gold certifications which included strict energy and greenhouse gas targets (Ordonez, Uzsoki & Dorji, 2015).

(Climate Bonds Initiative, 2018b). There are other regional standards in place as well – the first one being the ASEAN Green Bonds Standard, which was put out by the ASEAN Capital Markets Forum in November 2017 (Arshad, 2018). On the international front, the International Standards Organization (ISO) is working with its various member countries to come out with a green bond standard (Gould, 2018). Furthermore, in terms of harmonizing various green definitions internationally, the European Union is working on green taxonomies through its high-level expert group on sustainable finance (HLEG) (European Commission, 2018).

However, there is a tangible need for improvement in policy support from various country regulators and governments. Furthermore, it would be fitting if an international dialogue on a green bond standard could be had on an international platform like the United Nations (UN) or International Standards Organization (ISO), especially since stakeholders from various developing and developed countries can be brought to the table. Finally, the issuer disclosures on the use of proceeds and the growing trend of impact reporting is what differentiates this market from others (Climate Bonds Initiative, 2018a). However, there is a need to make this process more efficient and in-built among various issuers, which is possible either through standardization or intervention from regulators. By doing so, the practicality of this financial instrument and its market would be sustainable over the long-term.

### **3.4. The Emerging Role of Green Finance in China**

In order to transition towards a green economy, it is estimated that emerging economies like China, will need a minimum CNY 2-4 trillion (equivalent to USD \$316-630 billion) each year in green investments from 2015-2020, with approximately 85% coming from private sector capital (Climate Bonds Initiative, 2017). The Chinese government has advocated for the need to scale up investments through a policy and regulation-driven approach in order to build up this market on both international and domestic fronts (Kidney, Oliver & Sonerud, 2014; Dai, Kidney & Sonerud, 2016). However, China's work on climate and green finance began long back in 2007, with the issue of the green credit guidelines (Weber, 2017; Weber, 2016).

This work on the LCR economy was further strengthened with key regulations such as the Guidelines for Establishing the Green Financial System released in August 2016 (Climate Bonds Initiative, 2017). These Guidelines outlined the definition of green finance, incentives, disclosure requirements, development plan for green financial products and risk mitigation strategies for China (Yao & Zadek, 2017, p. 13). Furthermore, due to the key regulatory players involved in creating the guidelines – including the People's Bank of China (PBoC), Ministry of Finance and five other ministerial agencies – there was some mainstreaming of the green finance market into China's policy and regulatory framework (Ordonez, Uzsoki, & Dorji, 2015). Given the emphasis on a top-down policy approach and proactive market actions, China has been recognized as a leader in many green finance initiatives, and especially in the growth of the green bond market (Yao & Zadek, 2017).

The growth of the Chinese green bond market has been successful in not only driving domestic climate finance investments, but also in leading the global green bond market. The local green bond market is being driven by the need for investments into new developments and infrastructure projects (Kidney & Oliver, 2014). In order to finance such large-scale

infrastructure, green bonds are being issued to provide the long-term capital necessary for climate resilient project finance. However, given China's late entry into the global market, it is interesting to note the leading position it currently holds. The issuance of green bonds began in China only in 2015, with the Agricultural Bank of China issuing a green bond in the London market (Climate Bonds Initiative, 2016b). Following this, in December 2015, the PBoC published regulations for green bonds in the China interbank market (China's largest bond market), which were followed by another set of guidelines by the National Development and Reform Commission (NDRC) outlining eligible projects in the state-owned enterprise sector (Climate Bonds Initiative, 2016b).

Although both the PBoC and NDRC issued detailed guidelines on eligible projects, the criteria used to select these categories were different. The NDRC Guidance identified 12 categories and allowed 50% of proceeds to be directed to repaying bank loans and investing in working capital (Climate Bonds Initiative, 2016b, p. 7). On the other hand, the PBoC Catalogue outlined 6 broad categories and was more closely aligned to the international best practice of directing 95% of proceeds to green projects (Climate Bonds Initiative, 2016b, p. 7). It is important to note that for a green bond to be issued on the domestic market, it must be approved by the relevant regulatory authority such as PBoC, NDRC or the China Securities Regulatory Commission (CSRC). This approval is subject to the bond meeting the guidelines and this lack of harmonization amongst different regulators can serve as a limitation in the market (Climate Bonds Initiative, 2017; Kidney & Oliver, 2014).

However, given that the PBoC Catalogue is broader in nature and similar to international best practices, it has been the one used more predominantly by the big Chinese issuers that are looking at the international markets as well (Climate Bonds Initiative, 2017). This is partly due to the fact that the PBoC Catalogue was China's first guidance document and provides details on how to select projects at a sub-sector level as well the eligibility criteria within the 6 broad categories (Climate Bonds Initiative, 2016b). The central bank regulator's key role is further reflected in the country's two stock exchanges both using the PBoC Catalogue as a reference when determining the scope of green projects (Climate Bonds Initiative, 2016b).

Both these regulations provide various issuers with incentives to develop the green bond market in China and this is evident in its rapid growth over the past three years. Since its establishment the market has grown rapidly, with 82% of its issuers consisting of large commercial banks such as Shanghai Pudong Development Bank, Industrial Bank and Bank of Communications (Climate Bonds Initiative, 2016b). This exponential growth came after PBoC's Catalogue release in December 2015, which also outlined the process of how a financial institution or bank can issue a green bond. This PBoC guideline requires reporting from a green bond be done on a quarterly basis and that the issuer disclose details on the use of proceeds in their annual report, which are then further reported to the PBoC (Climate Bonds Initiative, 2016b).

Additionally, various other regulatory authorities and stock exchanges have also played a crucial role in developing the Chinese green bond market. For example, Shanghai Stock Exchange and Shenzhen Stock Exchange publishing the Notice on Green Bond Pilot Program in April 2016, which indicates that green bonds can be listed on these stock exchanges in addition

to the interbank bond market (Climate Bonds Initiative, 2016b). More recently in 2017, the China Securities Regulatory Commission (CSRC), which is in charge of regulating listed companies, followed the lead of other regulators and issued its own green bond guidelines for listed companies (Climate Bonds Initiative, 2017b). According to the Climate Bonds Initiative (2018a), growth in 2017 was due to a number of policy developments, momentum at the local level and diversification of issuer types and use of proceeds. Given the robust participation of issuers in the ensuing years, it signalled the potential impact that regulations or institutional incentives might have had on the growth in this market.

To summarize the various regulatory policies in the Chinese green bond market, the following Table 4 highlights the name of relevant policies and their oversight agencies.

Table 4: Summary of green bond policies and guidelines in terms of their subsequent regulators in China (Source: Author’s construction using Climate Bonds Initiative and Syn Tao Green Finance report, (Guo, Liu, Wu, Kidney, Dai, Zhang, Liu & An, 2017)).

<b>Types of Green Bonds</b>	<b>Green Financial Bonds, Sovereign Bonds, Municipal Bonds, Asset-Backed Securities, Non-Financial Corporates</b>	<b>Green Debt Financing Instrument (mainly Non-Financial Corporates)</b>	<b>Green Corporate Bond, Corporate Asset-Backed Securities</b>	<b>Green Enterprise Bond</b>
<b>Regulating Agencies</b>	Ministry of Finance, PBoC, CBRC	PBoC, NAFMII	CSRC, Shanghai and Shenzhen Securities Exchanges	NDRC
<b>Policy Document</b>	PBoC Announcement No. 39 (December 22 <sup>nd</sup> , 2015)	NAFMII guideline for non-financial enterprise green (March 22 <sup>nd</sup> , 2017)	Guidelines to Support Green Corporate Bond Issuances (March 2 <sup>nd</sup> , 2017) & Notice on Green Bond Pilot Program (April 2016)	NDRC No. 3504 December 31 <sup>st</sup> , 2015)
<b>Classification of Use of Proceeds</b>	GB Catalogue	GB Catalogue	GB Catalogue	NDRC Catalogue (with 12 types)
<b>Reporting Requirements</b>	Quarterly reporting	Half yearly reporting	Annual reporting	Unspecified

### 3.5. Climate Finance and the Indian Green Bond Market

Similar to China's emphasis on the green economy in relation to climate change, India faces the need to focus finance on climate change adaptation and mitigation. Apart from its NDMC, there is a tangible need for India to provide its 1.35 billion citizens with basic infrastructure such as durable roads, shelter, access to electricity and public transportation among many other services (UNEP FI & FICCI, 2016). In order to achieve some of its targets, India is planning to reset its renewable energy capacity targets from 175 GW (NDRC Interim Report, 2016) to 223 GW by 2022 (Hill, 2018), so as to ensure greater energy security. However, even this level of target requires high capital investments, with estimates ranging greater than USD \$100 billion every year (USAID, 2015). Given that this is no small investment in just one sector, the projections for either building from scratch or updating other infrastructure creates a massive gap in funding – one that cannot solely be fulfilled by public financing (Agarwal & Singh, 2017). Therefore, the need for private sector participation has become crucial in filling the funding gap that currently exists across key sectors such as infrastructure or energy.

Currently, the prevalent method to financing some of these projects is through the Scheduled Commercial Banks (SCB) lending, sponsored financing from Non-Banking Finance Companies (NBFCs), multi-lateral and bi-lateral lines of credit to financial institutions (FIs) and domestic bond issuance (UNEP FI & FICCI, India Inquiry Report, 2016). However, even these are inadequate to meet the financing requirements for capacity addition, like those mentioned in the renewable energy sector. Additionally, these organizations face constraints with providing long-term funding for infrastructure projects, given their asset-liability mismatch<sup>10</sup>, the higher cost of borrowing in India<sup>11</sup> as well as the internally set limits of investment in each sector<sup>12</sup> (USAID, 2015). Such constraints showcase a need to introduce new means of financing and financial tools that can leverage a more diverse investor base, such as those offered by institutional investors like pension funds, insurance companies and sovereign wealth funds (managing an estimated USD \$80 trillion) (USAID, 2015, p. 5).

Currently, India's domestic debt markets do not allow for the flexibility or provide the level of funds required from capital markets, so as to meet such rising demands. This is a key limitation as demand for infrastructure creation or upgrade is continually rising and there is a need for innovative instruments that allow financial institutions the access to capital at suitable interest rates and tap into a wider investor base (USAID, 2015). In this regard, green bonds are unlocking capital flows from private sector to support projects with the purpose of making them

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<sup>10</sup> Asset-liability mismatch can occur in situation where the bank or financial institution has substantially long-term assets (like project financing loans), but short-term liabilities such as deposits. Especially in India, the problem of asset-liability mismatch is acute (UNEP FI & FICCI, 2016). Estimates made in 2009-2010 showcase nearly 79 percent of bank deposits having an average maturity of less than three years, whereas some infrastructure projects, including renewable energy infrastructure, have require an average of ten years in financing (USAID, 2015).

<sup>11</sup> In India, interest rates are high (7.21%) as compared to European (0.93%) US (1.84%) or Canadian markets (1.25%) (OECD, 2016), and this makes debt an unattractive venture. This is further exacerbated due to the lack of fixed interest rates (due to short-term lending and asset-liability mismatch) and the near absence of bond markets in India. These factors raise costs of new and unestablished sectors like renewable energy by almost 24-32 percent, as compared to the rates offered by North American or European institutions (USAID, 2015).

<sup>12</sup> SCB have an internal sectorial limit that helps with reducing risk by limiting exposure to any one market, sector, or technology (USAID, 2015, p. 6).

resilient to climate change impacts. The green bond market has allowed various Indian financial institutions or issuers of green bonds with the opportunity to raise capital for project finance (Climate Bonds Initiative, State of the Market, 2016). The benefits for Indian issuers associated with this market is the ability to overcome challenges related to sector limits and managing asset-liability mismatch by allowing FIs an exit option before the maturity of the project (USAID, 2015). Furthermore, green bonds are comparably priced to traditional bonds, have lower risk-return profiles given their due environmental diligence (Allen, 2017), they increase overall capital flow as well as access to finance at various stages of the project lifecycle (USAID, 2015).

On the investor side, divestment from fossil fuels using the green bond market can provide an opportunity to diversify investment portfolios and hedge the risks associated with climate change (Weber & Hunt, 2017). By providing long-term competitiveness on green assets, high bond market liquidity and lower risks, green bonds are an attractive option for those institutional investors that are looking to fulfill their fiduciary duty (Ordonez, Uzsoki & Dorji, 2015.). In terms of the benefits for the state, green bonds have provided Indian governmental agencies like the Indian Railways or NTPC Ltd. (India's largest power utility) the opportunity to not only raise capital for public infrastructure, but also fulfill the GHG reduction targets set under India's NDMCs and the National Action Plan on Climate Change (USAID, 2015; Climate Bonds Initiative, State of the Market, 2017).

Reflecting the growing interest in the green bond market, India stood as the 8<sup>th</sup> highest issuer of green bonds in 2017 (Climate Bonds Initiative, 2017). With USD \$3.2 billion issued as of April 2017, Indian issuers were also leaders in having the most labelled green bonds receive a review or certification from an external reviewer (Climate Bonds Initiative, State of the Market, 2017). For the Indian issuers, certifications ensure international investor confidence in the green credentials of the Indian green bond, as most of these bonds have been traded on the international markets. This signal has been especially important as there is interest to leverage the growth in the green bond market by various types of issuers. For example, although issuers like NTPC Ltd. have predominant assets in fossil fuels, they issued a green bond in order to raise green finance to support renewable energy projects and associated infrastructure (Climate Bonds Initiative, State of the Market, 2017).

Furthermore, in 2016, when the market grew with new issuers including the Indian Renewable Energy Development Agency (IREDA) private energy companies and commercial banks (Climate Bonds Initiative, 2016), it was strongly supported by domestic investors in India. These investors include ICICI Prudential Asset Management and Reliance Capital Trustee Co. Ltd and happen to be in the top ten global investors with the largest green bond holdings (Climate Bonds Initiative, 2016). Out of the 14 green bonds issued by Indian issuers in total, 6 were listed internationally in Singapore, London and Berlin. This international exposure of bonds highlights that Indian issuers have been looking to tap into deeper pools of capital, such as those held by the institutional investors (Climate Bonds Initiative, 2016). In comparison to the Chinese green bond market, there is a greater focus on the international exposure of the green bonds in the Indian market.

The regulator most publicly-associated with India's green bond market is the Securities and Exchange Board of India (SEBI). Established in 1992, SEBI's job as a securities market



regulator is “to protect the interests of investors in securities and to promote the development of, and to regulate the securities market and for matters connected therewith or incidental thereto” (SEBI, 2018). In the context of the green bond market, this means that any green bond issued by a publicly-listed organization has to follow the norms set out by SEBI. In order to further support the growth of the Indian green bond market, SEBI published green bond requirements for Indian issuers in the form of disclosure norms (SEBI, 2017). Released in May 2017, these disclosure norms cover green debt securities (such as green bonds) falling under categories such as renewable energy, clean or sustainable transportation, sustainable water management, energy efficiency, waste management, biodiversity conservation, sustainable land use and climate change adaptation (SEBI, 2017, p. 1).

The other market regulator that might potentially be associated with the green bond market in India is the Reserve Bank of India (RBI) or India’s central bank. Given that the workings of all banks are regulated by the central bank, RBI has to be kept informed by the Indian banks that are issuing green bonds. Furthermore, RBI also sets the priority-sector lending (PSL) limit of 40 percent of all bank credit business to increase lending into nationally important sectors. Among these PSL sectors, renewable energy is mentioned and here is where financing or refinancing from green bonds become relevant. According to the PSL limits, banks can only loan up to INR 150 million to borrowers looking to finance renewable energy projects. Given that the sector is important to India, this limit becomes a handicap for banks trying to finance greater number of projects in the renewable space. As of now there has not been any changes to this regulation or the PSL limits, especially given its direct impact on the green bond market. However, the RBI is also expected to come out with green finance guidelines in 2018, which include further regulations related to green bonds (Climate Bonds Initiative, State of the Market, 2017).

In terms of the overall private sector involvement in green, the only official framework or regulation is through corporate social responsibility (CSR) route – where a small portion of private sector profits (approx. 4%) have to go towards CSR projects (Ministry of Corporate Affairs, 2011). The CSR route consists of a set of voluntary guidelines released from the Ministry of Corporate Affairs in July 2011. These voluntary guidelines showcase government-backed integration of ESG factors in financial decision-making, (Ministry of Corporate Affairs, 2011). The National Voluntary Guidelines (NVG) encourage Indian businesses to adopt responsible investment practices and do reporting to stakeholders based on global frameworks like those provided by Global Reporting Initiative or NVG’s framework.

### **3.6. The Need for a Regulatory Pulse on the Market**

The interest in green bonds is growing in both India and China, with most of these bonds being oversubscribed (The World Bank, 2015). Given the various opportunities present for infrastructure projects in these emerging economies, the potential to utilize green bonds to raise the necessary capital, is enormous (Kennedy & Corfee-Morlot, 2012). While China is currently leading the green bond market worldwide, the green bond market in India now sits at a critical juncture of growth.

Although both these countries are being motivated by a climate change agenda, however, it is the role of the regulator that has differed in the growth of the market in these two economies. For the Chinese market, regulations play an instrumental role, and this is reflected with the number of regulations that exist in relation to this market. It is also evident that upcoming Chinese regulations will continue to play an important role in further strengthening the support for this market. In relation, the Indian market has one regulatory guideline from its market regulator SEBI, which has resulted in some growth but not to the same extent as that in China. In both countries, the regulators have had some level of impact in growing the market. However, there is a need to understand to what degree this impact can be and how to best utilize it in the context of the green bond market.

In most developing countries, the case for an environmental role of central banks or other regulators is typically strong, as they have strong institutional standing in the policy frameworks of these countries (UNEP FI & CIGI, 2017). The case for assigning an environmental mandate to regulators is further backed by the fact that in most developing and emerging economies the financial regulators are part of the most powerful public institutions (UNEP FI & CIGI, 2017, p. 12). Through their command over the banking and financial sector, they can exert influence over private investment decisions and promote best practice reforms to support the adaptation and mitigation of climate change impacts. In fact, historically, the central banks and financial regulators of many countries have played a crucial role in the economic development of that country, by supporting targeted sectors – be it industry or finance (UNEP FI & CIGI, 2017, p. 13). At some point, all central banks and regulators have to engage in selective targeting or directing the lending and investment in growth sectors (UNEP FI & CIGI, 2017, p. 13). Given the level of public standing and strong institutional reputation, it is important that policy required to grow any market or sector is backed by a regulator. This aspect of a regulator's role in growing the green bond market will be further explored in the theoretical framework chapter of the study.

### **3.7. Existing Academic Literature on Green Bonds**

Although existing academic literature on green bonds has been lacking so far, there has been a recent growth in terms of the number of journal papers and thesis' that are based on analyzing the growth in the market. With the United States leading in terms of overall issuances, the green municipal market has been well documented in terms of its growth and potential (Brennan & MacLean, 2018). However, with recent exponential growth in emerging countries, one study points to the market growth being stalled in the United States, due to a lack of promising regulatory support (Wang, 2018). Another study supports the need for regulatory or policy-interventions, by stating that green public policies can promote long-term green growth by influencing expectations and the credit market, whereas in the short term, issuances of green sovereign bonds can short-term win-win solution for the economy (Monasterolo & Raberto, 2018).

In terms of what is driving the green bond market, one article concludes that the attractiveness of the market cannot currently be linked to the superior risk-return profiles, and pricing appears to be driven by similar drivers for regular bonds (Horsch & Richter, 2017).

Although investors realize this, they are motivated by additional considerations (such as ability to address climate change) that are being provided by green bonds (Horsch & Richter, 2017).

Findings from a thesis paper also show that green bonds outperform traditional counterparts in the short term, but the sample significance increases with time (Ley, 2017). Another similar paper shows that corporate green bonds allow companies to invest in projects that improve their environmental footprint and contribute to long-term value creation by also attracting a new set of investor types (Flammer, 2018). By doing so, both studies claim to support the argument that investment in green bonds can not only deliver financial performance, but also allow institutional investors the ability to act in the fiduciary interest of their capital (Ley, 2017).

In terms of clarifying definitions for green bonds, one study shows that various certification mechanisms have evolved to allow more granularity and continuity in the assessment of green bonds (Ehlers & Packer, 2017). This study further adds that a relatively large share of green bonds is in the sectors that are subject to environmentally related credit risk and having a more consistent cross-jurisdictional green bond standard can further help develop the market (Ehlers & Packer, 2017). Another study that addresses risk is one that looks to evaluate the nexus between climate change and financial innovation through incorporating risk into value theory – it does so by evaluating the perceived risk in climate-friendly projects that get funded by green bonds (Christophers, 2016).

In terms of a multi-country analysis, one event study provides the evidence that shareholder react positively a day after green bond announcements are made by issuers and this is in line with the increasing global interest and concerns by investors and firms towards climate change (Roslen, Sin Yee & Binti Ibrahim, 2017). Other innovative concepts like land conservation (duPont, Levitt & Bilmes, 2015) and upcoming sectors like water and climate adaptation in agriculture (Lazurko & Venema, 2017), are also explored by academic researchers looking at the green bond market.

