Green Bonds Issuance and Chinese Sustainable Governance

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Abstract

Reform and opening up policies since 1978 have achieved high growth of Chinese economy. However, to proceed sustainable economic growth Chinese societies have to solve some critical problems overflowing from noneconomic spheres such as regional governance relative to Hong Kong issue and social security weakened by COVID-19 pandemic, climate change issues to increase natural disasters and others. Green bonds issuance is expected to be effective for construction of sustainable community but unavoidably takes structural changes of stakeholders with digital industrial revolution. The theoretical analysis of multi stakeholders explores a cooperative scheme to develop green bond issuance in two steps. The theoretical model of green bond issuance proves that a definition of Chinese green bond markets brings a restrictive framework for stakeholders to increase the issuance of green bond and to promote construction of social infrastructures.

1. Introduction

Since 1978 reform and opening up policies have propelled high growth of Chinese economy. China has developed exports and joined WTO in 2001. Chinese economy has contributed on enlargement of world trade with the thought of the neo liberalisms. The enlargement of global markets is formed by dynamic competition in the growing world market but arranged with revolution of ICT. The innovation of ICT does alter not only production of manufacturing but also performance of financial service industries. Consequently, lifestyles of residents as well as industrial structures have been changing extensively. Since the ancient China has not only obtained a large region but also governed international society to be shared with many nations. The new industrial revolution promoted by innovation of ICT should be compatible with contribution on construction of sustainable Chinese communities.

In the 21th century globalization supported by innovation of ICT requires China to solve two problems. In the first, economies of China have grown with enlargement of global economies. Consequently, the economic prosperity of China depends on sustainable development of global economies. The global communities should attempt to

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overcome cooperatively some global problems such as Climate Change and COVID-19[1]. While global economies have grown and integrated efficiently by developing globalized and digitalized markets, global communities must be involved with problems of government and market failures at a global level. In 2020, COVID-19 has brought many lockdown places in the world. The preventing policies for inflection spread of COVID-19 require each region to recover serious damages of the pandemic. Climate Change problems have exhibited various natural disasters in many regions. China-US trade problems occurring by raising tariffs and regulating trade in 2018 leave framework of free trade to develop world economy. In the process of globalization many neo liberalists have argued that enlarging market economies could improve welfare of global societies. As globalized economies move into an integrated system, the social and environmental problems disturb the development of market economies. Enlarging scale of market economies is more probable to increase peril lowering sustainability of society. Chinese economy will be not exceptional but follow suit of other major countries. To prevent great crises the globalized economies should construct positively sustainable scheme of communities.[2]

In the decade of 2010, many corporations become to have more opportunities to obtain benefits by connecting with services provided by internet. [3] In China many large corporations such as Alibaba and Tencent combine efficiently supply system with needs of consumer by internet services. Innovation of ICT is expected to bring the 4th industrial revolution to reconstruct fundamentally Chinese social and economic systems. The new industrial revolution changes the profitable business model from the price competition for market dominance brought by scale of production to diversified provision of services on the platform. Hindman (2018) explores the mechanism that the digital economy builds monopolies. Tanaka (2019a) theoretically discusses that behaviors of the major corporations in the digital economy can be suitably formulated by the centralized framework. The digitalization has not only evolved the centralization of the economies, but also influenced on features of stakeholders.

In the centralized scheme Tanaka (2019b) focuses on the structural reform of stakeholders brought by this industrial revolution. Development of ICT facilitates the

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[1] Tanaka (2017b) and (2018) provide a theoretical framework to evaluate regional sustainability.

[2] Tanaka (2016a) makes a theoretical foundation for the principle of social responsibility.

[3] This paper investigates the efficient net work system that the digitalized economic and social system construct.

communication between corporations and stakeholders and changes lives of the resident. However, some individuals to stay outside of the digital communication[4] can not obtain enough benefit from the new industrial revolution. The digital industrial revolution diversifies the relations between market and stakeholders. This paper provides a theoretical foundation for the Tanaka (2020b) to research the new normal initiatives of China. This paper is organized as follows. Section 2 explores relations between structure of stakeholders and green bond issuance. The stakeholders are classified to analyze the green bond issuance. This section exhibits a theoretical framework with multi stakeholders to explore the interrelation between the digital industrial revolution and the green bond issuance. Section 3 makes clear theoretically the social mechanism that green bonds transform the structure of stakeholders. The two definitions of Chinese green bonds are demonstrated to make impacts differently on issuance and stakeholders.

   This paper explores green bond initiatives that China facilitates to aim for sustainable communities. Green bonds produce cooperative schemes with many stakeholders to achieve sustainable communities. Arrow (1973) argues that CSR (Corporate Social Responsibility) is significant for the research of economic theory. Tirole (2001) explores CSR by developing incentive theory on shareholder values. Sustainability of global communities seeks for construction of decentralized schemes. Tanaka (2004) presents a theoretical model to analyze sustainability of the corporation with multi stakeholders. Tanaka(2016a),(2017b) and (2018) apply this theoretical model to investigate sustainability problems of global communities[5]. Tanka(2019a) and (2019b) provide the hypothesis that the new industrial revolution brought by globalization and digital innovation develops centralized frameworks in societies and economies. The research investigates further the market and the government failures brought by the centralized framework. Tanaka(2019c),(2020a),(2020c) evaluate social impacts of the new industrial revolution by investigating the structural change of stakeholders.

2. Green Bond Definitions and Sustainability in China

   The ancient Chinese dynasties had established traditionally a centralized system of governance. However, traditionally the regional societies which were formed before the industrial revolution have been governed cooperatively in communities. The reform

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[4] Choudrie, Tsatsou and Kruria (2018) and others explore the diversities in the social usability of digital technologies.

[5] Global Sustainable Investment Alliance(2019) discusses the progressive development of sustainable governance in the global economies.

and opening up policies have facilitated market mechanisms and reconstructed social systems to adapt for growing production of manufacture industries. Since the 2010s innovation of ICT and spreading utilization of internets induce efficient economic systems to be independent of scale merits from mass production[6]. Long and Gao (eds.)(2019) do not fucus mainly on the development of digitalization of industries but explore that the structural change of industries brings many shrinking cities in China and diversified vitalization of regions.

Although China has been enhancing welfare of societies by growing scale of economies since the period of the reform and opening up policies, Tanaka (2019b) demonstrates theoretically that digitalized economic systems are not able to improve social welfare without constructing sustainable schemes. China could not develop economic and social systems without developing digital transformation and primarily should aim to achieve sustainable framework of communities. China has facilitated green bond markets to solve climate change problems and to construct social infrastructures. This paper theoretically explores green bond market in China to attain sustainability of economies and societies.

Tanaka (2019b) and (2020a) fucus on the structural changes of stakeholders and present a theoretical model to investigate sustainable communities to improve digital transformation of economies. The model explores the relation between the corporation and the stakeholders by using a principal and agency model of game theories. The model takes the following assumptions. The corporation performs production x to obtain net private profit. In this paper we explore behavior of stakeholders in the green bond market. In this situation production x indicates the amount of green bond issued by the corporation for own project or business. The corporation takes n stakeholders and makes payment t_i, such as wages, benefits and tax, for each stakeholder i. The total payment t is stated by the expression $t = \sum_{i=1}^{n} t_i$. The stakeholder i exhibits evaluation of corporation by $V_i(x, t_i)$. The stakeholder i is classified into positive stakeholders, $\frac{\partial V_i}{\partial x} \geq 0$ and negative stakeholders, $\frac{\partial V_j}{\partial x} < 0$. Spreading facilities of internet affect the relations between corporations and stakeholders. The digitalization of industries

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[6] Richardson and Nam(2014) explain the reasons why globalized economies bring many shrinking cities. Many researcher discuss rising influences of the digital industries. Rifkin(2014), Oskam (2019), Paus (2018), Cassiers, Maréchal and D.Méda ed. , (2018) and Baecker,R.M.(2019)explore the revolutionary changes in social systems to be brought by innovation of ICT.

increases a new type of negative stakeholders and consequently reform the structure of stakeholders. To explore the feature of digitalization in economies and societies Tanaka (2019b) classifies stakeholders into three types to be defined as inside, outside and external stakeholders. The corporation ordinally follows the contacts with many stakeholders in markets and institutions but is probable to bring occasional connections with some stakeholders. The former stakeholder is referred as the inside stakeholder and the latter stakeholder is named as the outside stakeholder. The inside stakeholders include regular customers, business partners and employees. The outside stakeholders can connect more occasionally and freely with the corporation than the inside stakeholders. In the context of the green bond the inside stakeholders exhibit a related organization including local governments and the outside stakeholders is collected in digital markets. Although the external stakeholders are not concerned directly with the corporation in economic activities, they could take it more socially by non economical means such as regulations and legislations.