In terms of research related to green bonds or green finance specific to India, it is more basic in terms of providing a summary of the existing literature on green banking initiatives or available products in the Indian finance markets (Goel, 2016). Another India-specific paper also focuses on green finance, but through a more energy-focused financing perspective (Sarangi, 2018). Overall, academic literature on Indian green finance space addresses the concept of green bonds, any current challenges and future growth potential of the market in terms of nationally prioritized sectors like energy (Harikumar & Sussha, 2017).

For China, the green bond market is more documented in terms of its impacts, especially in terms of its industry reports. However, academic knowledge on green bonds is also increasing, given the institutional approach that is taken by the government for innovative markets like green finance. Academic literature on green finance documents various aspects such as institutional impact of green credit policy on the financial and sustainability performances of Chinese banks (Weber, 2017), bottom-up reform of the banking sector (Zhang, Yang & Bi, 2011), institutional legitimacy of the green financial system, as well as the impact of green lending on credit risk (Cui, Geobey, Weber & Lin, 2018) among several others.

### **3.8. The Literature Gap**

As the previous section pointed out, regulatory uncertainty showcases the need to understand how exactly regulatory policy and institutional pressure can impact the growth in the green bond market in both these countries. For China, there is growing academic data and several industry reports available in terms of documenting the institutional pressure and its impact. However, for India there is a lack of academic as well as industry study of this market, especially from an institutional perspective.

There is a need for the green bond data to also be contextualized in terms of the regulation and related climate change policies in either country. Although institutional theory lens can be used to explain the variances in both country contexts, there is a gap in terms of understanding how this relates to the green bond market. The research gap needs to be filled in order to explain the drivers of growth in the respective country green bond market. This research will look to fulfill this literature gap as well as the academic gap in theory.

The next chapter outlines the fundamentals of institutional theory, keeping in mind the socio-political contexts of the two countries.

## Chapter 4. Theoretical Framework and Research Questions

This chapter provides a theoretical framework and outlines the research questions and objectives.

### 4.1. Theoretical Framework

With increasing impacts of climate change beginning to affect institutional settings in both environment as well as the economy, a review of the literature shows the increasing linkages between combining the two institutional frames. For instance, institutional theory literature has looked at related topics such as corporate social responsibility (Brammer, Jackson & Matten, 2012), carbon disclosures (Reid & Toffel, 2009), institutional investors (Cotter & Najah, 2011), stakeholder engagement (Delmas & Toffel, 2004; Doh & Guay, 2006) as well as climate change impacts on innovation frameworks for adaptation (Rodima-Taylor, Olwig & Chhetri, 2011), multinational-enterprises (Pinkse & Kolk, 2011) and the global commons (Ansari, Wijen & Gray, 2013). However, there is a need to examine the role that key institutions like regulators and governments will play in creating the necessary enabling conditions for institutional growth in the upcoming field of climate finance.

Institutions that lack the mandate and knowledge to implement climate-sensitive measures can reduce the adaptive capacity of that country to socio-ecological changes. The innovation in such situations depends on the sensitivity of public and regulatory institutions to progressively respond to climate change. Thus, institutional theory can be an avenue to explain the boundaries between institutions and society as well as improve our understanding of how investment decisions get made within climate markets like the green bonds market.

#### 4.1.1. Institutional Theory

“Institutions can be described as social arrangement that are capable of change rather than being obsolete” (Hamilton, 1919).

Given that institutions operate in public and social spheres, it becomes imperative that institutional theory address both formal and informal norms and dynamics that govern them. Institutional theory’s main contribution is to “explain core characteristics and behaviours of actors in the emergence and diffusion of practice by pointing to the relevance of higher order principles like rules, norms, taken-for-granted assumptions or cultural belief systems (DiMaggio & Powell, 1983)”. In other words, it showcases a unique insight into the relationship between the actor and its environment, by explaining the correlation between the legitimacy of a system and its overall behaviour (Tolbert & Zucker, 1983). On the other hand, neo-institutional theory suggests that organizations and their behaviour is heavily influenced by the broader institutional setting in which they operate – which can be shaped by institutional legacies reflecting historical contexts, culture and polity of that region or country (Doh & Guay, 2006). That is why this study uses an institutional perspective to describe the prevailing institutional contexts in India as well as China.

However, in order to understand the different institutional settings, one can look at institutions in three related categories. The first one is formal institutions, which consist of laws,

policies, regulation and formal agreements that are agreed upon by everyone in that country or field (Doh & Guay, 2006). Informal institutions, on the other hand, are the subtle behavioural rules or norms that govern the functioning of these formal institutions (Doh & Guay, 2006). An example of informal institutions is when individuals in one might have different cultural, political or religious beliefs than those in another country. However, institutional difference can also occur in terms of various fields and level of organizations that form a part of this field. Therefore, rules and institutions around finance will differ from those based on environmental conservation, with formal institutions (regulators like central banks) being more important in the former than the latter.

From existing academic as well as secondary literature, it is evident that climate finance is becoming an important aspect in the transition towards a low-carbon and climate resilient world. However, the various field or institutional logics that might help achieve this transition are not well studied in terms of their institutional impact. Institutional or field logics are the prevailing norms or “deep-structural rules that coordinate and motivate actor’s perceptions and actions” (Fuenfschilling & Truffer, 2014, p. 774). One of the main challenges in the transitions to the LCR economy is trying to overcome these conventional institutional logics, or the “rigidities and path-dependencies [in] already existing, highly institutionalized system structures and build up new, more sustainable ones” (Fuenfschilling & Truffer, 2014, p.774). These field logics are what contribute to the level of embeddedness or structuration in the ongoing regime. Hence, a big part of this challenge is understanding the current regime and institutional logics of green finance in India as well as China. This research looks to address that gap in literature about existing regimes and their impacts on the growth of climate finance.

#### **4.1.2. Impact of Existing Regimes on Institutions**

As described in the literature, a regime is a “high degree of structuration [or level of embeddedness] within a system” (Fuenfschilling & Truffer, 2014, p.), which has considerable impact on the actors in that system. Regimes can be based on societal structures including political ideologies, cultural values and demographic transitions (Fuenfschilling & Truffer, 2014). For instance, unlike China, institutional regime in India is not always a top-down approach and has several critical yet invisible field logics that drive this regime (Shah, 1999). Based on the different political and social structures, the institutional field logic of the two countries is vastly different. For example, certain institutional regimes in the Indian context can be driven by social, political and financial incentives to the actor. Taking the Indian capital market as an example, one form of allocating market capital is based on risk/return evaluation of the investment by a bank employee through over-the-counter (OTC) contracting (Shah, 1999). This style of functioning is based on the bank employee’s direct evaluation of information and depends on factors like the information availability, incentives they have to expend energy and effort to process the information as well as the incentives they have to make the decision based on their analysis (Shah, 1999).

The bureaucratic nature of this approach makes it easier to influence financial decision-making based on personal financial gain or political views of the employee (Shah, 1999), with the latter being a less likely factor in China due to its political set-up and strong enforcement

levels. Such factors are in conflict with the long-term viability of any financial market and can result in bad-loans or capital allocations being made. This is evidenced in the Indian economy's growing struggle with non-performing assets (NPA), where bad-financial decisions by the banks have been due to a lack of reliable information disclosures (Shah, 1999), lack of accountability in human capital as well as overall weak governance mechanisms (Acharya & Subramanian, 2016). The remedying of this situation lies primarily with the government or the regulator making radical changes to institutional structures (Acharya & Subramanian, 2016).

However, given the current regime in India, market actors have shown a high degree of resistance to institutional change when a new form of organization hurts their secondary revenue sources, i.e., due to improving market transparency (Shah, 1999) or even expanding the market access to other stakeholders. Therefore, it is important to keep in mind that in order to change institutional logic or structures requires “deinstitutionalization of existing logic elements coupled with institutionalization of new elements” (Fuenfschilling & Truffer, 2014, p. 776). In the context of India, the institutional logic for green or climate finance is still very nascent and can be affected by the field logic present in the traditional financial markets. Therefore, in order to capitalize this opportunity, it becomes important to understand how existing institutions function in India and what are the social factors driving them.

In the institutional literature, there are seven different social factor that influence the way institutions function – the family, the community, the religion, the professions, the state, the corporation and the market (Fuenfschilling & Truffer, 2014). Each of these social factor exhibits a distinct belief system or dominant logic that may be contradictory or complementary (Fuenfschilling & Truffer, 2014). For example, institutional factors in the firm setting ensure that profits are pursued, whereas those in political parties seek votes and so on. Given India's democratic political system and religious diversity, social factors like voter priorities and religion can be a big force in how institutions get influenced through the government (Pritchett, 2013). In comparison, China's one-party system advocates for the state-based or top-down approach, where factors like economic growth and power can be the dominant logic for institutional change. Therefore, in the context of green bonds and climate finance, different social factors and their dominant institutional logics will influence the role of public institutions in different ways.

#### **4.1.3. Stages of Institutionalization**

A structure which can achieve a great degree of acceptance and have scale in terms of reach, can be considered a strong institution. However, in order to reach this stage, the literature highlights three main stages of institutional growth that are experienced by field actors or legitimate users of that institution. The first stage is that of habitualization or an uncoordinated behaviour that does not achieve enough legitimate users and usually fails; the second stage is objectification, where there is some degree of social consensus among organizational decision-makers to increase adoption on the basis of that consensus; and lastly, there is sedimentation or when the structure has become normative and the discourse about it has settled down due to vested interests in maintaining that structure (Tolbert and Zucker, 1999).

When comparing the institutional stages of India and China, the literature review points to the fact that political context and social priorities are crucial to understand why and how actors

respond to institutional pressure. For example, regulatory threat in China from their Green Credit Guidelines is able to influence the behavior of financial institutions to improve at the level of both financial and sustainability performances (Weber, 2017). This points to China's public institutional set-up being at a more sedimentation stage, where the green bond market or climate finance structure has become normative due to legitimacy it attains from the government. In comparison, India's public institutions are not at the sedimentation stage (Kapur, Mehta & Vaishnav, 2017), and are instead at the objectification stage. This comparison between the two country's institutional stages will further be examined in the discussion.

#### **4.1.4. Role of Institutional Logic and Actors in Institution Transition**

In terms of experiencing institutional transition due to climate change, the social actors and their institutional logic can be dependent on triggers of structural, temporal and entrepreneurial variables (Fuenfschilling & Truffer, 2014). For instance, evolution or modification of an existing institutional logic is dependent on the robustness or strength of the institution's structure during particular events (like major climate change disasters), power distribution among actors (legitimate formal decision-making power) and the efforts to engage in institutional work and change (through formal or informal lobbying) (Fuenfschilling & Truffer, 2014). In order to understand institutional change, it is necessary to keep in mind these social actors, their institutional logics and whether or not they contradict or complement the change.

Another way to impact institutional transition, has been through social actors like stakeholders and shareholders. In terms of reducing climate risk from bad-investment decisions, shareholder and stakeholder engagement has driven greater changes and created higher standards of behaviour in corporations (Hebb, 2006). It is important to realize this integral role that stakeholders like institutional investors can play in driving any market forward. This is where the need for other institutional players like government and regulators to collaborate in policy design with legitimate stakeholder groups (like institutional investors) becomes evident.

#### **4.1.5. Role of Regulatory Actors in Institutional Settings**

Given the scope of this paper, the institutional actor that will be primarily examined are the financial market regulators and their role in the green bond market. The type of institutions that this study addresses are the formal ones, such as regulatory bodies that are responsible for making green bond market regulations. It also further discusses the role of informal institutions like Climate Bonds Initiative's advocacy efforts and investor expectations on shaping how the formal institutions, like regulators, react or respond to the market.

The main reason for focusing on the role of the financial regulators has been their credibility on ensuring financial market as well as macroeconomic stability for a country. This role is especially amplified in developing or emerging countries, such as India and China, where important regulators like the central bank have an added mandate of "developing markets and financial institutions, and allocating or directing credit towards priority activities" (d'Souza, 2017, p. 171) that can help grow the economy.

Furthermore, as a regulator, their role involves market oversight and maintaining an autonomous or independent status in the market. However, being arms-length can lead to certain



issues such as recognition lag, where there is a time lag between economic shocks and the policy used to react to it (d'Souza, 2017). In this case, the economic shock to financial markets has been the introduction of green bond itself, given the innovative nature of climate finance.

However, the reaction of the regulator and the recognition lag has been different for both countries. For example, recognition lag in the case of India, led to policy for the market only after growth was observed by regulators in the market. This approach was due to Indian regulator's institutional approach of "how to best mimic competitive markets" (Dubash, 2017, p. 225). However, the opposite occurred in China, where regulation or policy came out soon after the first green bond was issued. This approach mimics that used in the establishment of the green credit policy, where a set of norms or rules was first created in order to establish a market for green (Weber, 2017). In both countries, the regulatory approach seems to depend on prevailing field logics of how institutional actors operate, and this seems to differentiate how institutions get built or transition, even within the category of an emerging economy.

Another aspect of a regulator's role in institution building has been its ability to create governance mechanisms that maintain integrity or legitimacy among social actors (Dubash, 2017). As Dubash & Rajan (2001) suggest, historical regulatory intervention in India was based on creating sectoral or market transformation, with the intention of deepening of those markets. In the case of the telecommunications industry in India, "regulatory presence was established to ease concerns of private investors and signal credibility of reforms, in particular the intent of checking monopoly power of the incumbent players" (Dubash, 2017, p. 230). Similarly, it seems like new markets like the green bond market, are bound to attract regulatory attention only if the need for it is felt by market participants.

Regulators in any country are seen as rationally designed institutions that are aimed at solving governance problems (Dubash, 2017). In the case of a democratic country like India, the role of regulators to insulate themselves from changing political pressures is not only challenging, but also paramount (Rajan, 2016). Furthermore, in the case of China, a regulator is driven solely by what the national priorities are, and these do not seem to change based on election cycles, due to their single-party political system.

Furthermore, in an institutional setting, a regulator operates in 'rule-based' world, where the only governance challenge is the application and monitoring of rules. However, as argued by Dubash & Morgan (2013) and Pritchett (2013), in much of the developing world, deal-making rather than 'rule-following' is the norm. In this context, "deal-making is not referred to as a free-for-all environment where only relative power settles decisions and there is no scope for institutional constraints, instead it is to recognize that many regulatory decisions involve an exercise of judgement because technical virtuosity alone cannot provide a definitive and unique answer" (Dubash, 2017, p. 237).

This is why it becomes harder for Indian regulators to enforce rules or even pro-actively create them, as following the rules-based system is not the prevailing institutional field logic in India. Furthermore, even if rules are created, they are often influenced by redistributive capacities (like political pressures) and prevailing norms (market conditions), which mean that regulatory environments in developing countries like India, "will retain some form of negotiation" (Dubash, 2017, p. 237) or field judgement between the market participants and the

regulator. In China, the regulatory situation is different as the institutional change is not driven by market participants, but from previous green finance literature (Weber, 2017; Zhang, Yang & Bi, 2011; Cui, Geobey, Weber & Lin, 2018) it seems to be a pro-active approach in creating the market itself.

Since the green bond market operates in the international context, it is important that relevant regulators in both countries get viewed as credible institutional organizations that are able to ensure uniformity in their approach and showcase rationality when it comes to decision-making (Dubash, 2017; Majone, 1994).

#### **4.1.6. Theoretical Relevance for the Green Bond Market**

As mentioned in DiMaggio & Powell (1983), the process of institutional structuration or regime change consists of; (i) increase in the interaction among organizations in the field, (ii) the emergence of sharply defined interorganizational structures (iii) increase in the information load with which the organizations in the field must contend, (iv) the development of a mutual awareness among participants in a set of organizations that they are involved in a common enterprise (DiMaggio, 1982).

Given that any institutional change comprises of this structuration process, it is interesting to note that the existing level of structuration within the green bond market in both India and China. For example, both markets already show greater interaction among various market stakeholders, a growth of inter-organizational structures such as stock exchanges, public-private forums and regulators. Additionally, there is increasing information availability and disclosures on green bond issuances as well as a national push towards a common enterprise or goal – of having a market that ensures stable financial returns, but through a low-carbon growth transition.

In terms of the stages of institutionalization of the green bond market, it differs in both countries and is based on a number of variables. It is important to note here that rate of institutional change or transition is also influenced by institutional actors (in both formal and informal institutions) (DiMaggio & Powell, 1983). Although this study focuses on formal actors like financial regulators, it acknowledges the integral role of informal actors like industry organizations (like Climate Bonds Initiative) or investors (like institutional investors) in driving the structuration of the institutional changes in the market.

Institutional transition in such nascent settings can occur either through coercive pressures (from formal and informal institutions), mimetic pressures (where uncertainty or ambiguity in the institutional setting encourages imitation of other legitimate institutions) or normative pressures (where existing norms provide legitimacy) (DiMaggio & Powell, 1983). This study draws on DiMaggio & Powell's findings on the different types of institutional pressures to support its hypotheses that institutional change in China's regulatory green bond market is due to coercive and normative pressures, whereas in India's regulatory green bond market the change is driven by mimetic and normative pressures.

DiMaggio & Powell's (1983) work also focused on a number of findings about how organizations respond to institutional change, and the rate of change is dependent on the existing regimes in those institutions. In their research, they focused on a number of key hypotheses that

serve as relevant rationale for this study's own hypotheses. The first relevant hypothesis was that the greater the centralization of an organization, the greater the extent to which that organization will change to resemble the organization on which it depends for resources (DiMaggio & Powell, 1983). The second relevant hypothesis is that the greater the participation of organizational managers or networks in that field, the greater the rate of change (DiMaggio & Powell, 1983). Lastly, the more ambiguous or uncertain the goals of an organization are, the greater the extent to which that organization will model itself after organizations it perceives to be successful (DiMaggio & Powell, 1983). The following section describes these hypotheses in relevance to how they apply to the green bond market in India and China.

## 4.2. Hypotheses

The growing trend that private sector is increasing its engagement of responsible investment is now visible in the exponential growth of the green bond market. This growth in the green bond market is happening across various countries, currencies, several green bond indices, through evolution of green bond standards as well as increasing investment from mainstream institutional investors. Given its rising popularity among mainstream actors like investors and governments, there is now a changing notion of traditional economic growth and its accompanying institutional field logics.

In the scope of this study, a major focus of its analysis will be on identifying the prevailing and emerging institutional field logics in the Indian and Chinese green bond markets, and further assessing their degree of structuration. In evaluating the respective country's institutional strengths, strong institutional pressure will be defined as that which has higher issuance amounts in its green bond market as well as appeals to social actors like investors.

Keeping this definition in mind, the paper has the following hypotheses:

**H1:** China's green bond market regulation is driven by a highly institutionalized structure.

**Rationale:** The greater the centralization or resource-dependence of an organization, the greater the rate of change (DiMaggio & Powell, 1983). Given that China's financial markets are strongly influenced by regulations (Weber, 2017; Zhang, Yang & Bi, 2011; Cui, Geobey, Weber & Lin, 2018), the impact of coercive institutional pressure in conjunction with normative social pressures (such as international best practices) can be evident.

**H2:** India's green bond market regulation is driven by the demands of social actors.

**Rationale:** The greater the participation of organizational networks in the field, the greater the rate of change (DiMaggio & Powell, 1983). Given that India's institutional transition seems to be more normative and mimetic in nature, institutional change may be driven or restricted by social actors (Dubash, 2017), which may or may not be looking to legitimize the market just yet.

**H3:** In both countries, institutional factors in the form of policy signals, overall robustness of financial sector and advocacy from key stakeholders, impacts the growth of the green bond market.

**Rationale:** The more ambiguous or uncertain the goals of that institutional setting, the greater the extent to which change in that setting will be modelled on other legitimate institutional settings

(DiMaggio & Powell, 1983). Given the nascent stages of the market in both countries, there seems to be some form of adhering to international best practices, which showcases a more legitimate institutional setting based on mimetic pressures. By doing so, institutions in both countries hope to improve viability and sustainability of the green bond market for its respective stakeholders.

### 4.3. Research Objective and Questions

This study's research objective is to better understand the impact that governments and institutional pressure can have on growing the green bond market in various economies. Specifically, this research would like to focus on the drivers of the green bond market and analyze their impact on countries where policies in relation to climate change finance and green economy have already been implemented. There are lessons to be learned from institutional policies that have been implemented with relation to the green economy as well as the green bond market.

This research will have broader implications for growing and strengthening the green bond market in emerging economies around the world. Furthermore, it would be making theoretical contributions to institutional theory and understanding its impact on the flow of international climate finance. By focusing on the two biggest emerging economies India and China, this study will help identify the policies that can help strengthen the growth in their green bond market.

Since impact of institutional pressure on green finance is already documented for China, this study asks what the role of institutional pressure in the context of the green bond market is in China. For India's case, given the gap in academic research on institutional pressure with respect to green finance, this study focuses on identifying the driving factors for the green bond market and whether or not institutional pressure exists. And lastly, this study seeks to understand what institutional factors might be responsible for growing the green bond market in emerging economies.