This paper explores sustainability of Chinese economic and social systems by focusing on green bonds. Financial technologies have evolved greatly with innovation of ICT. Green bonds are probable to grow by facilitating the improving internet technologies and offshore markets. Openly enlarging markets are required for trades to be fair and legitimate. However, green bond markets in China reflect domestic financial systems. The theory of multi stakeholders stated above is applicable to exhibit the issues of Green bond markets in China. Figure 1 represents that Chinese green bonds are divided into the two groups according to CBI and Chinese definition. The classification in the theoretical model of stakeholders is effectively applicable to exhibit the two green bond markets in China.

2019 global green bond issuance: top 15 countries
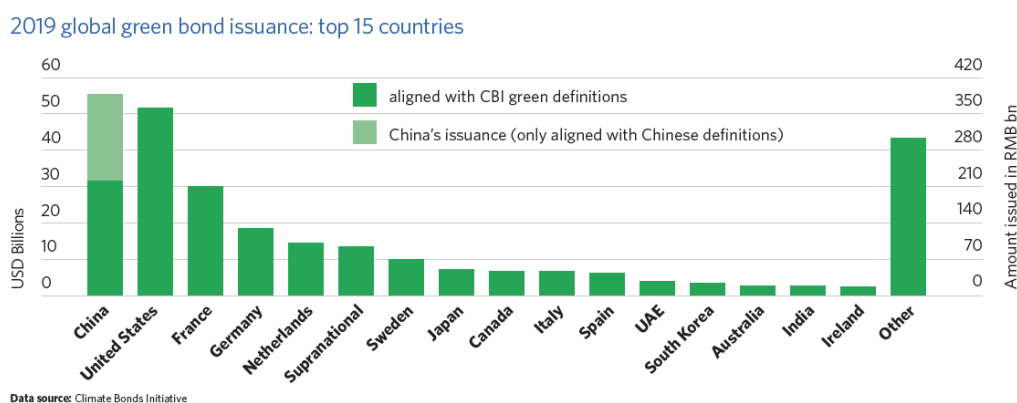
Data source: Climate Bonds Initiative

Source: Climate Bonds Initiative; *China Green Bond Market :2019 Research Report, page 3*

Figure 1 Global green bond issuance

Applicants of the green bond aligned by CBI rule are defined to be outside stakeholders. Chinese corporations take various ways to achieve sustainable governance. While some corporations frequently perform transactions according to global businesses rules, others trade mainly in a large domestic market. Many large companies are state owned corporations and could not efficiently adapt changing global requirements of governance. The reform of the state owned corporation is a problem of corporate governance in China. To explore the transition of economies and societies in the Chinese digitalization, this paper assumes the following classification of stakeholders. Inside stakeholders are corporation and individuals to be concerned mainly with the domestic markets and outside stakeholders perform actively in global markets. To apply more formally the theoretical model of stakeholders on Chinese bond markets, the inside and outside stakeholders are assumed to be defined as follows. The inside stakeholders participate in green bond markets to be aligned by Chinese domestic rule. The outside stakeholders transact mainly the green bond to be aligned by CBI rule. As the first type of the green bond is probable to improve the local infrastructure, the inside stakeholders are assumed to share positively the related profit with the corporation. On the other hand, the second type of the green bond could facilitate sustainability of global communities such as in climate change problems, the outside stakeholders are possible to take negative stakeholders.

The digitalizing scheme of economies and societies efficiently facilitates voluntary contribution of stakeholders to provide services and knowledge. This voluntary contribution influences the relation between the corporation and stakeholders. While corporations continue to develop centralized scheme, Tanaka (2020b) demonstrates that digitalization is probable to increase negative stakeholders. The negative stakeholders attempt to decrease the dead weight losses from over production. The reaction for negative stakeholders to activate decentralized systems improves sustainability of communities. Tanaka (2017b) explores that negative stakeholders contribute the sustainable mechanism. China should initiate a method for negative stakeholders to contribute on sustainable communities. In mathematical expression, the inside stakeholders are denoted by $1, \ldots, n_0$. The outside stakeholders are exhibited by $n_0 + 1, \ldots, n_1$. The external stakeholders such as NGO and NPO are denoted by $n_1 + 1, \ldots, n$.

The communication between the corporation and the inside stakeholders is expected to enhance efficiently green bond issuance. While the inside stakeholders might support issuance of green bond, the outside stakeholders intend to improve the scheme of sustainable governance. The stakeholder i contributes effort y_i to improve

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communication scheme. As the communication scheme forms a network structure, the total efforts $y = \sum_{i=1}^{n} y_i$ collectively improve efficiency of communication mechanism. However, the effort of each type of stakeholder differently influences communication mechanism. Inside stakeholders are involved in the corporation more intensively or extensively than outside stakeholders. This efficiency indexes of communication scheme represent different values $\beta(x)$ and $\gamma(y)$ for the inside and the outside stakeholders. As inside stakeholders are supposed to connected more intensively with the corporation than outside stakeholders, the mathematical index of efficiency regarding communication schemes represents the inequality $1 > \beta(x) > \gamma(y)$ for any x, y. To hold mathematically the optimal conditions, the two communication index functions are increasing with x, y and are satisfied with $\beta'(x) > 0$ and $\gamma'(y) > 0$. The condition $\beta'(x) > 0$ implies that the accuracy to imvestigate the related projects is improving for enhancing bond issuance. As innovation of ICT in such as digital transactions aims to prevent free riding from digital services, improving ICT makes possible to indicate efficiency of communication regarding outside stakeholder by $\gamma(y)$[7]. $\gamma(y)$ is supposed to be an increasing function to be expressed by $\gamma'(y) > 0$. As the total contribution of stakeholders may alter the borders to classify stakeholders, border numbers n_0 and n_1 are not constant but variables of y. To be preciously, two borders are denoted by $n_0(y)$ and $n_1(y)$.

To recover the economies from the great depression of corona virus pandemic the government finance should construct framework of private public cooperation. "Global green bond issuance that is aligned with CBI green definitions reached USD259bn in 2019, marking a new global record. The total is up by 52% on the final 2018 figure of USD170.6bn….However, discrepancies still exist between China's local green bond guidelines and the international ones, especially when it comes to the eligibility of green projects and disclosure. On the definitions of some projects, the international guidelines pay more attention to climate change mitigation and adaptation, while the China's domestic ones also emphasize on environmental benefits such as pollution reduction, resource conservation and ecological protection in addition to the reduction of greenhouse gas emissions. In addition, China's local green bond guidelines also allow the proceeds of some type of green bonds to be used as general corporate operating

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[7] Tanaka (2019b) describes the optimal contribution y_i on communication scheme.

capital.[8]" The net benefit function of the corporation is stated by (1)[9].

$$NB = \Pi(x) + \beta(x)\sum_{i=1}^{n_0(y)}\{V_i(x,t_i) - y_i\} + \gamma(y)\sum_{i=n_{0(y)}+1}^{n_1(y)}\{V_i(x,t_i) - y_i\} - t. \quad (1)$$

To achieve sustainability of communities the Chinese corporation must consider not only market conditions but also evaluations exhibited by stakeholders. We should explore the coordination of economic and social systems to integrate behavior of stakeholders[10]. To explore the efficiency of the integrated system we define the transaction costs for the three types of stakeholders as follows. The expression (1) expresses that one unit of contribution on communication system with inside, outside and external stakeholders decrease the profit of the corporation by $\beta(x), \gamma(y)$ and zero. A part of contributions by stakeholders burden the corporation. The transactions taken by the stakeholders increase greater beyond the range that theory of industrial organizations has investigated[11]. The transaction costs of stakeholders C_i, C_o, C_e to improve communication are sated by

$$C_i = 1 - \beta(x), \quad\quad\quad\quad\quad\quad\quad\quad\quad (2)$$
$$C_o = 1 - \gamma(y), \quad\quad\quad\quad\quad\quad\quad\quad\quad (3)$$
$$C_e = 1 - 0. \quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad (4)$$

The transaction costs defined above simply show that the structure of stakeholders is closely related with the relative social communication costs. As a declining social communication cost is one of driving forces to propel a new industrial revolution, we should investigate structural change of stakeholders.

3. The Two Phases of Stakeholders Structure in Bond Issuance.
3.1 Invariable Structure of Stakeholders

The issuance market report of Chinese green bond features fundamental problems to digitalize societies in China. The corporation is assumed to maximize function (1)

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[8] the Climate Bonds Initiative and China Central Depository & Clearing Research Centre(2020),page 3.

[9] This expression revises (2) in Tanaka (2019b) to be applicable for the investigation of this paper.