Given this objective and scope, the following research questions will be addressed by this study:

**RQ1:** What has been the role of institutional pressure on the green bond market in China?

**RQ2:** What has been the role of institutional pressure on the green bond market in India?

**RQ3:** How do institutional factors further strengthen the growth of the green bond market in emerging economies like India and China?

### 4.4. Limitations of the Study

Although this research hopes to showcase an unexplored aspect of the green bond market using institutional theory, it faces certain limitations. For instance, institutional theory is just one lens to examine the key drivers of the green bond market in India and China, however, there

might be other theories (such as stakeholder theory) that might work better in combination with it.

Furthermore, the market in both countries has only been around for four years at the most, and there was not enough data to conduct a statistical significance test for causation of variables. Given this nascent stage of the market, the ability to analyse the long-term effects of stakeholder activism and regulatory changes is limited.

This study also does not document any comprehensive changing corporate behaviour (or other financial markets) in either country. It focuses only on the green bond market; therefore, can potentially miss out on impacts from other socio-economic and political events that are impacting either country as a whole. Given these limitations, the analysis might be restricted in terms of providing a full picture of where the institutional framework stands in terms of green or climate finance for both countries.

## Chapter 5. Methods

This chapter highlights the qualitative and quantitative methods used in this study.

### 5.1. Mixed Methods Approach

A convergent parallel mixed methods approach, which is a side-by-side analysis of the qualitative and quantitative data, was undertaken in this research (Creswell, 2014). This method was chosen due to its ability to account for gaps in both qualitative and quantitative data sources. The convergent parallel approach was used so as to determine the relationship between the dependent and explanatory variable. An explanatory variable is a type of independent variable; however, one cannot be certain it is full independent or unaffected by anything else (Creswell, 2014).

In this study, the dependent variable to be measured was the green bond market growth or total issuance amount in each country. In order to explain the impact on the dependent variable, institutional structures and their strengths were chosen as the explanatory variables. Given that this variable can be impacted by more than one factor, like institutional field logics or actors in that field, it was viewed as an explanatory variable rather than being fully independent. The explanatory variables identified in this study were based on both quantitative and qualitative data. These include national economic priorities, sector trends, climate change policies & green bond regulation, key events and advocacy. For both countries, the main assumption was that their green bond market is influenced by varying degrees of qualitative and quantitative explanatory variables that are further responsible for creating institutional changes in their respective markets.

In order to identify the various degrees of prevailing and emerging institutional field logics within India and China, a general historical analysis of the financial sector and various climate change policies was conducted. To gather this secondary data, various archival sources such as reports, books and journal articles were consulted. In order to gain insights from this step, the data was categorized in terms of its relevance to the green bond market. One way to interpret the relevance of the policies was based on how it impacted the financial sector – and whether it was direct or indirect. An assumption here was that an explicit guidance document (from a financial regulator) or a major report (UNEP Financial Inquiry) would have a more direct impact on this market. Another significant assumption was that any major financial sector event like the demonization of a currency, would have a negative indirect impact on the market.

#### 5.1.1. Quantitative Methods

The first methodological cornerstone of this research was to analyze the trends in the secondary data obtained from the Climate Bonds Initiative (CBI) database. The CBI database was chosen due to its ability to provide the most up-to-date and reliable data on green bonds issued. Although part of this database is public, additional detailed information was obtained from CBI by filling out an academic data request form. By doing so, this study was able to analyze granular information like issue size, issuer name, maturity and issue date, sectors invested in and number of green bond certifications. The following variables were considered when evaluating the quantitative data:

- **Investment Sector** based on CBI's categorization.
- **Issuer Type** including industry type and majority shareholder.
- **Historical USD Currency Conversion**, in order to have a uniform and consistent comparison of two different currencies.

- **Total Issuance and Number of Issuers** based on issuer type reflected trends about sectors that were more popular than others.
- **Regulation/Policies** that were directly and indirectly related to green bonds.
- **Key Events**, including release of major reports or financial events that have been discussed in the literature review to explain certain impacts on the market.
- **Advocacy Events** that reflected the work being done by CBI and others in that market to raise awareness as well as encourage greater stakeholder participation.

Green bond issuance amounts (in \$USD) were then segregated at the financial year quarter scale (Q1, Q2, Q3 & Q4), given the short time range of data that was available. The analysis was broken down to reflect issuer and issuance amount trends in each quarter. The assumption here was that this would reflect a more detailed time-sensitive impact of explanatory variables driving the market. Furthermore, a count of related and domestically held CBI events (from its Events Archive) was undertaken to determine the advocacy levels in the market. The assumption here was that CBI was an important stakeholder that is able to drive this market around the world through its advocacy.

### 5.1.2. Qualitative Methods

Primary qualitative data from semi-structured interviews with various high-level stakeholders – including regulators, industry associations, green bond issuers, underwriters as well as multilateral finance institution – for the Indian and Chinese green bond markets was gathered. The assumption here was that their insights provided the prevailing institutional field logic elements in that country’s context.

The main reason for doing primary data collection predominantly in the Indian context was due to a lack of green finance and institutional literature being available. In addition, the Indian market had a smaller market size and spread, this indicated that stakeholders in this market interacted closely and would have more experiential insights. Given this access to high quality information from a select group of key stakeholders based in India and some internationally, the sample size was limited to 10 participants.

In contrast, not a lot of primary data was collected for China’s case, as the data available for their green bond issuance was widespread (in terms of total size and number of issuers). Furthermore, various academic studies and secondary literature explaining the Chinese institutional impact on green finance were also readily available.

Although the size of the interview group may have been a limitation of the study, the knowledge of the participants was highly informed in terms of the regulations and their impacts on the market. Participants were picked on their ability to influence this market’s regulations, whereas some others were picked to represent stakeholder interests in both the markets. The method used to contact them was an email outlining the study’s research objective, ethics clearance and an overview of the broad set of questions that would be asked.

The total sample size emailed was 10 and the response rate was a hundred percent. They were able to confirm their participation, given their previous association or mutual connections with the researcher. As evident in Table 5 interviewees were then coded into the following categories in order to maintain their confidentiality.

Table 5: Coding of interviewees that participated in the qualitative aspect of this study (Source: Author).

Type of Organization	Participant
Regulator A	Participant 1
Regulator A	Participant 2
Regulator B	Participant 3
Regulator B	Participant 4
Issuer A	Participant 5
Issuer B	Participant 6
Industry Association A	Participant 7
Industry Association B	Participant 8
International Underwriter	Participant 9
Multilateral Financial Institution	Participant 10

Once the data was collected from the semi-structured interviews, the author was able to code it based on recurring themes found in the notes that were taken during the interviews. This type of method used to bring out qualitative themes in this study was open and axial coding, which is based on Corbin & Strauss (1990)'s work on grounded theory research. Open coding is the interpretive process by which data is analytically broken down by the researcher to give new insights into thinking about or interpreting a phenomenon that is reflected in the data (Corbin & Strauss, 1990). For the purposes of this study, open coding allowed the coding of data into conceptually similar categories that were identified across the participants.

Then axial coding or the method of relating open coding categories to the emerging themes related to the study's research questions and hypothesis, was conducted. In this study, axial coding allowed the contexts of those themes to be related to the overall institutional theory framework of how social actors like market stakeholders can influence institutional logics and transitions in the case of the green bond market. The rationale for using both the coding methods was to form the basis of sampling of the data on theoretical grounds and bring out the drivers of growth or challenges in the markets (Corbin & Strauss, 1990).



### 5.1.3. Key Variables & Assumptions

The following Table 6 summarizes the different variables used in this study, their data sources and the key assumptions:

Table 6: Key variables, data sources and assumptions for India and China (Source: Author).

Variables	Data for India	Data for China	Data Source	Key Assumptions
<b>Sectors Invested</b>	Adaptation, Energy, Buildings, Transport & Water	Adaptation, Energy, Buildings, Transport, Waste, Water, Land-Use & Industry	CBI database	Based on secondary data available from CBI's up-to-date and reliable database
<b>Issuer Types</b>	Power and Renewable Energy Producers (Public & Private), Banks (Public & Private), State-Owned Enterprises (Financial Services, Financial Services in Energy), Financial Services - Infrastructure & Energy (Private) Corporate (Agriculture) & Municipal Transit	Power and Renewable Energy Producers (Private, Public, Joint-Stock), Banks (Private, Public, Joint-Stock), State-Owned Enterprises (Financial Services, Environment, Automotive), Corporate (Automotive, Industry, Waste Management, Real Estate), Financial Services (Private and Joint-Stock), Utilities & Municipal Transit	Author's analysis of issuer using web search on primary business type/sector (energy, banks, corporate etc.) and majority shareholder stake in that issuer (private, public, joint-stock)	<p>Web search on the issuer revealed majority shareholders, which helped establish if the issuer was private, public or joint-stock.</p> <p>The main assumption for segregating similar issuer category like Financial Services or Automotive into state-owned enterprises from public as well as joint-stock, was to enable the clear distinction between amounts in direct public financing vs. private or joint type financing.</p> <p>Other mixed categories included Power &amp; Renewable Energy Producers as well as Banks.</p> <p>Utilities and Municipal Transit were also two separate categories as it was not inherently clear as to which type of project (infrastructure or transit) bonds from these issuers would be financing.</p> <p>For India specifically:</p> <ul style="list-style-type: none"> <li>The Financial Services category was split into state-owned and private. This was done to showcase the differences in the type and business of the issuers. For e.g., the private issuer focused on financing mainly infrastructure</li> </ul>

				and energy projects, whereas the state-owned focused on general financing but also more energy-specific financing.
<b>Currency Conversion</b>	US Dollar (USD) conversion of all bonds that were issued in Indian Rupees (INR)	Historical US Dollar (USD) conversion of all bonds that were issued in Chinese Yuan (CNY)	Historical USD conversion rates (dated to the issuance date of the bond) obtained from universal currency converter website called 'XE.com Inc.'	<p>Main assumption in converting the currencies to their historical USD amounts was to be able to compare them uniformly.</p> <p>The USD was chosen given that it is the most widely used in international trade and can be a reserve currency for most countries.</p>
<b>Regulation Chosen</b>	<ol style="list-style-type: none"> <li>SEBI's Disclosure Norms for Listed Green Issuers</li> </ol>	<ol style="list-style-type: none"> <li>PBoC Announcement No. 39 for interbank bond market,</li> <li>NDRC Guideline No. 3504 for corporate bonds</li> <li>CSRC Guidelines for listed companies</li> <li>NAFMII Guidelines for non-financial enterprises</li> <li>PBoC and CSRC Guidelines for Verification</li> </ol>	<p>India: SEBI's website</p> <p>China: Climate Bonds Initiative China State of the Market reports (2015-2017), UNEP FI Report for China, PBoC and NAFMII websites</p>	<p>For India, there was only one formal regulation out by securities market regulator SEBI.</p> <p>For China, the PBoC, NDRC &amp; CSRC guidelines were chosen due to these organizations being the official regulators/overseeing state agencies for the various types of issuers involved in the Chinese green bond market.</p> <ul style="list-style-type: none"> <li>NAFMII was chosen since it is a non-profit 'self-regulatory' market association that is made up of inter-bank market participants, intermediaries, related practitioners as well as experts and scholars on a voluntary basis (NAFMII, 2018).</li> <li>All these regulators and organizations were chosen due to their policies/guidelines explicitly involving the green bond markets of both countries.</li> </ul>
<b>Key Events</b>	Main events in India included:	Main events in China included:	Web search and UNEP FI	For both countries, the release of their UNEP Financial

	<p>RBI regulation allowed Indian banks to issue Masala Bonds in foreign markets</p> <p>SEBI Concept Paper and Public Consultation of Green Bonds in India</p> <p>UNEP FI India Inquiry Report</p> <p>Demonetization of Indian Currency</p>	<p>UNEP FI Report on China</p> <p>Financial Industry Standardization System Construction and Development Plan (2016-2020) (Yinfa [2017] No. 115)</p>	<p>reports for both countries.</p>	<p>Inquiry reports was based on the assumption that it signaled the financial industry and policy support for a transition towards a low carbon economy.</p> <p>For India specifically:</p> <ul style="list-style-type: none"> <li>• RBI regulation was included to showcase the start of Masala (or rupee-dominated bonds) in the international market.</li> <li>• SEBI’s public consultation and concept paper was chosen to indicate the market regulator’s interest.</li> <li>• Demonetization was included given the wide-ranging impact that it had on the Indian economy and its financial markets.</li> </ul> <p>For China specifically:</p> <ul style="list-style-type: none"> <li>• The Financial Industry Standardization Development Plan was included, given its relevance to harmonizing definitions in the financial markets and standardization across five different Ministries and Commissions.</li> </ul>
<p><b>Advocacy Events</b></p>	<p>All CBI events related to India’s green bond market, (held domestically and internationally) were included.</p>	<p>All CBI events related to Mainland China’s green bond market (held domestically and internationally) were included.</p>	<p>CBI website: Archive of Events</p>	<p>The first assumption was that CBI events indicated advocacy was being done on behalf of the market participants to the regulator and/or government.</p> <p>A second assumption was that CBI events increased awareness about that country’s market, especially among domestic and international investors as well as marketed growth opportunities to</p>

				<p>regular bond issuers in those countries.</p> <p>A third assumption was that advocacy has been instrumental in bringing together various stakeholders in the market, especially when they are used to working in silos.</p> <p>An assumption specific to China was that mainland issuers were governed and influenced by advocacy events differently than those in Hong Kong, as both have been known to have a different market regulation and also have separate stock exchanges.</p>
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#### 5.1.4. Validity

This study’s validity is reflected in the use of a mixed methods approach as a tool to balance out the gaps in either quantitative or qualitative results. The quantitative results showcase validity by yielding trends that are in line with the annual reports released by CBI (also known as State of the Market) for both countries. The CBI reports can be used as a reliable source, given that they are recognized as being non-biased and disseminators of primary data by all international green bond market participants.

In terms of qualitative results, the validity is reflected in the process of triangulation, which means that data was gathered using more than just one method (Creswell, 2014) as well as high-quality reliable data from key stakeholders and active participants in the Indian green bond market. In this study, triangulation was achieved by comparing the trends in both data types and cross-validating results (Creswell, 2014).

Finally, the challenge in establishing validity is also making sure the assumptions are credible. In this study, this challenge has been addressed by ensuring that assumptions are in line with the theoretical basis of this study. Institutional theory has been a crucial lens in shaping the assumptions and interpretation of this study’s results. Although this study is a first of its kind in climate finance markets, the results are in line with institutional impacts had on various other related topics such as SRI or CSR literature.

#### 5.1.5. Reliability

In terms of reliability, the quantitative results of this study can be replicated as long as there is access to CBI’s database (either publicly or through a data request form). The assumptions used in the quantitative section are clearly outlined in the above summary table and can be used to reproduce similar future research.

In terms of qualitative reliability, there were some challenges related to access to the interview participants. These participants were high level decision-makers in the organizations and institutions that were primarily participating or closely associated with the Indian market. Given their high-level positions, access to these individuals is not always guaranteed, and can be dependent on having strong social and professional network-based connections.

This research was able to access these participants given the author's previous experiences attending roundtables and workshop events with them. Reproduction of the qualitative portion of this study can be done using an institutional theory framework and basing it on country-specific knowledge.

## Chapter 6. Results

The presentation of the results starts with a broad analysis of the Indian and Chinese green bond markets. It looks at quantitative secondary data provided by the CBI database from 2014 to 2017 for both markets. The quantitative portion of this chapter documents various trends such as sector specific issuances, issuances based on issuer types, trends per sector, advocacy events as well as significant regulation and key events in these markets. This chapter ends with qualitative results, which have been coded according to common and emerging themes from the interviews.

### 6.1. Quantitative Findings

The data analyzed ranges from 2014 to 2017 and documents various trends in both markets. The findings are based on the variables highlighted in the Methods chapter and include currency trends, trends highlighting issuer types, amount issued per quarter, amount issued per issuer type, investment targeted in various sectors. Furthermore, variables such as release of regulation, key events and advocacy events are mapped in conjunction with the overall green bond markets of India and China. The following Table 7 summarizes the key information for the two markets:

Table 7: Summary and comparison of China and India’s green bond market (Source: Author’s construction using data from CBI database and reports).

China	India
Market started in 2014	Market started in 2015
4 regulators in this market (formal participation - PBoC, NDRC, CSRC and NAFMII)	2 regulators in this market (formal participation - SEBI and informal participation - RBI)
Total issuances (102 bonds) in CNY (83 bonds), EUR (6 bonds) and USD (13 bonds)	Total issuances (28 bonds) in USD (10 bonds) and INR (18 bonds)
CNY – \$35.7 billion, USD – \$ 6.7 billion & EUR – \$5.2 billion	USD – \$4.9 billion & INR - \$2.9 billion
Total – \$47.6 billion (2014-2017)	Total – \$7.8 billion (2015-2017)

The above table highlights the quantitative data differences between the two countries and will be used to highlight the themes in the qualitative findings as well. As we see above, China’s market was started in 2014, whereas India’s market started in 2015. There are four regulators formally participating or actively involved in the Chinese green bond market. These

consist of the central bank (PBoC), national planning commission (NDRC), securities market regulator (CSRC) and the national association for financial market institutional investors (NAFMII). In India, there are two regulators that are involved in the market – with the securities regulator (SEBI) playing a more formal role (by issuing a regulation related directly to the market) and the central bank (RBI) having a more informal role (given that all banks have to report infrastructure bond issuances to the central bank).

### 6.1.1. Currency Trends

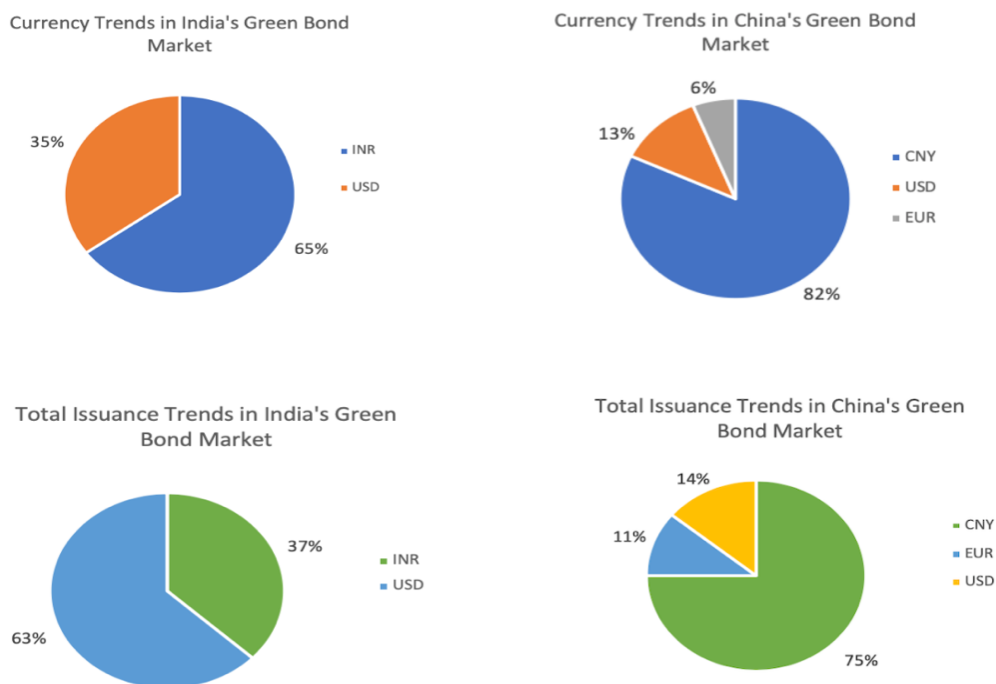


Figure 10: Currency and total issuance trends in the Indian and Chinese green bond markets (Source: Author’s construction using CBI database).

As showcased in both Table 7 and there were a total of 102 bond issuances in China between 2014 – 2017, with most bonds (81% of the bonds contributing to 75% of the capital raised) being in CNY, and the rest being in USD (13% of bonds contributing to 14% of the capital) and EUR (6% of the bonds contributing to 11% of the capital). The total issuance amount for China from 2014 – 2017 was approximately \$47.6 billion. On the other hand, India’s market consisted predominantly of USD denominated bonds, with 65% bonds accounting for 63% of the capital raised. There was also a rise of domestic INR bonds, with 35% of INR bonds accounting for 37% of the total capital. The total amount raised by the Indian green bond market for 2015 – 2017 was \$7.8 billion.

### 6.1.2. Comparing Issuer Trends

As we can see in Table 8 and Figure 10, green bonds in China were invested across 8 sectors, whereas in India they were invested across 5 sectors. In both countries, investment in various sectors differed in terms of the number of green bonds addressing those sectors, the issuer types and the number of different issuers (meaning the same organization or issuer was not double counted in that sector).

The following Table 8 highlights the summary results for each sector, based on these variables. It is interesting to note that the total number of green bonds addressing various sectors follows a similar trend in terms of issuer types and total number of different issuers in that sector. As the number of green bonds increases in a sector, the issuer types and number of different issuers also increases. This shows the higher the diversity in issuer types, there is also an increase in the number of different issuers in that sector and vice-versa.

Table 8: Comparing sector-based investment through green bond use-of-proceeds in India and China (Source: Author’s analysis of the CBI database).

Name of Sector	Total number of green bonds addressing this sector (China)	Issuer types in this sector (China)	Total number of different issuers in this sector (China)	Total number of green bonds issued in this sector (India)	Issuer types in this sector (India)	Total number of different issuers in this sector (India)
Adaptation	23 green bonds	5 issuer types	15 issuers	1 green bond	1 issuer type	1 issuer
Energy	70 green bonds	13 issuer types	35 issuers	25 green bonds	7 issuer types	15 issuers
Buildings	23 green bonds	6 issuer types	17 issuers	2 green bonds	2 issuer types	2 issuers
Transport	54 green bonds	10 issuer types	27 issuers	4 green bonds	4 issuer types	4 issuers
Waste	39 green bonds	8 issuer types	24 issuers	0	0	0
Water	44 green bonds	9 issuer types	23 issuers	2 green bonds	2 issuer types	2 issuers
Land Use	3 green bonds	2 issuer types	2 issuers	0	0	0
Industry	5 green bonds	3 issuer types	5 issuers	0	0	0

For China, based on partial or full use-of-proceeds, the most important sectors (2014-2017) were Energy (mentioned in 70 green bonds), Transport (mentioned in 54 green bonds) and Water (mentioned in 44 green bonds). The least important sectors were Land-Use (mentioned in 3 green bonds) and Industry (mentioned in 5 green bonds). For India (2015-2017), the most



important sector was Energy (mentioned in 25 green bonds), whereas the least important was Adaptation (mentioned in only 1 green bond).

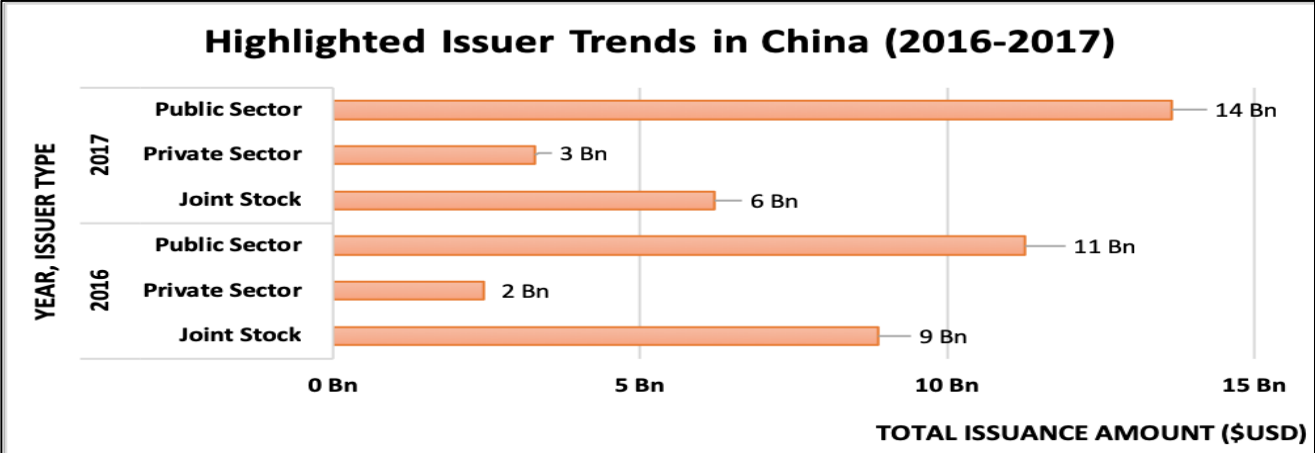


Figure 11: Highlighted overall issuer type trends in China for 2016-2017 (Source: Author’s construction using CBI database).

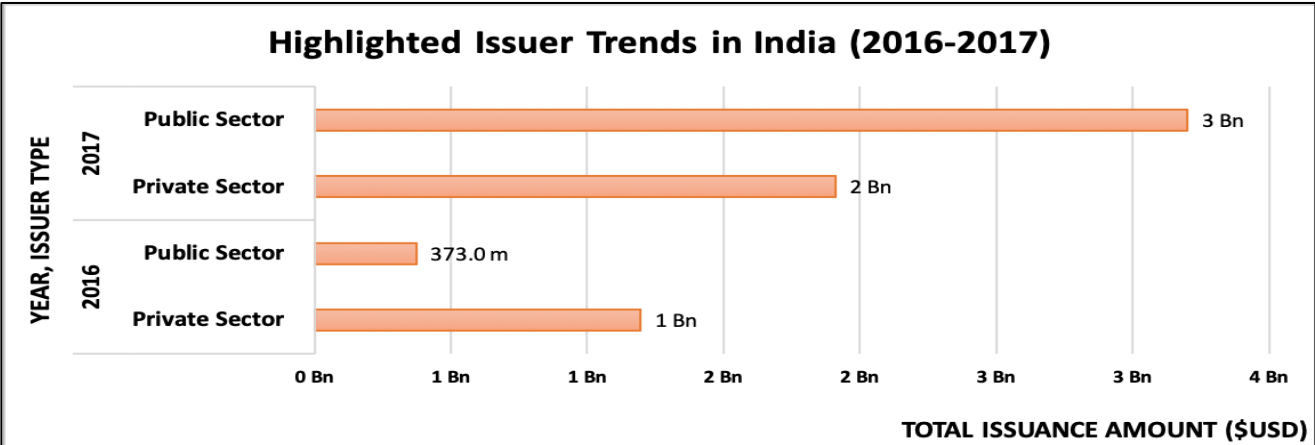


Figure 12: Highlighted overall issuer type trends in India for 2016-2017 (Source: Author’s construction using CBI database).

As seen in Figure 11, trends in terms of issuer types for the most recent issuances in China (2016-2017), were driven by public and joint-stock issuers. For India, although the market started off with a private sector issuer in 2015, there was a greater rise in public sector issuers. This rise of public sector participation in India for recent years (2016-2017) can be seen in Figure 12.

**6.1.3. Comparing Sector Trends**

As seen below, Figure 13 further breaks down the overall sector trends according to annual growth in China’s green bond market. It is important to note here that the number of issuances in this graph are based on categorization of the use-of-proceeds by the issuer and not the number of green bond issuers in that sector. Therefore, total issuers in the market do not necessarily equal the total number of green bonds issued nor does it equal the full amount going

towards one sector. This means that a single green bond's proceeds could go into one or more sectors. A limitation of the CBI database was that it is not clear as to the percentage of total issuance from an individual green bond that goes into a particular sector. Hence, Figure 13 looks only at the number of green bond issuances that mention their green bond's use-of-proceeds going into one or more sectors (and not the number of issuers or total issuance amounts per sector).

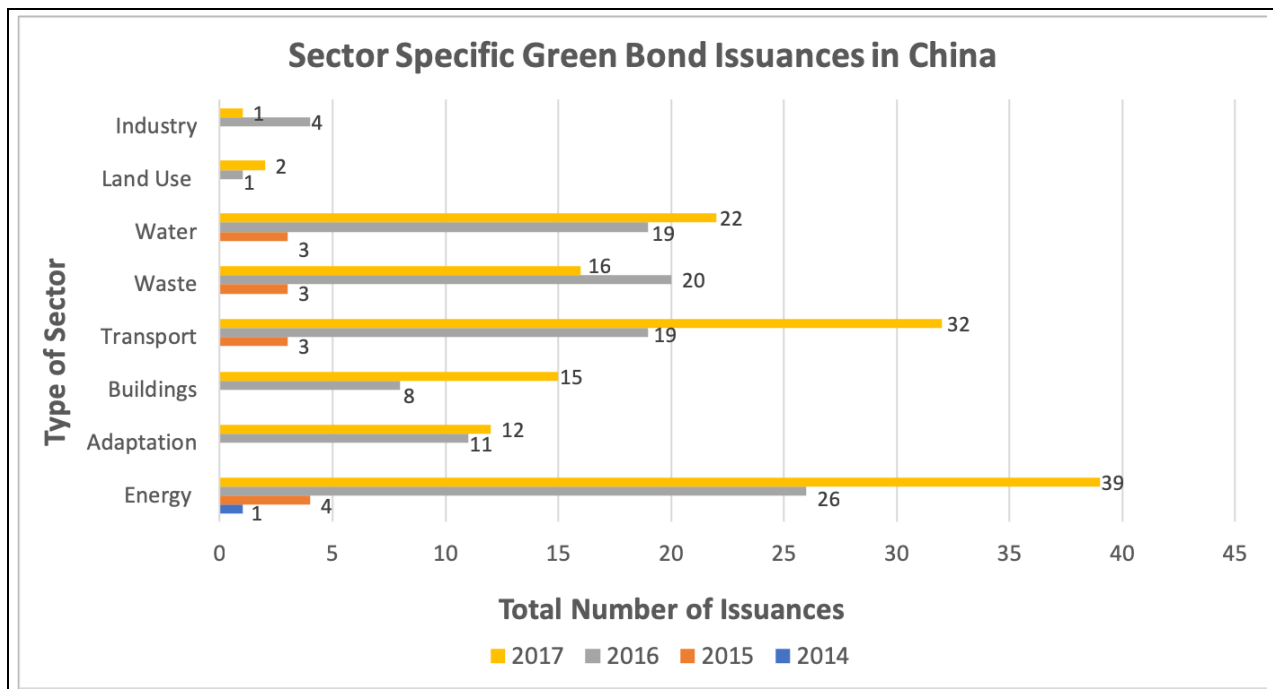


Figure 13: Sector specific green bond issuances in China from 2014 to 2017 (Source: Author's construction using CBI database).

Furthermore, Figure 13 supports the trend that energy sector has been consistently important since 2014 and the number of green bond issuances investing in this sector have grown over the years as well. The next important sector is that of transportation, where Figure 13 shows similar trends like those in energy, where investment is growing per year and has been the second highest in 2017. The third most prioritized sector seem to be water followed closely by waste, both of whom started off similarly in 2015. However, the difference emerges as the waste sector slightly outperformed the water sector in 2016, whereas the vice-versa is true for 2017. In 2016-2017, sectors like buildings and adaptation seem to be growing as well, with buildings performing slightly better than adaptation in 2017. The least popular investment sectors seem to be industry and land-use, however, the lowest sector-based investment in both 2016 and 2017, was land-use.

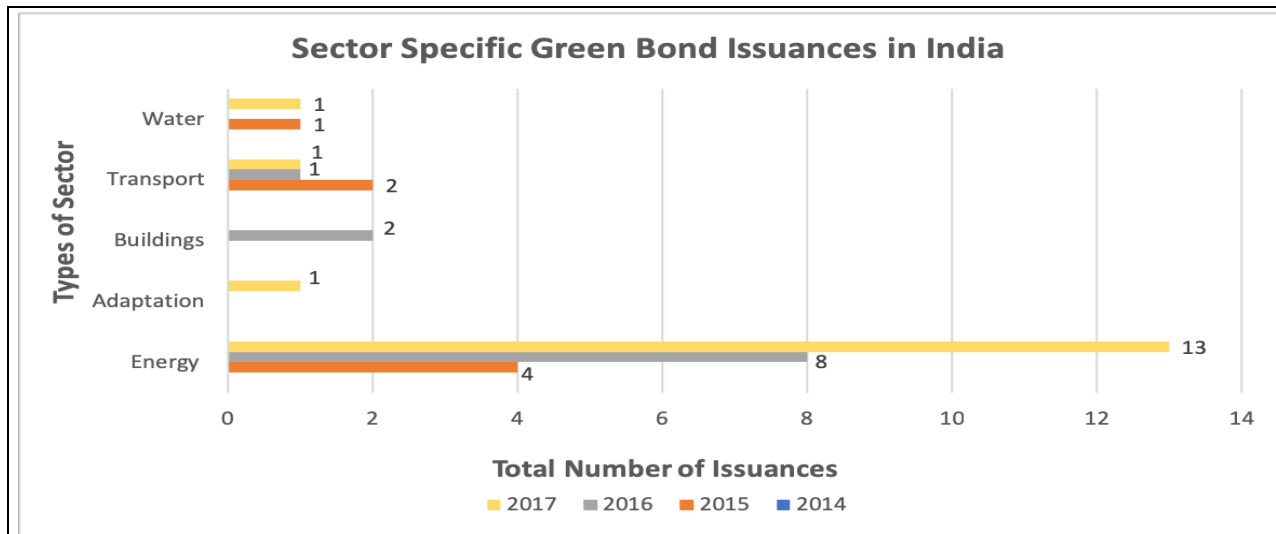


Figure 14: Sector specific green bond issuances in India from 2014 to 2017 (Source: Author’s construction using CBI database).

In comparison, India’s green bonds are invested across 5 sectors of energy, adaptation, buildings, transport and water. Based on Figure 14 highlighted trends, the most important sector in India seems to be energy (25 green bonds mentioning this sector). Other sectors such as transport (4 green bonds), buildings (2 green bonds), water (2 green bonds) and adaptation (1 green bond) seem to be more closely weighted but were clearly not as important as the energy sector.

One common trend is that both India and China’s issuances seem to prioritize investment into the energy sector, followed by transport and water. The next section highlights the detailed use of proceeds by each issuer type and showcases trends occurring in various sectors in either countries.

#### 6.1.4. China’s Green Bond Market

This sub-section outlines trends in China’s green bond market, including trends in total issuance, issuer types and highlighted sector trends.

### 6.1.4.1. Green Bond Trends Based on Total Issuance and Issuer Type

#### Legend

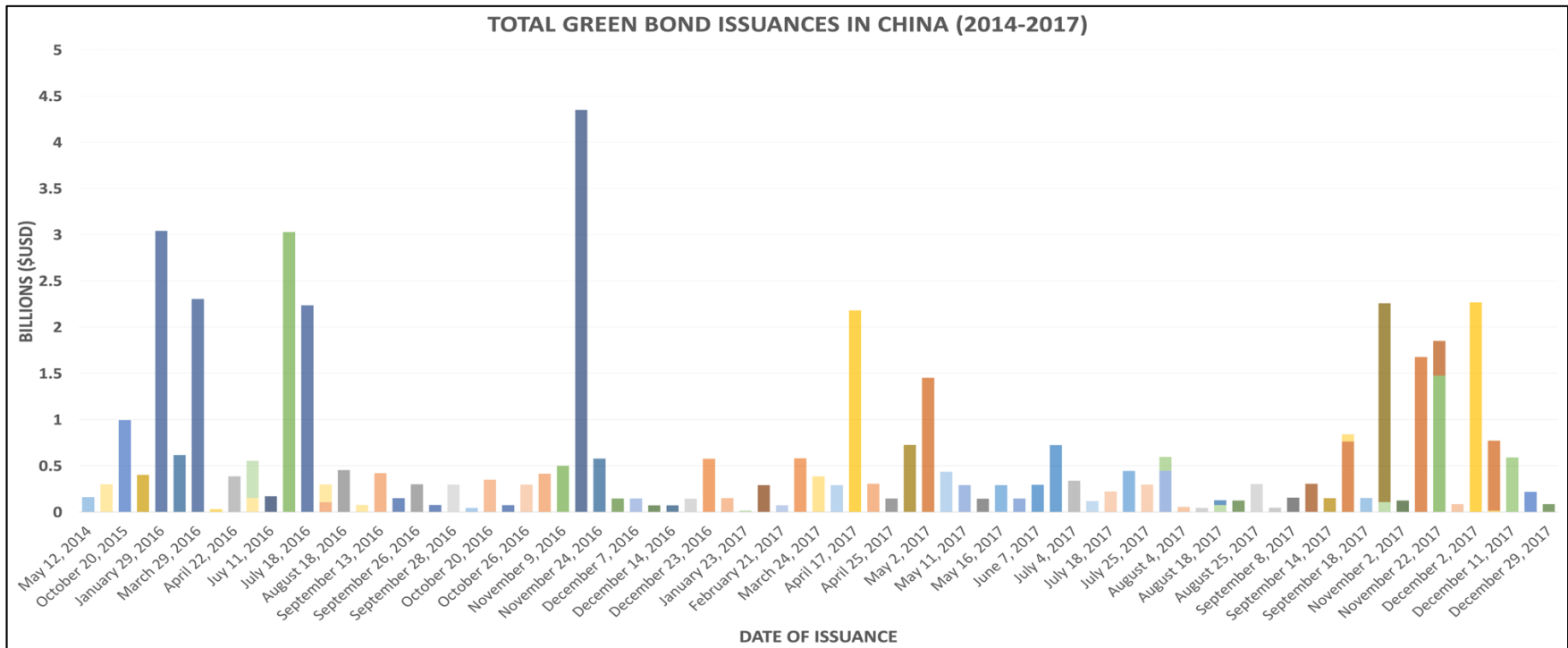


Figure 15: Total Issuance in China from 2014 – 2017 (Author’s construction using CBI database).

In Figure 15, we can see the total issuance amounts based on particular dates spanning from 2014 to 2017. This amount is the total amount from one or more issuers issuing their green bonds on those dates. It is also evident that over the years, both issuer type and issuance amounts has varied. From 2014 to 2017, there were 102 green bonds being issued by 54 different issuers in China. However, as mentioned in the Methods chapter, total issuer types or issuer category in China was limited to 17.

In 2014, there was only one issuer (a state-owned independent power and renewable energy producer called CGN Wind Energy) with an issuance amount of CNY 1000million (or approximately \$160.3million). In 2015, the issuer type doubled with two different types of issuers; independent power and renewable energy producers (joint-stock) and a public sector bank, with overall issuance amount being almost \$1.3 billion.

In 2016, the number of issuers expanded exponentially and there was a total of 13 issuer types in the market. This year was also China’s highest issuance by the Bank of Communications, which took place in November 2016, with a CNY 30 billion (or approximately \$4.4 billion) worth of green bonds. Furthermore, it also shows that five total green bond issuances (based on a particular date) this year crossed the \$1 billion mark and the overall issuance amount for 2016 was approximately \$22.5 billion.

This total issuance amount trend only increased in 2017, with six green bond issuances (based on particular dates) crossing the \$1 billion mark. Additionally, in 2017, issuer type increased to 16 different issuers and overall issuance amount was a bit higher than 2016 at approximately \$23.15 billion. The next sub-section further examines the various trends in issuers and sectors.

### 6.1.4.2. Overall Issuer Trends in China

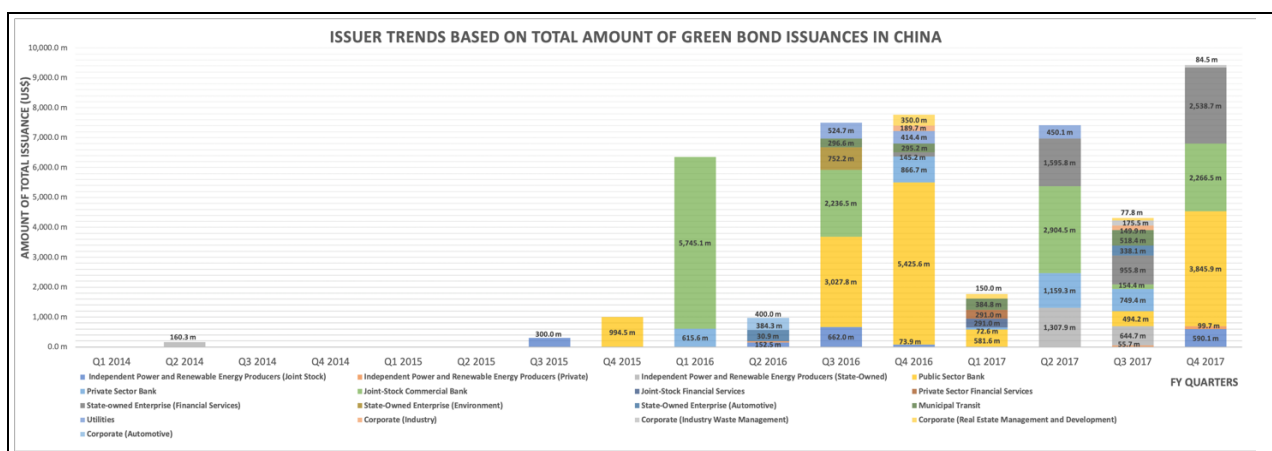


Figure 16: Overall issuer trends in China based on total amount of green bond issuances in 2014-2017 (Source: Author’s construction using CBI database).

In China, the total number of issuer types in 2014 to 2017 consisted of 17 different types or categories. Figure 16 shows the various types of issuer classification (the methodology for which is outlined in Methods section). Certain similar issuers types (like utilities and

municipal transit or corporate industry and corporate industry waste management) were kept separate in order to understand which sectors their use-of-proceeds were going towards.

The main trends evident from Figure 16 is that in 2014 and 2015, there were very few issuances and only 3 types of issuers in the market. However, in the first quarter of 2016 the amount of issuance increased exponentially. Issuers in this quarter consisted of joint-stock commercial banks (approx. \$5.7 billion) and a private sector bank (approx. \$615 million).