[10] The development of digital economies creates new types of the transaction of goods and services. Beyond theory of Coase (1937) new forms of contracts are invented continuously. Corresponding to new wave of transaction, legislations and regulations are supplemented.

[11] There are many references such as Williamson(1975),(1986)and(1990).

regarding x, t_i ($i = 1, \cdots, n_1$). The optimal payments for stakeholders are expressed by (5),(6) and (7). Stakeholders voluntarily provide the total contribution y to improve communication. Innovation of technologies and efforts to reform communication scheme raise y. To explore reform of Chinese bond markets y is assumed to measure international and digital index in the bond markets. This paper discuses that the reform of bond market will change the structure of stakeholders. The optimal conditions of inside and outside stakeholders regarding payment are expressed by (5) and (6). $n_0(y)$ and $n_1(y)$ express that y possibly alters the borders between any two stakeholders.

$$\frac{\partial V_i(x,t_i)}{\partial t_i} = \frac{1}{\beta(x)}, \quad i = 1, \dots, n_0(y). \tag{5}$$

$$\frac{\partial V_i(x,t_i)}{\partial t_i} = \frac{1}{\gamma(y)}, \quad i = n_0(y) + 1, \dots, n_1(y). \tag{6}$$

As the corporations are assumed to perform centralized platform, their boundary solutions for external stakeholders are denoted by (7).

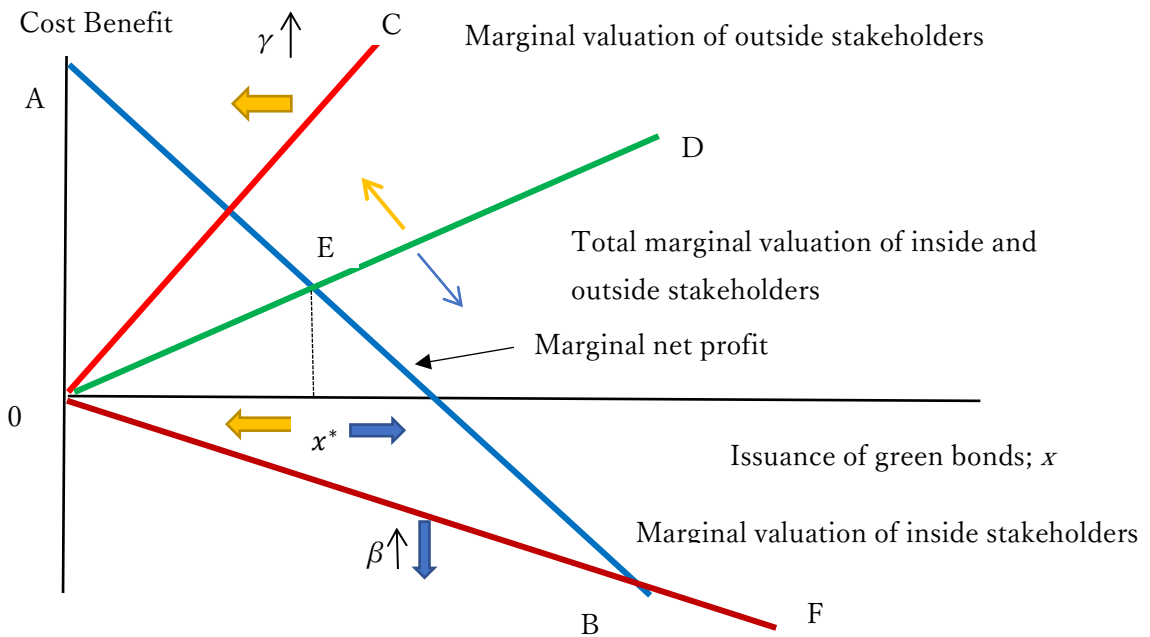$$t_i = 0, \quad \frac{\partial V_i(x,0)}{\partial t_i} > 0, \quad i = n_1(y) + 1, \dots, n. \tag{7}$$

Tanaka(2020c) provides a mathematical analysis to define contribution y. Stakeholders decide y to maximize own target of social welfare. In this paper we suppose that innovation of ICT and improving governance in the digital industrial revolution raise contribution y. We theoretically demonstrate that reform of communication systems between the corporation and stakeholders alters the structure of stakeholders to bring sustainable communities. The external stakeholders to hold strict condition (7) could improve communication of communities[12].