In the second quarter of 2016, the issuance dropped drastically and was less than \$1 billion. This quarter consisted of previous issuer types of joint-stock and private power and renewable energy producers as well as new issuers such as corporate and state-owned enterprises based in the automotive industry.

The third quarter in 2016 increased the issuance amount to almost \$7.5 billion and showcased a diverse mix of issuers and included new issuer types such as state-owned enterprises (environment), municipal transit and utilities. The last quarter showed slightly higher issuance amount trends and featured more new issuers such as corporates (real estate management and development), corporate (industry) and state-owned enterprises (financial services). It is interesting to note that public sector banks issued almost 70 percent of the total issuance this quarter.

Moving to 2017, the first quarter had a lower number of issuance (approx. \$1.5 billion), which contrasted the first quarter of 2016 (approx. \$6.3 billion). This quarter also introduced new issuers like private sector and joint-stock financial services. However, the second quarter of 2017 had more than five times the issuance of the first quarter (approx. \$7.5 billion). This quarter included increasing amounts being issued by earlier types of issuers, such as state-owned enterprises (financial), joint-stock commercial banks, private sector banks as well as power and renewable energy producers (state-owned).

Although the total issuance amount dropped almost 1.5 times in the third quarter, it stood out in terms of the diversity in issuers. This quarter had the greatest number of issuer types in China's green bond market so far. The newest type of issuer here included corporate (industry waste management). The last quarter of 2017 consisted of the highest issuance amount of green bonds (approx. \$10 billion) and was driven mostly due to public and joint-stock issuances such as banks, financial services as well as power and renewable energy producers.

Figure 16 shows the linear progression of issuances in China's green bond market and the steady growth of various new types of issuers entering the market every year. Another interesting trend is that total issuance amounts increase consistently as the end of the year approaches (specifically in the fourth quarter of every year).

#### **6.1.4.3. Highlighted Sector Trends in China**

In order to better understand the issuer trends over the years, we can look at number of issuers and their consequent types, investing in the following sectors.

(Note: Same issuers were not double counted for the same year. However, if they appeared in multiple years, they were counted again as part of the issuer type in that year).

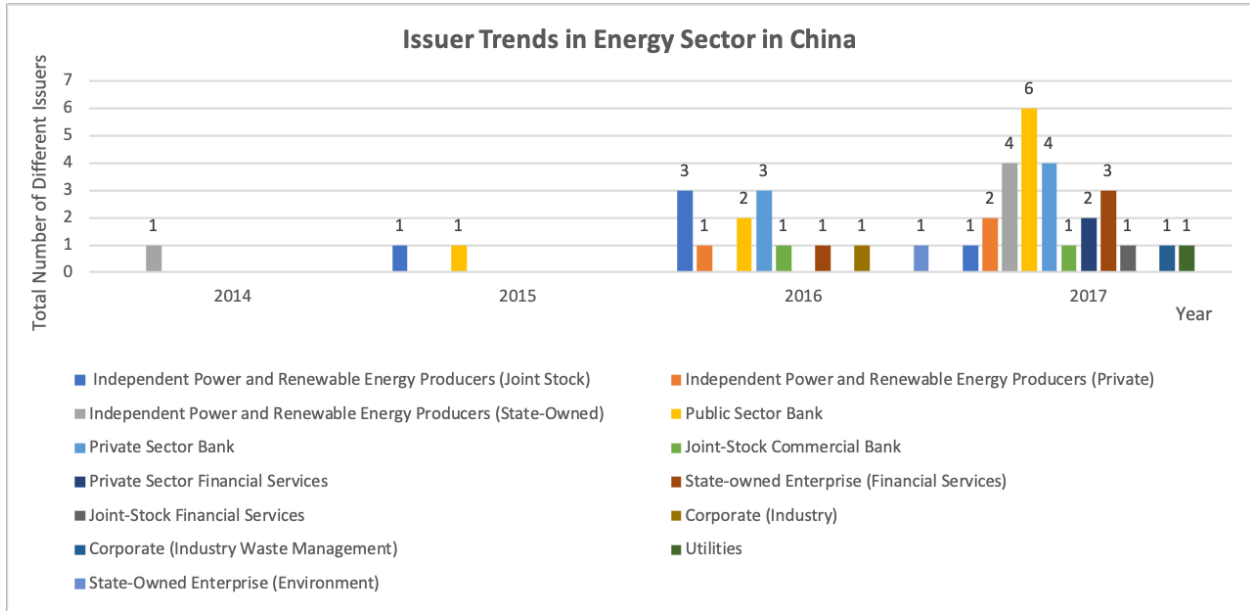


Figure 17: Issuer Trends in Energy Sector in China for 2014-2017 (Source: Author’s construction using CBI database).

Given that energy sector was an important sector (as mentioned in the previous section), issuer trends in the energy sector reinforce this trend in Figure 17. The first green bond issuance in China was done in this sector in 2014 and it has been consistently rising every year. This sector had a total of 35 different issuers over the years. In terms of issuer types investing in this sector, the recurring ones include power and renewable energy producers (state-owned, joint-stock and private), banks (public and private), financial services (state-owned and private). This sector also had the most diverse number of issuers – 13 different types, ranging from private to public sector and from utilities to financial services. The highest number of issuers in this sector were public sector banks as well as various types of power and renewable energy producers.

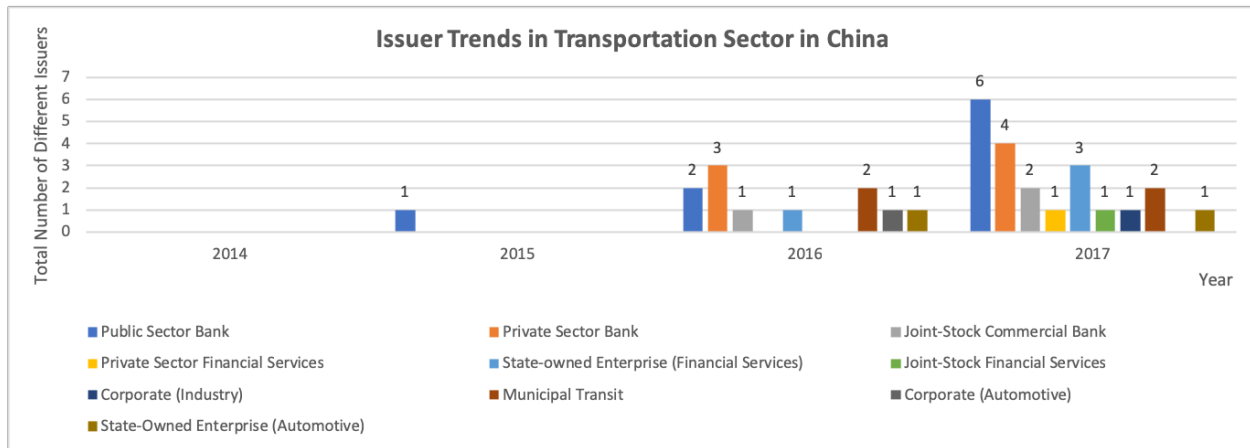


Figure 18: Issuer Trends in Transportation Sector in China for 2014-2017 (Source: Author’s construction using CBI database).

This sector was the second most popular sector, having 10 different issuer types across 27 different issuers from 2015 – 2017. From Figure 18, we can see that issuers addressing the transportation sector only started in 2015 and their number has been rising steadily since then. In 2016, the biggest issuer type for this sector was private sector banks, followed closely by public banks and municipal transit. In 2017, the issuer number tripled for public sector banks, state-owned financial services and doubled for joint-stock commercial banks. New issuers like private and joint-stock financial services as well as corporate (industry) also ventured into this space in 2017. Similar to the energy sector, transportation also had the maximum number of issuers from public sector banks, which was closely followed by private sector banks.

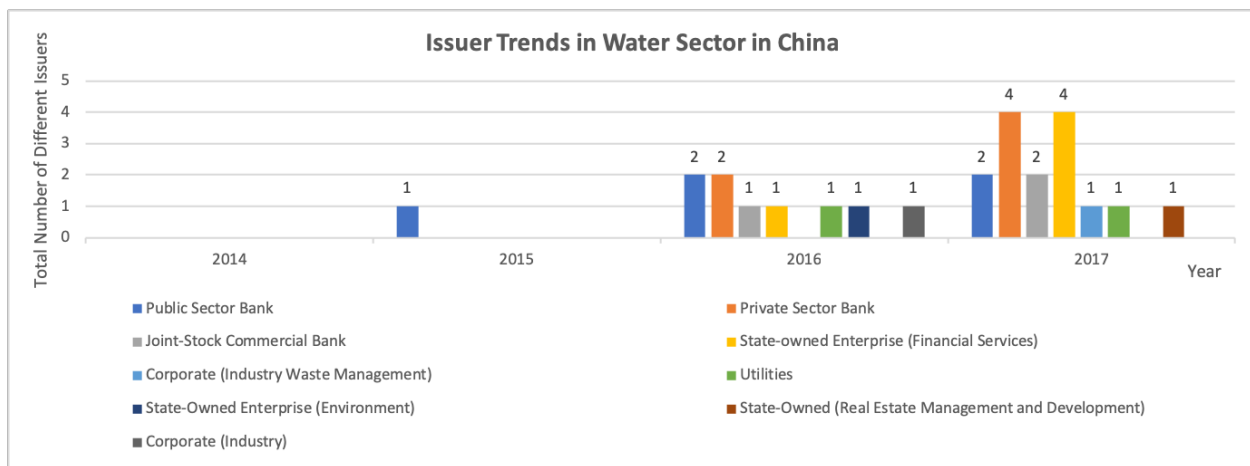


Figure 19: Issuer Trends in Water Sector in China for 2014-2017 (Source: Author’s construction using CBI database).

This sector consisted of 23 different issuers across 9 types from 2015-2017. From Figure 19, we can see that issuance addressing the water sector also began in 2015 and has been rising steadily since then. In 2016, the highest issuer type for this sector included various types of financial services. Out of these private and public sector banks were high in issuer numbers.



Other unique issuers in this year included utilities, state-owned enterprises (environment) and corporate (industry). In 2017, the number of issuers doubled for private sector banks as well as state-owned enterprises (financial services). Public sector bank and utilities issuer numbers remained the same, whereas new issuers like corporate (industry waste management) and state-owned real estate management and development entered the market. The maximum number of issuers in this sector were from private sector banks, which was closely followed by state-owned financial services enterprise.



Figure 20: Issuer Trends in Waste Sector in China for 2014-2017 (Source: Author’s construction using CBI database).

This sector consisted of 24 different issuers across 8 types. From Figure 20, we see that issuance addressing the waste sector also began in 2015 and followed trends similar to that of the water sector. In 2016, the highest issuer type for this sector included various types of financial services. Out of these private sector banks had the highest number of issuers, whereas other banks (public and joint-stock) followed closely behind. Other unique issuers in this year included state-owned enterprises (environment, financial services) and corporate (industry). In 2017, issuer number increased for private sector banks as well as other top issuers from 2016. The newest issuer to enter the market in 2017 was a corporate in industry waste management. The highest number of issuers in this sector were from private sector banks, followed closely by other financial institutions.

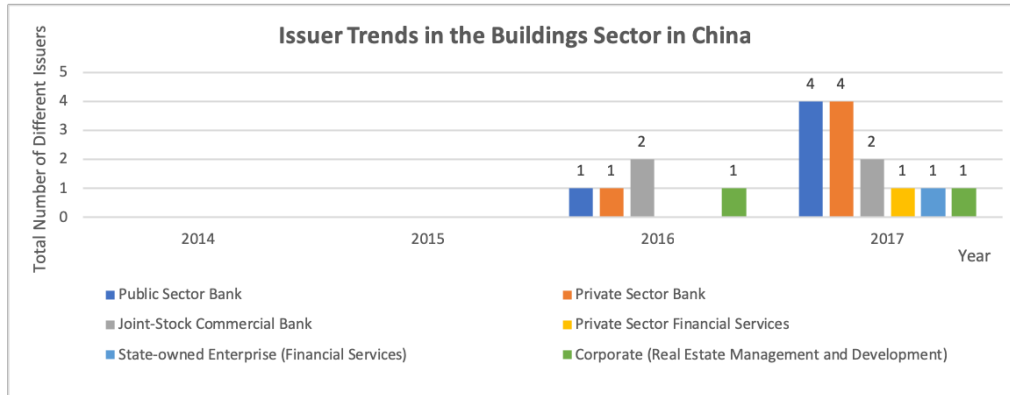


Figure 21: Issuer Trends in Buildings Sector in China for 2014-2017 (Source: Author’s construction using CBI database).

As Figure 21 shows that issuance began in 2016 in this sector and consisted of 17 different issuers across 6 types. The top and consistent issuers in this sector were public and private sector banks, followed by joint-stock commercial banks and corporate (real estate management and development). New issuers in 2017 included two types of financial services (state-owned and private).

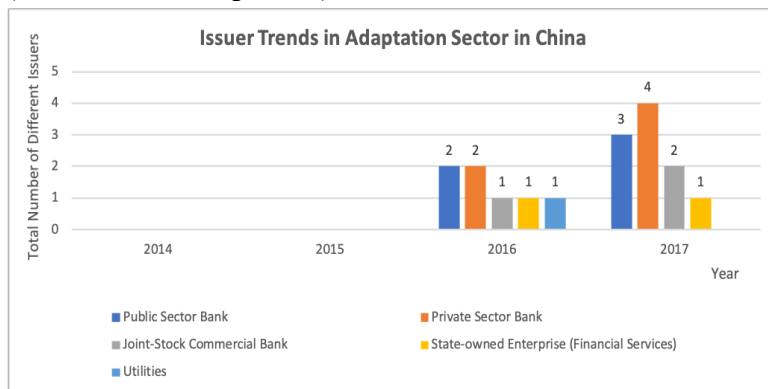


Figure 22: Issuer Trends in Adaptation Sector in China for 2014-2017 (Source: Author’s construction using CBI database).

As Figure 22 shows, issuance began in 2016 in this sector as well and consisted of 15 different issuers across 5 types. The top issuer in this sector was private sector banks, followed by public sector banks and joint-stock commercial banks. Interesting to note here is that issuer diversity fell in 2017, with only 4 issuer types investing in this sector. Although Utilities was the missing issuer type in 2017, the total number of issuers rose in 2017 with 3 new issuers entering the market.

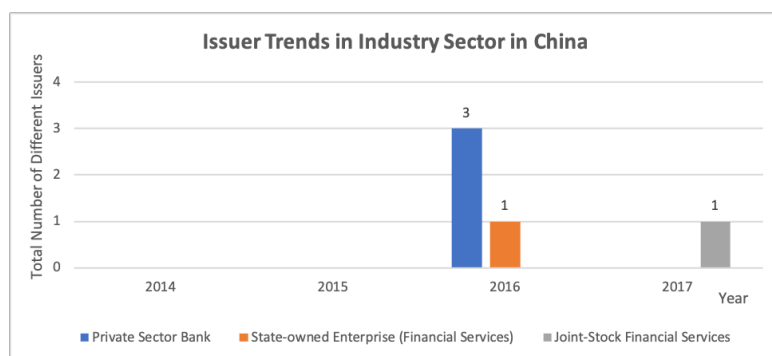


Figure 23: Issuer Trends in Industry Sector in China for 2014-2017 (Source: Author’s construction using CBI database).

Issuance began in 2016 in this sector as well and consisted of 5 different issuers across 3 types. As Figure 23 shows, top issuer in this sector was private sector banks, followed by state-owned (financial services) and joint-stock commercial banks. Although there was the entry of a new issuer type in 2017 (joint-stock financial services), issuer number as well as diversity fell in this year.

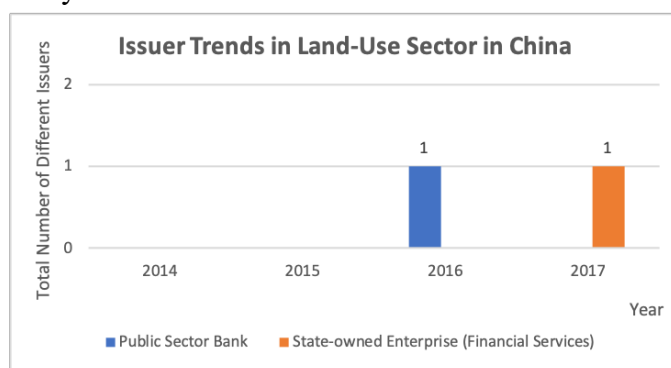


Figure 24: Issuer Trends in Land-Use Sector in China (Source: Author’s construction using CBI database).

Issuance in this sector began in 2016 as well and consisted of 2 different issuers across 2 types. As Figure 24 shows, issuers in this sector were public sector banks and state-owned (financial services). Although both years consisted of a new issuer type, there was no growth in issuer type or number in the consecutive year.

### 6.1.5. Indian Green Bond Market

This sub-section outlines trends in India’s green bond market, including trends in total issuance, issuer types and highlighted sector trends.

#### 6.1.5.1. Green Bond Trends Based on Total Issuance and Issuer Type

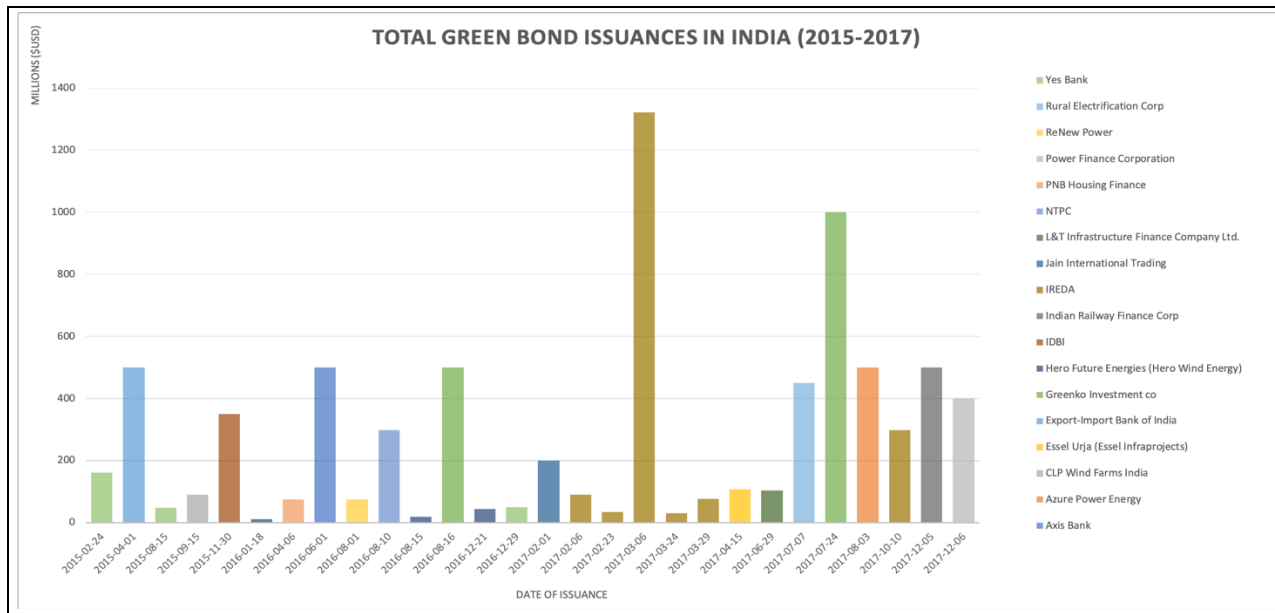


Figure 25: Total green bond issuance in India from 2015 – 2018 (Source: Author’s construction using CBI database).

As Figure 25 shows, in India the green bond market was first started in early 2015 with an issuance from a private sector bank known as YES BANK, for an amount of approx. \$162 million. The issuance in 2015 consisted of a mix of issuer types, ranging from private sector banks and corporates to state-owned enterprises and public banks. In this year, issuance amounts passed the \$200million mark in the second and fourth quarters.

In 2016, issuance reached a peak during the second and third quarters but fell low in the first and fourth. The rise in this issuance was due to issuer such as Axis Bank (private sector), NTPC (state-owned power and renewable producer) and Greenko Investment co (Private power and renewable energy producer) issuing in the market.

In 2017, issuance reached an all-time high with issuers such as IREDA (state-owned financial service provider for energy) issuing \$1.5 billion green bonds. This green bond issuance was interesting as it was the first green masala bond to be listed on the London Stock Exchange, as well as the first green certified bond by a state-owned agency. Other notable bonds in 2017 include those issued by YES BANK, PNB Housing Finance, Indian Railways and Power Finance Corporation.

Furthermore, issuances made on 7 specific days cross the \$200 million mark, and out of these almost 2 reached \$1 billion. Overall the market from 2014-2017 in India raised almost \$5 billion across 18 different issuers. The next sub-section further examines the various trends in issuers and sectors.

### 6.1.5.2. Overall Issuer Trends in India

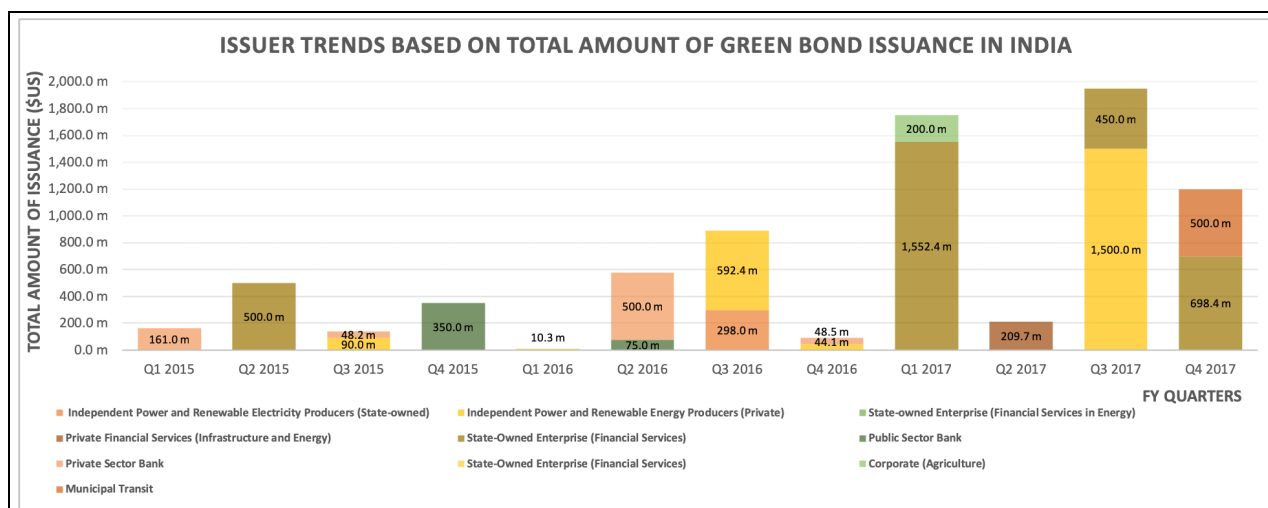


Figure 26: Issuer Trends Based on Total Amount of Green Bond Issuances in India from 2015-2017 (Source: Author’s construction using CBI database).

In India, the issuers from 2015 to 2017 consisted of 10 different types or categories. As Figure 26 shows the various types of issuer classification (adapted by the Author based on research related to majority shareholders and sector types). For example, there were types of shareholders identified (Private or Public) for certain sector-based issuers such as power and renewable energy producer and banks. In terms of other issuer shareholders, the majority shareholder was examined (corporate and state-owned enterprises as well as private financing institutions focused on infrastructure and energy).

Furthermore, issuer such as municipal transit was kept as separate category, so as to ascertain the amount they issued in the relevant sector. The trends evident from Figure 26 is that in 2015, there were very few issues and 4 types of issuers participated in the market. Given that this was the first year of the market formation, this number was higher than that compared to China’s first year (1 issuer in 2014). Another interesting contrast is that the Chinese market was led by a state-owned issuer, whereas the Indian market was led by a private sector bank.

In the first quarter of 2016 the amount of issuance dropped to approx. \$10.3 million and issuer types consisted of a private power and renewable energy producer. In the second quarter of 2016, the issuance increased gradually up to \$600 million, with the private sector banks leading the growth. The third quarter in 2016 increased the issuance amount to almost \$890 million and showcased a mix of issuances from private and state-owned power and renewable energy producers. The last quarter showed a sudden fall in issuance, with only \$92 million being due to two issuers.

Moving to 2017, the first quarter had a surprisingly high amount of issuance (approx. \$1.7 billion) and introduced new issuers like corporates in agriculture. However, the second quarter of 2017 had a dramatic drop in amount (\$200 million) and issuer type. However, it did introduce a new issuer type of financial services being provided for infrastructure and energy. The third quarter consisted of the highest issuance of the India market, reaching almost \$2

billion, with a mix of public and private issuer types. And finally, the last quarter of 2017 consisted of the approx. \$1.2 billion worth of issuance and was driven mostly due to state-owned financial services and municipal transit issuers.

Similar to China’s growth, Figure 26 shows the linear progression of issuances in India’s green bond market and the steady growth of various new types of issuers entering the market every year.

### 6.1.5.3. Highlighted Sector Trends in India

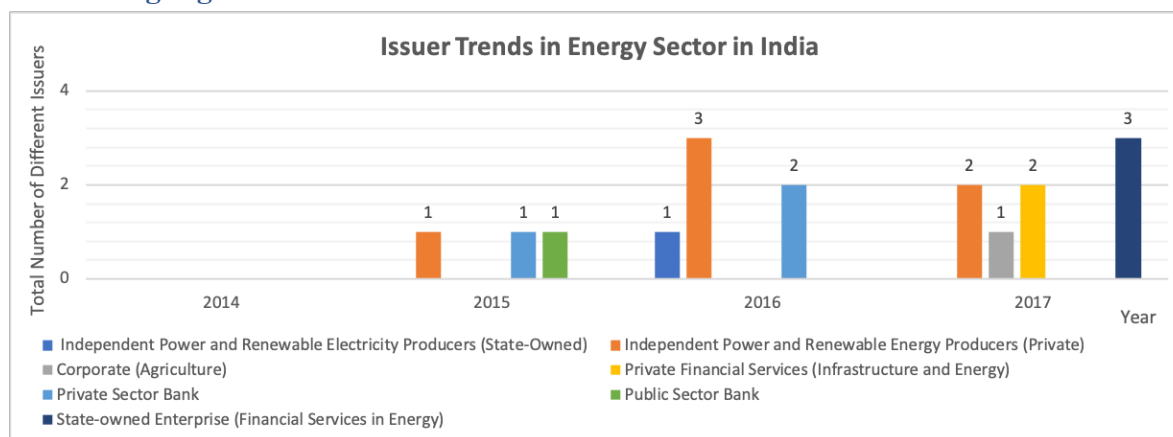


Figure 27: Issuer Trends in Energy Sector in India from 2014-2017 (Source: Author’s construction using CBI database).

Similar to China, India’s most important sector was that of energy and the following issuer participation in the energy sector reinforce this trend. As seen in Figure 27 the first green bond issuance in India was also done in this sector in 2015 and has been consistently rising every year. Issuer types in 2015, included private and public sector banks as well as a private power and renewable energy producer. In 2016, issuer types included state-owned and private power and renewable energy producers as well as private sector banks. In 2017, new issuer types such as private and state-owned financial services in energy as well as corporate (agriculture) entered this sector.

In terms of recurring issuer types in this sector, power and renewable energy producers (private) and private sector banks stood out. The energy sector also had the most diverse number of issuers – 7 different types, ranging from private to public sector. Overall, this sector had a total of 15 different issuers participating from 2015-2017.

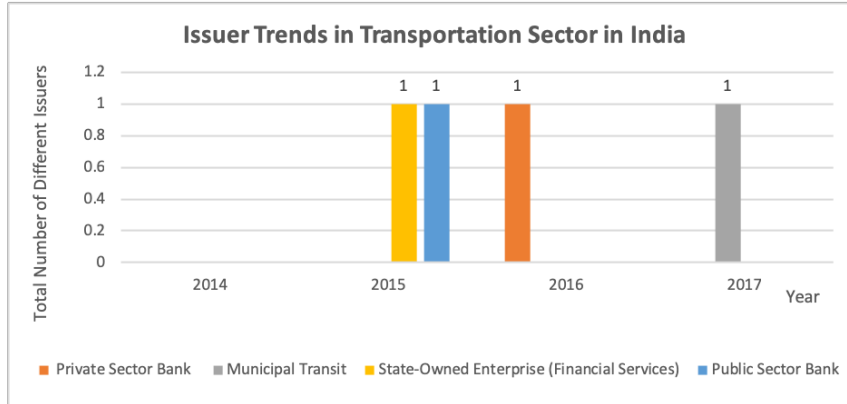


Figure 28: Issuer Trends in Transportation Sector in India from 2014-2017 (Source: Author’s construction using CBI database).

Similar to China, this sector was the second most popular sector in terms of number of issuers in the market as well as the different types. From Figure 28, we can see that issuance addressing the transportation sector only began in 2015. It had the maximum number of issuers in 2015, however, total amount issued increased in 2017 when the Indian Railway issued \$500 million green bond in the last quarter (Climate Bonds Initiative, 2017). The issuance in 2015 was predominantly driven by public sector banks and state-owned enterprises. However, in 2016 and 2017, private sector bank and municipal transit issuer type joined in respectively. Overall, this sector has been predominantly driven by state-owned or public sector issuers.

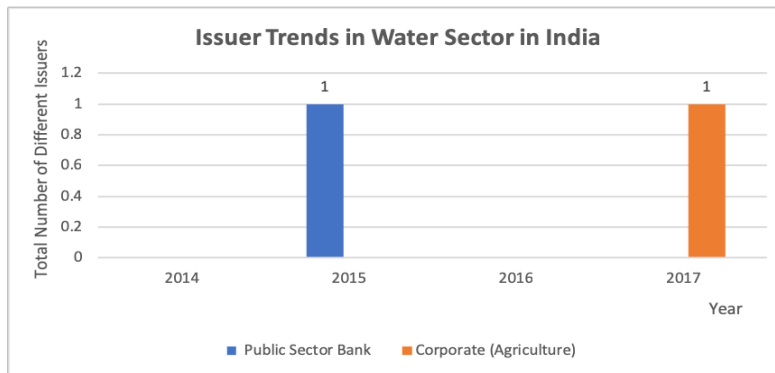


Figure 29: Issuer Trends in Water Sector in India from 2014-2017 (Source: Author’s construction using CBI database).

This sector consisted of 2 different types of issuers and from Figure 29 we can see that issuance addressing the water sector also began in 2015. The issuer in 2015 consisted of a public sector bank called as IDBI, whereas in 2016, there was no issuance at all. However, issuance in this sector picked up in 2017 with issuers like corporate (agriculture) issuing a green bond related to addressing irrigation systems in India’s agriculture sector (Climate Bonds Initiative, 2017).

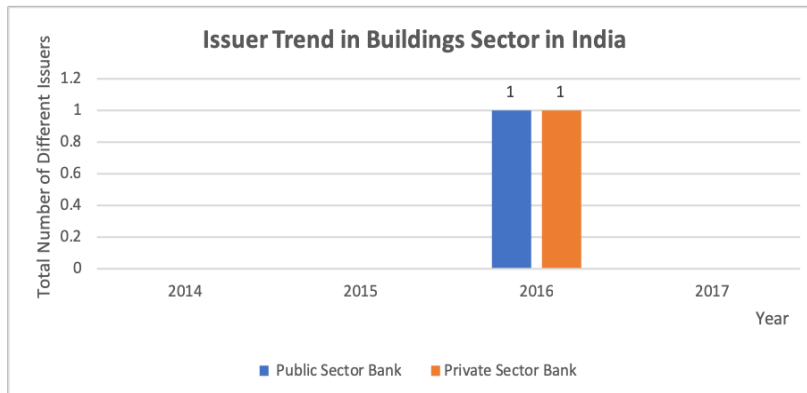


Figure 30: Issuer Trends in Buildings Sector in India from 2014-2017 (Source: Author’s construction using CBI database).

This sector consisted of 2 different types of issuers and from Figure 30, we can see that issuance addressing the buildings sector began in 2016 and did not gather any momentum in 2017. The issuer types in 2016 consisted of public and private sector banks. However, issuance by both issuers was done to support low-carbon buildings linked to commercial (KPMG, 2016; Climate Bonds Initiative, 2016) and housing projects.

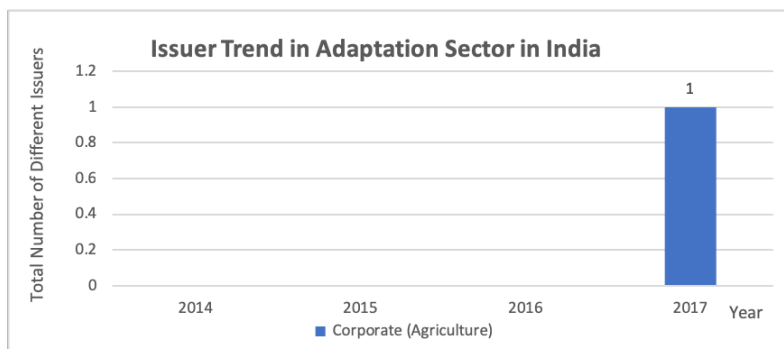


Figure 31: Issuer Trends in Adaptation Sector in India from 2014-2017 (Source: Author’s construction using CBI database).

This sector consisted of 1 issuer type and from Figure 31 we can see that issuance addressing the adaptation sector began in 2017. The issuer is a corporate known as Jain International Trading that is India’s largest producer of micro-irrigation systems (MIS) and is the second largest MIS company in the world (Sustainalytics, 2017). It’s green bond targeted sectors such as energy, water and adaptation. This bond was raised to fund renewable energy installation, irrigation networks and systems as well as water conservation projects across India (Sustainalytics, 2017).



### 6.1.6. Comparing Overall Issuances in Both Markets

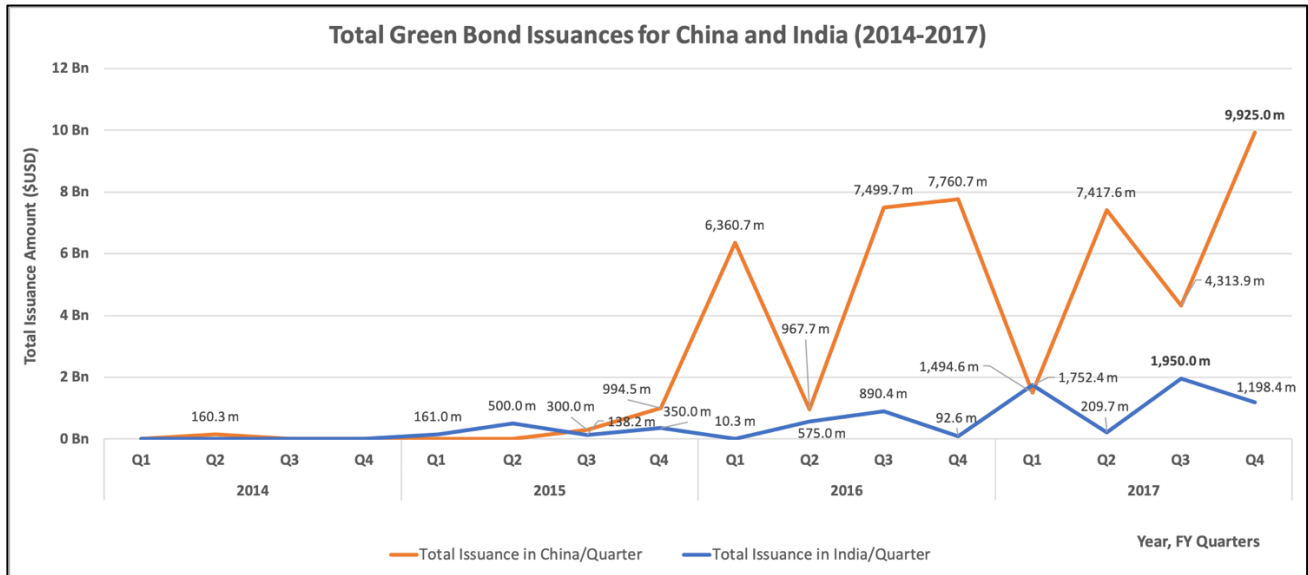


Figure 32: Comparing total green bond issuance amount in both countries per FY quarter (Source: Author’s construction using CBI database).

The above Figure 32 compares the total green bond issuances per quarter in the two markets. It is interesting to note that the issuances in both countries are at a start contrast in most quarters – with the peaks and troughs being noticed after 2015 Q2. We can also see that China’s green bond issuances are significantly higher than those in India. The vast difference between the two is visible in the highest issuance for China’s market (in 2017 Q4 for China) being almost five times bigger than India’s market (in 2017 Q3 for India).

The next sub-section analyzes each market from the perspective of CBI and advocacy events related to each country.

### 6.1.7. Comparing Advocacy Events in Both Markets

This section compares advocacy by Climate Bonds Initiative for the green bond market of both countries.

#### 6.1.7.1. Climate Bonds Initiative Events and China Green Bond Market



Figure 33: Comparing total green bond issuance amount in China per FY quarter with the total number of CBI events for China (Source: Author’s construction using CBI database and CBI Events Archive).

In Figure 33, can see that total issuance is increasing linearly over the years, but there are some quarterly fluctuations (this can be due to general market fluctuations or other related events). However, another interesting trend that the CBI events taking place and the growth or fall in the issuance amount of the subsequent quarter is somewhat correlated. At Q3 in 2017, it is also evident that the market seems to have started to grow further without the need for any related events. The total CBI events related to China’s green bond market from 2015 to 2017 were 16.

### 6.1.7.2. Climate Bonds Initiative Events and India Green Bond Market

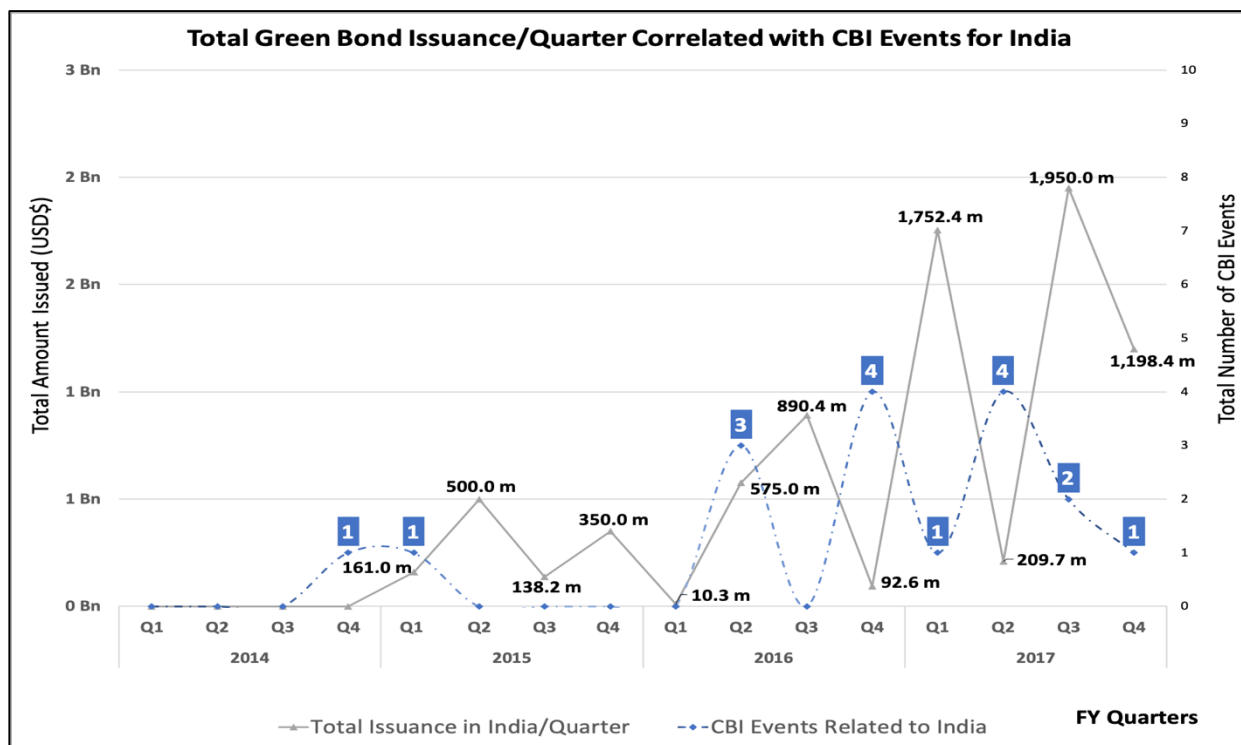


Figure 34: Comparing total green bond issuance amount in India per quarter with the total number of CBI events related to India (Source: Author’s construction using CBI database and CBI Events Archive).

In Figure 34 we see that total issuance is also increasing somewhat linearly over the years, but there are some quarterly fluctuations here as well (this can be due to market fluctuations or other related events). The total CBI events related to India’s green bond market from 2014 to 2017 were 17, similar to that in China’s market. However, an interesting trend was that events for India were consistently higher than China, especially from 2016 Q1 to 2017 Q2. Overall, the Indian market seems to have followed the general linear trend, similar to that exhibited by China’s market.

### 6.1.8. Comparing Regulation and Relevant Events in Both Markets

This section compares the regulation and relevant events in the green bond market for both countries.