The optimal condition regarding issuance of green bond is written by

$$\frac{d\Pi}{dx} = \sum_{i=1}^{n_0(y)} - \left\{ \frac{d\beta(x)}{dx} (V_i(x, t_i) - y_i) + \beta(x) \frac{\partial V_i(x,t_i)}{\partial x} \right\} - \gamma(y) \sum_{i=n_0(y)+1}^{n_1(y)} \frac{\partial V_i(x,t_i)}{\partial x}. \tag{8}$$

We produce Figure 2 to exhibit graphical implication of expression (8). The left side of the above expression presents marginal net profit regarding issuance of green bond to be depicted by the curve AB and is supposed to be deceasing with x. The first summation in the right side of (8) is composed by both positive and negative stakeholders and expressed by curve 0F. However, inside stakeholders are cooperatively related with supply mechanism of the corporation. Consequently, this first summation is presented

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[12] Xie (2009)discusses performance of environmental activists in China to be referred as external stakeholders in this paper.

Figure 2. Green bond issuance and multi stakeholders

approximately by a negative sloping curve. Reminding the previous definition that the outside stakeholders are negative stakeholders, the second summation including a negative sign in the right side of (8) is shown by 0C. The curve 0D is summed with 0C and 0F. The expression (8) exhibits green bond issuance by the intersection point E and x^* between AB and 0D. In invariable condition of stakeholders the expression (8) implies that Chinese bond issuance equilibrate under the two countervailing factors. The coefficient γ rotates 0C and 0D up and leftward. The β turns 0F and CD down and right ward. In the situation that the structure of stakeholders is invariable, increasement of γ is forced to lower issuance of green bonds. In the similar structural condition, rising β moves the issuance upwardly.

In a firmly constructed structure of inside stakeholders corelative relation β and the issuance of green bond may occur. Figure 3 shows that Chinese local governments encourage positively social projects on climate changes and construction of infrastructures. Chinese bond markets have been developing by restricted members of inside stakeholders.
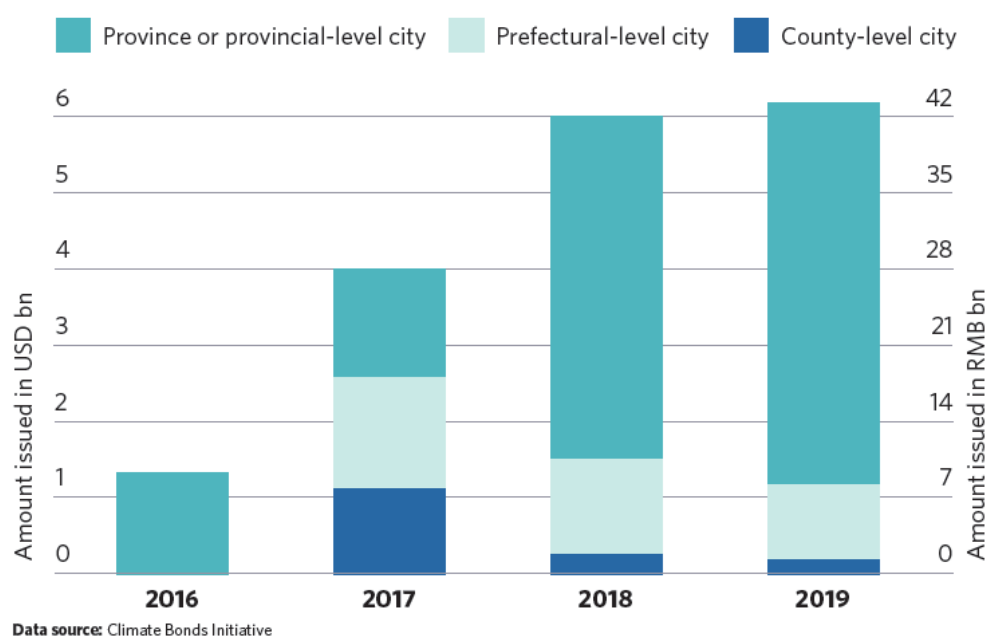
Source: Climate Bonds Initiative; *China Green Bond Market :2019 Research Report, page 5*

Figure 3. Local Government Financing Vehicles (LGFVs) and green bond issuance.

"While China's green bond market is currently being steered by a multitude of guidelines and measures, further growth could be spurred by tailored regulation and policy support. Different market participants have a varied need for green bond-related policies and incentives: issuers expect more sweeping subsidies and fast-tracked approval, whereas investors need better information disclosure and policy incentives. All market actors would benefit from clearer and unified standards. We have provided examples of policy mechanisms for key market participant groups below.[13]"

3.2 CBI global definition and Chinese domestic definition

The theoretical model in this paper makes clear the implication of this discrepancy of guidelines by producing Figure 2 as follows. Chinese domestic green bond guideline brings contribution y^c is smaller than y^i of international green bond guideline. Initial contribution y^0 before Chinese domestic guideline is lesser than y^c. According to

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[13] the Climate Bonds Initiative and China Central Depository & Clearing Research Centre(2020),19page.

increasing communication function communication coefficients of outside stakeholders indicate $\gamma(y^c) < \gamma(y^i)$. The right side of (6) regarding Chinese domestic definition is expressed by the line FF'. The outside stakeholders in international definition present the right side of (6) by the line GG'. The right side of (6) for the initial contribution y^0 is depicted by the line EE' to located above the line FF'. The line FF' to present Chinese domestic definition is exhibited upper than the international definition line GG'. As the outside stakeholders behave more sensitive than the inside stakeholders, the marginal evaluation curve CD of inside stakeholder *i* regarding payment is supposed to be steeper than the curve AB of outside stakeholder *i*.

To explore development of Chinese bond issuance, we suppose that the dominant and international definitions of bonds bring the following two situations. The domestic green bond definition aims to increase issuance of green bonds and is assumed to raise coefficient of inside stakeholders $\beta(x)$.

Assumption 1. The domestic definition of green bonds brings coefficient of inside stakeholder $\beta^c(x) > \beta(x)$. However, the coefficient in the international green bond definition remains in the same function as $\beta(x)$.

Chinese domestic definition of green bonds replaces the optimal conditions (5) and (8) by

$$\frac{\partial V_i(x,t_i)}{\partial t_i} = \frac{1}{\beta^c(x)}, \qquad i = 1, \ldots, n_0(y). \tag{9}$$

The domestic definition of green bond issuance some restrictions prevent stakeholders from turning out other type of stakeholders. The intersections expressed by (5), (6) and (9) present green bond issuance points initial and after reform of bond markets. Outside stakeholders obtain the initial point J and domestic definition point K. Inside stakeholders take the point M and domestic definition point N. The domestic definition of green bond brings consumer surpluses the area of triangles JSK for outside stakeholders and MUN for inside stakeholders. While the difference of the two surpluses does not appear remarkable, each stakeholder is not willing to take behavior of other type. In this condition, the structure of stakeholders is not probably to change greatly.

The international definition of green bond issuance is expected to alter greatly the structure of stakeholders. Although inside stakeholder obtains the same equilibrium point M as the domestic definition, outside and external stakeholders bring new points L and T. The consumer surplus of outside stakeholders increases from the area of triangle JSK to the area of triangle JTL. If international definition enhances the weight on net benefit of external

stakeholders to solve climate change problems, the payment condition for external stakeholders might approach the related one for the outside stakeholder. The optimal payment t_e^{**} for external stakeholders (7) is replaced by