#### 6.1.8.1. Regulation and Relevant Events in China’s Green Bond Market

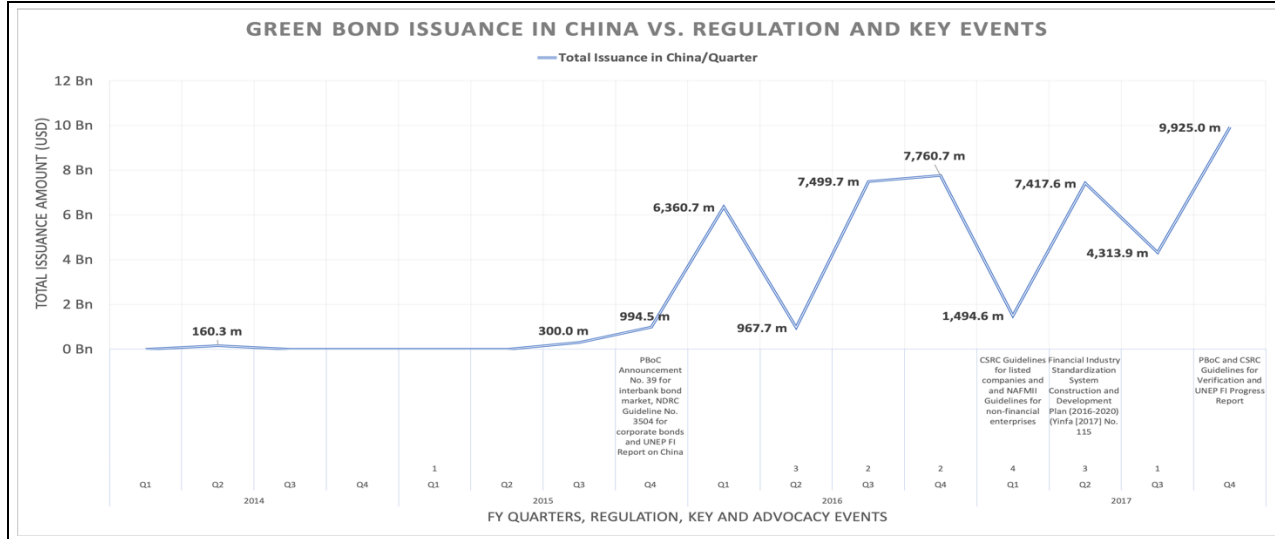


Figure 35: Comparing total green bond issuance amount in China per quarter with the relevant green bond regulation, related events and CBI advocacy (Source: Author’s construction using CBI database and CBI Events Archive).

The Figure 35 shows that green bond issuances have increased with relevant release of policies and guidelines by the regulator. The market seems moves more confidently in a linear fashion when a regulation or guideline related to green bond market processes is released. Furthermore, in the quarters that did not have any regulations or key events, there were a steady number of CBI events being held.

### 6.1.8.2. Regulation and Relevant Events in India's Green Bond Market

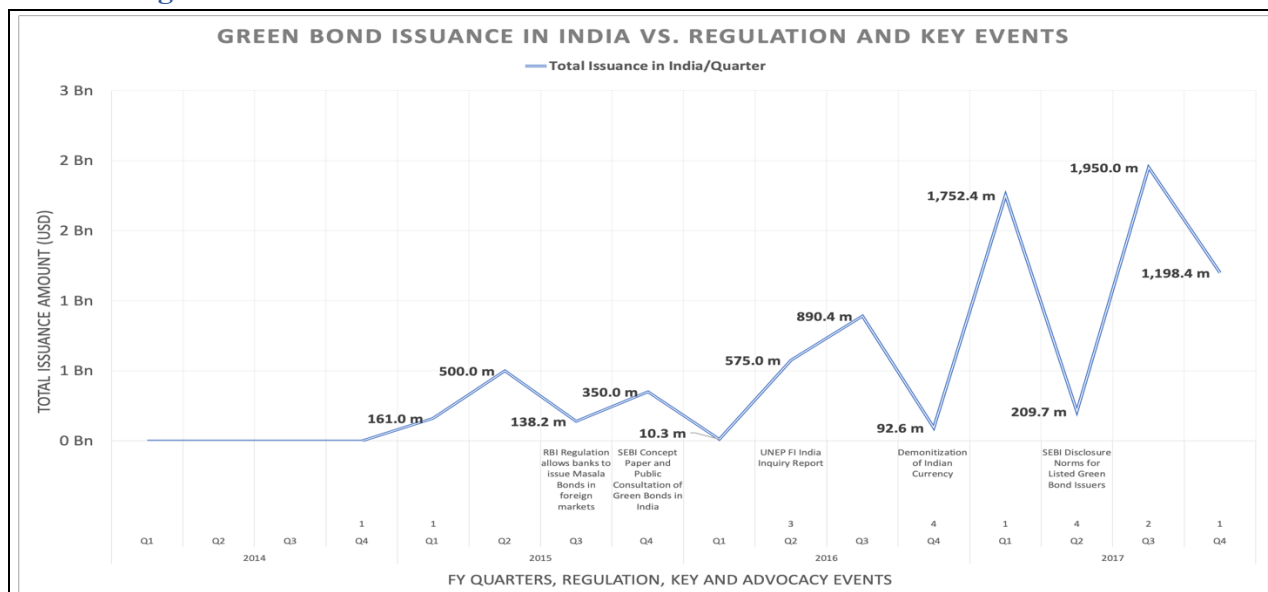


Figure 36: Comparing total green bond issuance amount in India per quarter with the relevant green bond regulation, related events and CBI advocacy (Source: Author's construction using CBI database and CBI Events Archive).

As Figure 36 shows, the market starts off after 2 CBI events for India are held in 2014 Q4 and 2015 Q1, with 2015's highest issuance being in Q2. Issuance picks up after RBI allows banks to issue Masala bond in foreign market in Q3 of 2015 as well as with the release of the UNEP FI India Inquiry report in Q2 of 2016. However, in Q4 of 2016, one key event that impacted market was the demonitization of certain Indian currency in November 2016. Furthermore, starting from Q4 of 2016, CBI events also started occurring every quarter in this market. However, India's green bond issuance reached its highest point in 2017 after release of relevant guidelines and disclosure norms by market regulator SEBI.

Overall, the market seemed to be moving upwards in a linear fashion and issuance seem to increase after CBI events, regulation or guidelines, consultation or policy support (such as ability to issue green masala bonds internationally or the UNEP FI report on India) was provided to the market.

## 6.2. Qualitative Findings

In terms of the qualitative results, the following themes emerged from interviews conducted with participants ranging from multilateral development finance institution, issuers, underwriters, investors, regulators and industry organizations associated with the green bond market in the two countries.

### 6.2.1 Investor Confidence

In terms of investors in the Indian green bond space, these include mutual funds, banks, insurance and multilateral FIs. As mentioned by an investor organization, for domestic investors in India, “factors like coupon rate and currency of issuance play a big role in what is viable” (Participant 8, 2018). However, as an industry association representative said, “cost of financing and credit risk is a real challenge when it comes to projects in India, and that is why the green bond market is still in its niche stages” (Participant 7, 2018). In order for this market to grow in India, “an investor pull needs to be created” (Participant 3, 2018) and “systemic financial risks” needs to be addressed. However, in terms of actually understanding the appetite for retail and domestic investors, more domestic or rupee issuances are needed in the market (Participant 3, 2018). In contrast, in China, the domestic participation has been quite high given the policy and regulatory signals that the government has put forth in the market (Participant 7, 2018).

Awareness on ESG integration and climate change is currently very low in India and this hampers market potential (Participant 3, 2018). Having low domestic awareness and a lack of domestic investor involvement, can also impact growth in the market. As mentioned in one of the interviews, “In China it is easier to mandate such changes, even from the investor side” (Participant 3, 2018). In India, “there is an added cost to issuers if awareness is not present in investors and that is why a disclosure route was chosen by the regulator” (Participant 4, 2018). This lack of awareness showcases the work India needs to do in order to compete on the international front. One policy maker mentioned that “perhaps stock exchanges can play a role in creating this awareness. For example, Chinese stock exchanges have played a big role in doing so in China’s green bond market” (Participant 3, 2018).

In terms of international investors, ESG investment has started to grow and this trend is further confirmed by the G20 committee’s findings as well. As one interviewee mentioned that ESG integration and reputation risks are important to how investment decisions get made (Participant 10, 2018). For example, even if “clean coal is included in a green bond, it will not get bought by investors that have specific mandates to avoid such investments” (Participant 10, 2018). Demand for such green bonds will vary and are definitely a risky option for those investors that represent institutional or SRI interests.

Another interesting factor for international investors looking at emerging country markets was the type of project and not the type of issuer. As a multinational finance institution participant mentioned, “they are more interested in encouraging greening of existing assets and this means not hindering any issuer type from entering the market. However, the market needs to be kept credible and in order for big anchor investors to place their orders, rigorous analysis and reporting needs to be done to show the integrity of the project” (Participant 10, 2018). However, these investors are not interested in just “business-as-usual cases and would like to more

ambitious projects” (Participant 9, 2018), especially among conventional issuers that come from carbon-intensive sectors like oil and gas.

### **6.2.2. Regulatory Outlook on the Market**

India’s securities market regulator came out with its Disclosure Norms for Listed Green Bond Issuers in 2017. So far, this has been India’s first and only formal regulation in the green bond market. This push for regulation was due to investors and issuers being more interested in seeing a “regulatory stamp on the market” (Participant 3, 2018; Participant 5, 2018). This regulation has been modelled for listed Indian issuers and is based on global best practices such as the CBI taxonomy and the Green Bond Principles. The regulation itself was released after a process of public consultation as well as working with several key Indian ministries including Renewable Energy and Finance. The impetus on keeping the regulation as disclosure norms was to allow investors to decide where they would like to invest.

However, most regulators highlighted that green finance was not an area of focus in India and sensitivity to climate change has not been very high. Given this lack of focus, “climate-related disclosures are fairly poor for India Inc.” (Participant 4, 2018) as highlighted by a senior policy maker. On the world stage, other countries have been going further in terms of green finance – such as creating green indices or mandating disclosures (Participant 2, 2018; Participant 3, 2018). However, India is slowly rising to the trend, by coming out with its own disclosure norms on green bonds.

Although other regulators in South Asia have issued regulation related to this market, Indian regulators are still waiting for the market to be ready before they do so. According to regulators, regulation in India does not get picked up “until the market calls for it” (Participant 1, 2018; Participant 2, 2018; Participant 3, 2018). Therefore, currently there are inter-departmental and inter-agency green finance regulator committees that are looking into this market and other green finance tools that might fit within India’s financial system (Participant 1, 2018; Participant 2, 2018; Participant 3, 2018). The purpose of these committees is to start discussions on what can be defined as green and whether the Indian market is ready for regulation on green finance.

If new green bond regulations are to be taken forward, new challenges will come up in formulating them. For example, as most of the interviews stated: Should new regulation be linked to international best practices or be more India-specific? What sectors should get priority (energy vs. transport)? Should there be caps on the amount of investment in these sectors? How would it change the PSL limits for existing sectors? Should the definition of green be according to the sectors covered or based on international definitions? Moreover, all these factors are also affected by the level of data that exists in the market, and currently “there is a gap in what data is available and reported by market participants in the green sectors” (Participant 2, 2018). There is also a “capacity building and awareness challenge that exists at all levels” (Participant 2, 2018) and this can further impact how the data gets collected and reported.

If a regulator is to mandate market participants to start reporting, it will take time to be reflected in the actual market. As regulators mentioned, “any changes to the existing regulation also take time to be implemented. For example, guidelines on India’s regular bond market came out in 2008 but were only picked up the market in 2012. Therefore, there might be a time lag in

how regulation gets picked up by the green bond market as well” (Participant 2, 2018; Participant 3, 2018).

Furthermore, different regulators are looking at this through their own regulation’s perspective. For example, the central bank will be looking only at banking, whereas the securities regulator will be focusing on listed companies in the stock exchange. The main challenge will be coordinating the different regulators to provide complementary and not competing policies for this market. As an international green bond market expert mentioned, competing regulation for different regulators in China showcases “different definitions for green” (Participant 7, 2018), and this lack of uniformity is already emerging as a challenge for domestic green bond issuers. Therefore, as one regulator pointed out, “a common platform or forum is needed for various stakeholders in the market” (Participant 2, 2018) in order to harmonize the definitions of green and enable more comprehensive regulations in the market.

### **6.2.3. Challenges in the Current Market**

In order for the market to grow at the scale it needs to, the “risk of green washing needs to be reduced” (Participant 8, 2018; Participant 9, 2018; Participant 10, 2018). However, reduction of this risk requires having market standards, clear definitions and market infrastructure present. By having “clearer definitions of green and a standardized market, it will encourage creation of a project pipeline and other policies that are needed to support these projects” (Participant 7, 2018; Participant 8, 2018). Those interviewed in the issuer category especially emphasized the need for this market infrastructure to be available for reducing transactions costs in issuances. By market infrastructure, they meant “policy and regulatory incentives that help reduce the extra financial and reporting costs that come with issuing a green bond” (Participant 5, 2018; Participant 6, 2018).

These incentives can include having “tax-free infrastructure bonds, which were once offered by the Indian government to encourage investment into infrastructure” (Participant 5, 2018) However, as a policy maker mentioned, “infrastructure bonds are no longer tax-free, given that the government was losing income on this scheme” (Participant 3, 2018). Given that most green bonds fund infrastructure, the lack of tax incentives on bonds makes it harder to attract domestic investors into this market. Furthermore, the lack of in-built market infrastructure or financial incentives for issuers also makes the market less attractive, given that green bonds come with no more financial benefits than a regular bond, but with added costs of verification.

From the issuers’ perspective, tagging a bond as green requires them to finance any additional reporting and auditing requirements. Given that additional compliance is required, it may not necessarily make it attractive to potential issuers to participate in the market unless there are added benefits for them. That is why it is important to create appropriate market infrastructure in order to support growth in the market. One issuer mentioned that doing so can not only create the financial incentives for the issuer, but also reduce the doubts around the value-add of the market (Participant 5, 2018). For example, China’s proactive approach on green finance framework, including releasing regulations like the Green Credit Guidelines, have actually helped achieve some of its financial and sustainability goals (Weber, 2017).



Furthermore, in terms of the green bond market, Chinese regulators have also mandated that verification and second opinions are done using domestic-based companies and auditing firms (Participant 7, 2018). This has prompted several Chinese firms to get verifier training and certifications from those at Climate Bonds Initiative, and further created an ecosystem of local green bond market verifiers. This verification ecosystem is missing in the Indian context and might take a while to form completely. As mentioned by a policy-maker, “non-compliance is a big challenge in India and needs to be monitored constantly” (Participant 2, 2018; Participant 3, 2018). Since most of these monitoring challenges in India have been with public sector undertaking (PSUs) like banks and non-banking financial corporates (NBFCs), it becomes an ongoing issue in the financial sector. This further results in the financial sector becoming stressed due to such non-performing assets (NPAs) and this impacts other financial markets as well.

Given the “firefighting mode” (Participant 1, 2018; Participant 2, 2018) that the regulator has to be in, it also becomes unlikely to take on additional work required for the green economy. Furthermore, the Indian government’s goal is also to increase basic financial literacy and financial inclusion across its citizens. The mandate of increasing financial inclusion is a huge undertaking for any regulator, and especially for one that needs to do so for approximately 1.35 billion people. Therefore, issues such as climate change or transforming to a low carbon economy do not get the same level of precedence in India as those that help in “modernizing and monitoring of the economy” (Participant 2, 2018; Participant 3, 2018; Participant 4, 2018). Lastly, most interview participants mentioned that it was an “election year” and policy changes in the innovative climate finance markets like the “green bond will take a backseat, whereas other more urgent issues like NPAs or improving governance in the financial markets, have to be given priority” (Participant 2, 2018; Participant 5, 2018; Participant 6, 2018).

#### **6.2.4. Business Case for the Market**

However, from the market side, one aspect of the business case for supporting green bonds emerges with the Indian government establishing renewable energy targets. As one issuer mentioned, “business case already exists for us to invest in renewable energy, but issuing a green bond allows us to have reputational benefits as well” (Participant 5, 2018). This is emphasized by the big role that private sector has had in building the green bond market in India.

In fact, regulation for the Indian market only came after the market was “already established” (Participant 6, 2018). However, the stakeholder growth in the market occurred when the government or public sector issuances began. Government participation in the market is not only a “good signal for other potential issuers, but also attracts investor demand” according to one private sector issuer (Participant 5, 2018). Furthermore, most participants mentioned that having a Climate Bonds Initiative certification also attracted greater “international investor mix”, especially when it came to India’s green bond market (Participant 6, 2018).

A general business case for the green bond market has been its emphasis on reporting and providing investors with higher levels of disclosure. As one institutional investor participant mentioned, “investor expectations from this market are higher, as investors would like to see greater information disclosures from the issuer. Investors now have dedicated green teams that

keep track of media and monitor their investments. This is enabling a greater demand for transparency and disclosures from the market and enabling greater demand as well” (Participant 10, 2018).

There is a “lot of work that goes in from the issuer side, in terms of operationalizing the reports and they would like to see a pricing benefit being reflected. But investors are not keen to pay a premium on green investments as of yet” (Participant 5, 2018; Participant 9, 2018). However, the “demand for green bonds are definitely higher than vanilla bonds, as additional types of investors are joining the books” (Participant 10, 2018). Although there is no pricing benefit for the issuer yet, their green bond is able to attract a more diverse investor mix, and this further contributes to the business case for the market.

## Chapter 7. Discussion

This chapter will start by addressing the three research questions and confirming the three hypothesis that were mentioned earlier.

### **RQ1: What has been the role of institutional pressure on the green bond market in China?**

As mentioned in the literature, China has a highly institutionalized structure in how it enforces a regulation or policy. This degree of institutionalization is noticed in how the green bond market adopts regulation as a “green signal” to scale up investment in a particular sector. For example, from *Figure 13* (sector-specific issuances in China), we can see that energy, transport and water are highly popular sectors for investment. These sectors have been issuing green bonds since 2015 and from *Figure 15* and *Figure 16* we see that the number of issuers as well as their total issuance amounts in these sectors have also gone up consistently.

In terms of the timing of regulation, we see in *Figure 35*, that total issuances shot up in Q1 2016, Q3 2016, Q4 2016, Q2 2017 and Q4 2017. These higher issuance amounts either concurrently included higher number of advocacy events (greater than 2 events) in those quarters (Q2 2016, Q4 2016 and Q2 2017 – as see in *Figure 33*) or were preceded by release of regulations in quarters (Q4 2015, Q3 2016, Q1 2017, Q2 2017 and Q4 2017 – as seen in *Figure 35*) before those higher issuance amounts. The quantitative results indicated that institutional pressures through regulations and advocacy was driving the higher issuances in China in those quarters. Having the presence of this highly effective institutional pressure was confirmed in the qualitative interviews as well as in literature.

Respondents associated with the international markets mentioned that regulators in China play an integral role in shaping the markets and this can be seen even in how some sectors are more popular than others. Although some regulation guidelines (like PBoC and NDRC) may have slightly different definitions of eligible green sectors, both regulations mention nationally prioritized sectors like energy, transport and water. As the qualitative findings suggest, there is high market discipline in China and a regulatory signal is an enabler for domestic issuers to “either venture into new sectors (like adaptation, waste, industry or land-use) or ramp up their issuances in a prioritized sector (like energy, transport and water)”. Given the domestic focus of the market so far and as *Figure 10* highlighted, issuances were mainly in CNY with most investors and market verifiers also being domestic. However, the rise in currency diversity (USD and EUR) showed that there was a push towards bringing more international investors in the market.

In terms of institutional actors shaping this market’s field logic, it was evident that certain regulators like PBoC will play a more crucial role. For example, in CSRC’s regulation the PBoC’s definition of green was adopted as opposed to NDRC’s slightly different definition. The PBoC’s definitions are aligned with international green definitions that are mentioned in the Green Bond Principles (GBP) as well as the Climate Bonds Initiative Taxonomy and Standards (Dai, Kidney & Sonerud, 2016). Furthermore, in Q4 2016 (Guidelines for Establishing a Green Financial System) and Q2 of 2017 (Financial Industry Standardization System Development), the Chinese government announced the intent to update market standards and harmonize varying definitions of green. In these announcements, it was indicated that the process would be led by

PBoC, which further showcases that some regulators are more likely to influence the institutional field logics of the green bond market than others.

However, it seems that all regulation in China is driven due to a top-down approach and institutional pressure can be implemented effectively due to a high degree of structuration in the regulatory institutions. Having this institutional pressure either through regulation or advocacy also increases market confidence among domestic issuers and therefore leads to greater growth in the market. From the findings on China, this paper can conclude that growth in the Chinese green bond market can be directly linked to coercive and mimetic institutional pressures exerted by regulators and international market advocates respectively (DiMaggio & Powell, 1983).

### **RQ2: What has been the role of institutional pressure on the green bond market in India?**

As mentioned in the literature, India's level of institutional support in the green bond market is still in its formative stages. Although there is some degree of social consensus among organizational decision-makers to support this market, the structure and discourse around creating this regulatory framework is not yet settled. As evidenced from the interviews, social aspects like awareness about climate change and green economy, political priorities and general health of the economy play a key role in how decisions get made in India. Therefore, it becomes crucial to understand what and who is driving the growth in the Indian green bond market so far.

Influences on this market is exerted from social actors like issuers, investors, industry associations and other stakeholders like Climate Bonds Initiative. However, what is clearly driving regulation signals has been the interest from investors and issuers to ensure that the market has some "regulatory stamp". As was mentioned in the qualitative findings, investor confidence plays a big role, especially for those that are from the international market and represent long-term institutional interests. Seeing a regulator like SEBI back the market through its disclosure norms, provides domestic and international investors the opportunity to know more about the green bond.

Having these disclosure norms in place can play a big role, especially if it feeds investor expectation to know more about their investments. However, the transaction costs around disclosures, such as annual or semi-annual reporting (as mentioned in SEBI's norms) as well as pre-issuance verification, can serve as a deterrent for potential issuers that would like to enter the market. Here is where having market infrastructure like domestic verifiers in China or tax incentives on green bonds can be useful for participants in the Indian green bond market. However, in order to do so, it requires an institutional regime change and this will only happen if social and economic priorities match-up.

Currently, from the market growth we see that India's green bond evolution is being driven by key national priorities, advocacy and investment opportunities. If we look at key national priorities, renewable energy targets for India's NDMC were recently updated from 175 GW to 223 GW by 2022 (Saluja & Singh, 2018). As was mentioned in the literature, this level of renewable energy requires greater than \$100 billion per year and requires exploring options beyond traditional sources of finance.

Furthermore, the current Indian government has also made political promises of electrifying all homes by 2019. This market currently serves as a financing tool to close the

financing gap for some of those renewable energy targets. However, it can also be used to fulfill those political agendas and therefore appeal to the social actor (general public or the voters) in the case of India. Additionally, regulators like the RBI can also influence interest rates and address priority sector limits (PSL) for renewable energy. As mentioned in the interviews, interest rate and financial incentives will definitely play a role in creating more attractive green bonds. Furthermore, if PSL bonds can be made tradable – it will allow for greater flexibility in the market.

The Indian market is driven by investment demand that has emerged from foreign investors as well as increasing local project opportunities. We can see this in the currency trends of *Figure 10*, where a majority (63%) of the total issuance amount was done in USD, as opposed to INR issuances (37%). However, total number of bonds in INR were higher than those in USD (65% as compared to 35% respectively) and this signalled the interest from Indian issuers to issue in local currency. In order to attract new international investors into the market, Indian issuers also had the greatest number of CBI certifications for their issuances. This signalled that the Indian market was also being driven by the needs of the investor, as opposed to just the regulation. In terms of sector-specific trends, issuances in energy were significantly higher than all other sectors. As one issuer pointed out, this focus on the energy sector was due to social and national priorities as well as economic opportunities in this sector lining up.

In terms of impact of advocacy in the market, a clear growth in total issuances per quarter was visible in *Figure 34*, especially when CBI events held were higher. For example, 2 or more events held in Q2 2016, Q4 2016, Q2 2017 and Q3 2017, were followed in the subsequent quarters (Q3 2016, Q1 2017 and Q3 2017) with higher than usual issuances. However, as visible in *Figure 36*, issuance also got impacted when key events like RBI regulation on Masala bonds, UNEP FI report release or demonetization of the currency occurred in India. Since the data available for both countries is only for three years, there was no statistical test conducted to measure the impact or correlation of the regulation or key events. However, it was clear from the qualitative interviews that policy support and advocacy for the market plays a big role in how the market responds.

In terms of growing the regulator's role in the market, green finance is a topic that is still in its nascent stages among Indian regulators. With issues of NPAs and lack of accountability becoming an ongoing challenge for the Indian financial sector, regulators are left being reactive rather than proactive to this market. According to one regulator, it was important for “regulation to come after the market was established and in a supportive capacity.” Doing so, however, restricts the proactive approach of creating a market infrastructure and limits the potential of the Indian green bond market. Furthermore, as experienced in the NPA situation, it is important that regulation come pro-actively rather than be built around market failure.

This latent growth in the market is visible in *Figure 32* and *Table 7*, which compares China's market as being six times bigger than India's (\$47.6 billion as compared to \$7.8 billion), having greater diversity in currency (3 as compared to 2), greater number of sectors (8 as compared to 5) as well as more issuer types (17 as compared to 9). In terms of upcoming regulation, various stakeholders indicated that 2018 being the year before the general election, it was less likely that any major regulation changes would take place in this market.

Given that awareness on green finance is generally low and it is not a political issue either, any work on green bonds or green finance would take a backseat to regulation on NPAs or the issue of bad loans in the Indian economy. However, it is important to note here that momentum in green finance around the world and especially in emerging economies like India, should not be taken lightly by any regulator. In fact, regulatory role plays an important factor in ensuring that the market integrity is kept and greenwashing or unaccountability in governance is prevented from the beginning (Dubash, 2017). This is further useful for investors that make financial decisions based on how reliable the project is and rely on the regulator's oversight to keep risk of default or fraud to the minimum.

The market-driven approach of India's green bond market is in line with the academic literature on how Indian regulators operate – where “the line between a policy decision and a regulatory decision is often blurred...as [the norm of functioning for] Indian regulators [often] require exercise of judgement...which extends beyond technocratic application of rules” (Dubash, 2017, p. 238) or following pro-active regulatory approach like that done in China. In most cases, the ‘regulatory space’ in India also consists of broader civil society actors and industry groups. Given this embeddedness of regulators in the public sphere, it is clear that important social actors in the Indian context – especially those in advocacy, investor and political roles – play a part in influencing the focus on regulation type as well as shape how fast the green bond market grows in India.

### **RQ3: How do institutional factors further strengthen the growth of the green bond market in emerging economies like India and China?**

As mentioned in institutional theory, the power distribution among various actors (legitimate formal decision-makers) and their efforts to engage in institutional work (lobbying) is indicative of how the norm is changing and new values are getting created in that field. In this case, advocacy actors like CBI and social actors like investors are engaging important legitimate decision-makers like regulators, through their events and communication in relation to the green bond market. This could indicate the early stages of institutionalization of the green bond market and a change in the traditional financial regime.

#### **Theoretical Contribution**

In order to better understand how institutional factors can be used to strengthen the green bond market in India and China, the following three new findings for institutional theory are evident in this study:

#### **Regulation is driven by high priority social actors and their impact – whether it is public perception of voters, investors or regulator.**

As mentioned in literature, social actors play an important role in defining the institutional logics of any field. In this context, social actors in both countries play an important role in how regulated the green bond market gets. However, this study finds that depending on the socio-political contexts, social actors differ and their ability to influence regulation creation or change is also unique.

From the findings, it is evidenced that a social actor that holds high degree of legitimacy, financial power and spans various institutional settings can be identified as being a *high priority social actor*. For example, in China, PBoC plays a bigger role in this market given its legitimacy as a central bank, financial power and ability to influence regulators across other institutional settings, thereby making it a high priority social actor for China.

In India, the impact of high priority social actors is contingent on public perception (through civil society organizations or voters) and investor confidence in the market. Regulation in the Indian green bond market is either dependent on investor needs or whether green finance becomes an important socio-economic issue for the public (similar to how NPAs are emerging as important issues). Similarly, in the international green bond market, a high priority actor can be the institutional investor, given their mainstream reputation, shareholder and financial power.

Therefore, in order to enable any regulation or institutional change in the green bond market, it is important to have the country's high priority social actor on board with the transition. By doing so, regulators can serve to restructure the negotiation space, to constrain it, make it more transparent and legitimize certain forms of negotiation that contain certain safeguards for the public (Dubash, 2017, p. 239). Institutional legitimacy for regulators lies in ensuring widespread participation in decision-making as well as tapping into the technical expertise (Dubash, 2017). By having participation from high priority social actors like important regulators or mainstream investors, it creates a necessary dialogue that not only increases information basis for a regulatory decision-making (Dubash, 2017, p. 244), but also ensures greater accountability and legitimizes democratic institutional change (DiMaggio & Powell, 1983; Dubash, 2017).

### **Increasing collaboration among regulators leads to better outcomes for field logics.**

Given that the green bond market involves a degree of “deinstitutionalization of existing logic elements” (Fuenfschilling & Truffer, 2014, p. 776) in the financial markets, it is important that regulators try to minimize the growing pains for stakeholders in this transition as much as possible. In order to do so, the study finds that collaboration among various regulators can lead to better harmonization across policies that will have a positive impact on this market.

A lack of collaboration can adversely impact the effectiveness of a policy or regulation in the market. From the Chinese case, different definitions and eligible categories for green from different regulators, led to the market becoming confused. Not having harmonized definitions may have adversely impacted greater participation rate in the market and therefore hampered the institutionalization of the field logics in the green bond market.

In the Indian context, currently there are inter-departmental committees set up by regulators on green finance. However, new regulators like RBI, Pensions Fund Regulatory and Development Authority (PFRDA), Insurance Regulatory and Development Authority of India (IRDAI) may issue regulations relating to this market at some point. Given that these regulators have public mandates, government's role as a policy coordinator will allow for effective regulation and make it easier for new issuers to participate in the market as well.

### **Reduction of social actors' perceived risk can contribute to institutional strength.**

As was mentioned in the literature, regulatory risk emerges as an important concern when addressing long-term investment in relation to climate change. In order for regulatory risk to reduce, it is important that social actors are kept in the loop about changes in the regulation. It was mentioned in the qualitative interviews that having a public forum or platform can be an important tool for better communication among various social actors.

Although there are communication initiatives in both countries – such as the Indian Green Bond Council or China’s Green Finance Committee – it is important that regulators be accessible to the primary market players. By communicating changes to regulation and taking in consideration what is required by the market, regulators can reduce a social actor’s perceived risk and thereby strengthen institutional impact in the market.

In conclusion, factors like advocacy from high priority social actors, overall robustness of financial sector, strength of institutional field logics as well as perceived regulatory risk will impact the growth of the green bond market in both countries.

### **Differences between the institutional structures of China and India**

For China, it is evident that institutional pressure already exists in the green bond market due to the high degree of institutionalization or legitimacy among regulators. Having several formal institutions that regulate the green bond market through policies, guidelines and regulation, allows Chinese regulatory actors to be at the sedimentation stage. Similar to the literature on Green Credit Policy, this stage signals that the green bond market has become normative and the discourse about it has settled down due to vested interests in maintaining the growth in this market (Tolbert & Zucker, 1999). In terms of further shaping the institutional field logics of the Chinese green bond market, it seems that high priority social actors like important regulators (like PBoC), international investors (institutional investors) or industry associations (Climate Bonds Initiative) are able to drive this change.

For India, the impact of institutional pressure from regulators is yet to be completely determined as only regulation currently exists in the market. However, in terms of stages of institutionalization of the market among regulators, it stands at the objectification stage. This means that there is some degree of social consensus among organizational decision-makers to increase adoption (Tolbert & Zucker, 1999), but the discourse has not fully settled yet.

Given the focus on a ‘market-based’ approach, Indian regulators are more reactive to the green bond market growth, as opposed to the pro-active approach taken by the Chinese regulators. However, regulators that participate in the market do so in order to convey policy signals and maintain market confidence of high priority social actors. Informal institutions like high priority social actors in India, like voters, investors or industry associations can be a driving force in changing prevailing institutional logic, either through their formal or informal lobbying (Fuenfschilling & Truffer, 2014). This is different than the institutional system in China, where such informal institutions are less likely to have a higher impact on institutional change.



## Chapter 8. Conclusion

With populations rising and climate impacts becoming worse every year, governments have realised a need to transition towards a low-carbon world. The green bond market provides this ability to invest into such a future, without compromising on economic benefits. This dual or bonus return is what has been driving the exponential growth in the market so far. However, there is a significant need to further support and sustain this market, in terms of public policy or economic incentives, especially if we are to do it in the timeline of a decade (IPCC, 2018).

As Mark Carney puts it, “climate change is a tragedy of the horizons”, where the lack of ability to think long term has been an impediment towards addressing this societal problem (Carney, 2015) – that is until now. With climate change already having widespread social, economic and environmental impacts, climate adaptation and mitigation solutions (such as those financed by green bonds) has peaked interest across private and public sector actors in the last few years. Over the years, this exponential growth in the green bond market has been a climate finance success story. It has shown that socially responsible investment can not only achieve a transition to LCR economy, but also provide both financial as well as environmental returns, without having to sacrifice one or the other.

Keeping this in mind, it is interesting that recent growth in the global green bond market has been driven by emerging countries and their governments. Given that emerging and developing nations are also the most susceptible to climate change impacts, it becomes important to address them as an important stakeholder in this market as well as in the global LCR transition. However, so far research and academic knowledge has been lacking on how emerging countries like India and China can actually safeguard their futures by growing their climate finance and green bond markets.

This study identified the need to understand the current role that emerging economy public sector plays in supporting such markets. It found that depending on the government’s approach, any policy action to combat climate change will have cross-cutting impacts on various societal, sectorial, economic and environmental aspects of growth in that country. It also found that governments can help build the market, if they are able to institutionalize it for the stakeholders involved.

One important institutional actor to create the necessary change is the regulator that oversees the accountability and access to this market. The traditional mandate of any regulator has been overseeing governance (Dubash, 2017; Majone, 1994), yet financial regulators in emerging economies like India and China are participating more actively in the growth of this market. This participation has been encouraging to market participants, such as international investors and potential issuers that are looking to raise capital in order to transition towards the LCR economy. Given the growing urgency of climate change and its ability to impact emerging economies, the role of regulators in supporting the growth in this market becomes integral to the adaptability and resilience of a country’s financial system.

Furthermore, with international investors in the picture, the regulator role is further amplified to safeguard the market from fears of ‘greenwashing’, by clarifying what is regarded as green in the context of that country. For regulators, the first step towards mainstreaming the green bond market is to keep in mind that context and high priority social actors can play a

significant role in ‘nudging’ this institutionalization. If regulators are able to effectively engage with various high priority institutional actors that are relevant to their country-context, it will prompt a change in traditional institutional logics of growth and enable the green bond market to scale up to fill the huge gaps that currently exist in LCR funding.

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## Appendix

### 10.1. Open and Axial Coding Themes

Axial Coding	Open Coding	Example of participant's quotes
Regulation	Policies, guidelines, disclosure norms, definition of green, green credit guidelines, reactive approach, pro-active approach	“waiting on regulation” “market is reactive to regulation” “international best practices” “regulatory risk” “enforcement not strong” “institutional approach”
Investor Confidence	Investor community, market confidence, investor expectations, stakeholders	“transparency” “greater disclosures are encouraged by investors” “constant dialogue” “impact of the investment”
Challenges in the Market	Transaction costs, issuers paying for verification requirements, reporting due to regulation, lack of market infrastructure, incentives	“issuers pay more for verification needs” “there is no sign of greenium as of yet” “reporting more than once a year is added transaction costs” “lack of incentives provided by the government” “no harmonized definitions of green”
Business Case of the Market	Reputational benefits, diverse investor mix, signalling opportunity	“reputation improves due to the green bond label” “more diverse investors want to place orders for these bonds” “good signalling opportunity for policy-makers and regulators” “establish the market framework”

## 10.2. Oral Consent Script

### **Introduction:**

Hello. My name is Vasundhara Saravade. I am conducting interviews about the impact of policies and regulation on the green bond market. I'm conducting this as part of my research for my Master's thesis at the University of Waterloo's School of Environment, Enterprise and Development (SEED) in Waterloo, Canada. I'm working under the direction Dr. Olaf Weber, who is a Professor at the School of Environment, Enterprise and Development.

I located/found your name by *reading your article [insert name of article]; visiting the websites of [insert website name]; searching for persons working in the area of [insert topic]; by having your name suggested to me by [possibly insert name of contact here, if appropriate]; by people who know about [insert topic].*

### **What will happen during the study?**

I'm inviting you to do a one-on-one interview *[telephone, Skype or face –to-face]* that will take about 60 minutes or 1 hour. I will ask you questions about the green bond market in your country and the policies related to the green bond market. I will take handwritten notes to record your answers as well as use an audio recorder to make sure I don't miss what you say. These recordings and notes will not be shared by anyone outside of the research team. We will also keep your identity and attribution of any quotes anonymous and confidential. If you agree to go ahead with an interview, we can set up a time (and place) that works for us both.

### **Are there any risks to doing this study?**

It is not likely that there will be any harms or discomforts associated with the interview. However, you do not need to answer questions that make you feel uncomfortable or that you do not want to answer. And you can withdraw (stop taking part) at any time. I describe below the steps I am taking to protect your privacy.

### **Benefits:**

It is unlikely that there will be direct benefits to you, however, by better understanding the green bond market through your perspective, the researchers and others may be able to contribute to the existing academic and practical knowledge on the topic.

### **Confidentiality**

I will keep any identifying information you tell me during the interview confidential. Information I put in my report that could identify you will not be published or shared beyond the research team. However, if applicable, I may use relevant quotes from the interviews and in such cases, there will be no attribution and your identity will be anonymous.

### **Voluntary participation:**

- Your participation in this study is voluntary.
- You can decide to stop at any time, even part-way through the interview for whatever reason.

- If you decide to stop participating, there will be no consequences to you.
- If you decide to stop, we will ask you how you would like us to handle the data collected up to that point.
- This could include returning it to you, destroying it or using the data collected up to that point.
- If you do not want to answer some of the questions you do not have to, but you can still be in the study.
- If you have any questions about this study or would like more information you can call or email me at (613) 265-3431 or [v3sarava@uwaterloo.ca](mailto:v3sarava@uwaterloo.ca). You can also contact my supervisor, Professor Olaf Weber at 519-888-4567 ext. 38065 or email [oweber@uwaterloo.ca](mailto:oweber@uwaterloo.ca).

I would like to assure you that the study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (**ORE#23082**). If you have questions for the Committee, please contact the Office of Research Ethics, at 1-519-888-4567 ext. 36005 or [ore-ceo@uwaterloo.ca](mailto:ore-ceo@uwaterloo.ca).

I would be pleased to send you a short summary of the study results when I finish going over our results. Please let me know if you would like a summary and what would be the best way to get this to you.

**Consent questions:**

- Do you have any questions or would like any additional details? *[Answer questions.]*
- Do you agree to participate in this study knowing that you can withdraw at any point with no consequences to you?  
*[If yes, begin the interview.]*  
*[If no, thank the participant for his/her time.]*

### **10.3. List of Interview Questions**

#### **Interview Questions for Industry Associations (like the Climate Bonds Initiative)**

1. Could you elaborate a bit more on the current green bond market situation in India and China? How can organizations like Climate Bonds Initiatives help in growing these green bond markets?
2. What are the key sectors in these two countries that international and domestic investors have the most interest in via a green bond?
3. With the rapid growth of the green bond market and its transition into an asset class, can you describe the investor base investing in these two economies? Further, which developed countries will most likely be investing in these two green bond landscapes?
4. How can potential investors evaluate performances and assess risk in the Indian and Chinese green bond market?
5. What kind of enabling conditions can the government create to attract international investors in certain sectors? For example, how can the Indian and Chinese governments convince international investors to focus their investment specifically into the sectors that are the most important to their national targets?
6. How has the COP-21 in Paris influenced the green bonds sector in relation to increasing climate adaptation funding?
7. Since the past few years, municipal green bond markets are booming. Since a green city bond is able to fund further development and infrastructure, do you think there is scope for international investment into green municipal bonds for small-medium sized cities in India and China?
8. In terms of short term and long-term sustainability, will green bonds be socially, economically and environmentally stable investment for the investor?
9. Is there any scope for growing the Indian and Chinese green bond market by opening it up to the domestic retail investor?
10. Is the accessibility in terms of volume and ease for an individual investment available in the current market?

#### **Interview Questions for Policy Makers in China and India**

1. What role does a green bond play in funding climate resilient infrastructure?

2. Are there any future plans for attracting international green investment (in the form of a green bond) into India/China? Please elaborate.
3. Given the emphasis of your government on the issue of climate change, is there a role for green bonds in curbing this problem? If so, what role does a national governmental agency play in the domestic coordination of a green bond's funds?
4. How can India/China attract greater private sector investment for this market?
5. What regulatory tools are advocated by your agency in helping grow the green bond market?
6. What is your country's level of target in the green bond market for the upcoming year?
7. Are there any new sectors that the government would like to focus on or support for prospective green bond issuers?
8. How does the government play to address political and regulatory risk for current and prospective investors and issuers of this market?
9. Are there any particular policies or regulatory approaches being implemented by other countries, that you think might help your country's current approach in growing the green bond market?

### **Interview Questions for Investors, Multilateral Financial Institutions**

1. What role do green bonds play in financing the transition towards a low carbon and climate resilient economy?
2. Ever since the COP21 in Paris, developed countries are promising the end of the fossil fuel era. Do you see green bonds playing a role in turning this commitment into reality?
3. Climate finance falls short of the \$100-billion-dollar commitment that developed countries have promised to developing countries. How can developing or emerging country green bonds attract higher private sector funds from these developed countries, in order to meet this target?
4. What sectors are investors most likely to invest in via a green bond?
5. Infrastructure is rapidly becoming an asset class in the green bond market. How can governments attract higher investment into this asset class?
6. What kind of enabling environments or policy changes can the Indian and Chinese governments make in attracting higher investment into their green bonds?

7. Do you think investors should be encouraged into choosing green bonds over regular bonds by using regulatory pressure from these two governments? Or should the Indian and Chinese market be left alone to develop at their natural pace?