$$\frac{\partial V_i(x, t_e^{**})}{\partial t_i} = \frac{1}{\gamma(y)}, \quad i = n_1(y) + 1, \dots, n. \tag{10}$$
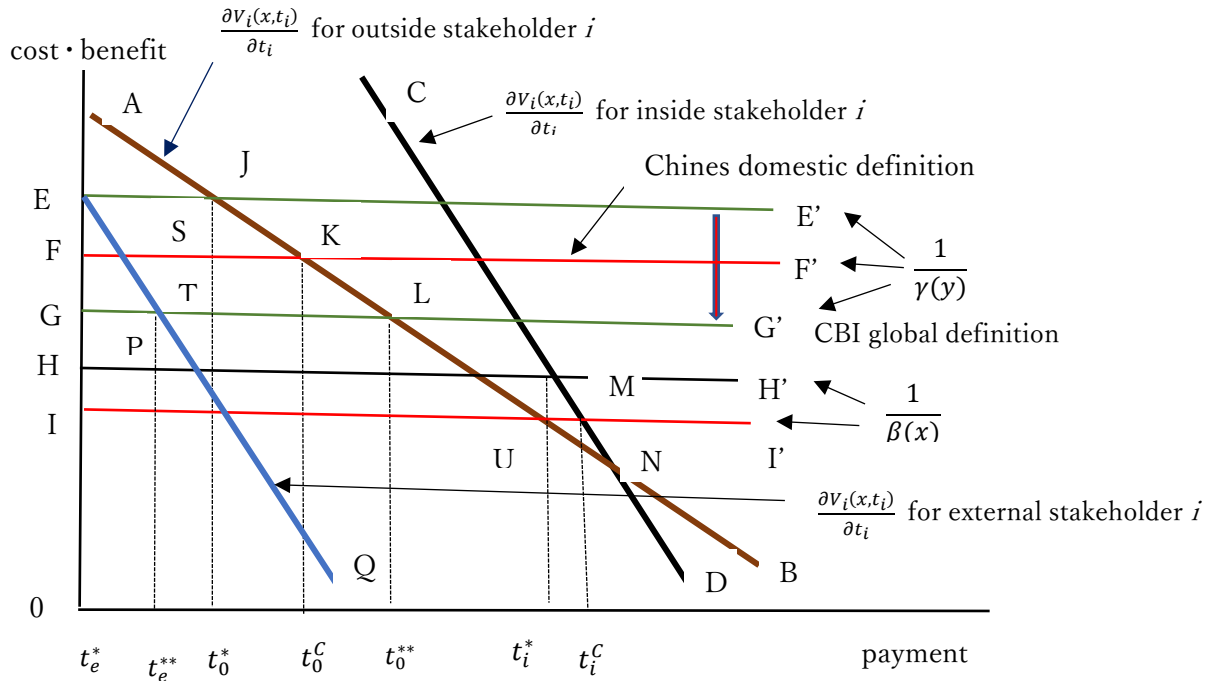
Source: produced by the author

Figure 4 International Definition of Green Bond Issuance

Reports of SNS sometimes makes effect on the performance of the corporation. Although the international definition raises influence of external stakeholders, the external stakeholders are assumed to be connected weaker than the outside stakeholders. Figure 4 represents marginal valuation curve EQ of external stakeholders lower than the marginal valuation curve AB for outside stakeholders. Consequently, the international definition brings more relative advantage of surplus to outside stakeholders than inside and external stakeholders. It is expected that a part of inside and external stakeholders attempts to turn into outside stakeholders. That is, the number of outside stakeholders increases relatively than inside and external stakeholders. The expression (8) to decides issuance raises $n_1(y)$ and decreases $n_0(y)$. Figure 2 turns up and leftward marginal valuation curve of outside stakeholders 0C and the curves of inside stakeholders 0F. The total valuation curve 0D moves up and leftward. The international definition is expected to lower issuance of green bonds by facilitating to reform structure of stakeholders.

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4. Concluding Remarks

Green bond financing is expected to contribute on sustainability of local communities. Tanaka (2019a) theoretically demonstrates that decentralized social mechanisms are constructed to obtain sustainability. The decentralized mechanism must be equipped with two ways of communication of communities. The communication procedure should practically solve various community issues. Tsinghua University and Chuo University have comparatively explored experimental initiatives to improve the communication schemes in Qinghe district, Beijing and Hachioji city, Tokyo[14].

Li, Wang and Yu (2020) investigate key problems on Chinese regional governance. "Since ancient times, Chinese society has been characterized by strong government power, and it is also known as a government-dominant society. Under the leadership of the Communist Party of China, the power of the government has been greatly strengthen. … The government is so powerful that it assumes all the responsibilities, which will deprive the vitality of the society. The more responsibility the government assumes, the heavier the burden it carries. All problems are to be solved the government. Such a result makes the society completely dependent on the government, social members do not act, and everything is waiting for the government. As a result, the government is overwhelmed. Once the government fails to meet expectations, people will blame and even distrust the government."[15]

Chinese green bond schemes are restricted to be cooperative with centralized government systems. The theoretical analysis on the multi stakeholders provides a foundation of green bond issuances. Chinese domestic definition of green bond issuance remains to value interest of inside stakeholders. Presently, this scheme is effective to raise green bond issuance. However, the digital industrial revolution is probable to reform the structure of stakeholders. Inside and external stakeholders are likely to move to outside stakeholders. As the influence of outside stakeholders on green bond issuance rises, the issuance to aim only at interest of inside stakeholders tend to decline.

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[14] The comparative researches in Beijing and Tokyo are presented in Tanaka(2016b) and (2017a).

[15] Li, Wang and Yu (2020),p.72.

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