

Urban Investment Bond and Green Financial Innovation: Literature Review and Case Studies

Michelle Chang

Aurora International Academy, ShenZhen,518066, China

Abstract. The impact of urban investment bonds on green financial innovation have been controversial. As some assume that it leads to a negative impact while some stands in the opposition. This paper reveals evidences of the effects of urban investment bonds on green financial innovation by literature review, case study, statistical analysis, and comparative study methods. The study result shows that the introduction of China's urban investment bond with significant financing scale have filled the large funding gap in climate investment and provides efficient support for dealing with climate change issues. Saudi Arabia's case have demonstrated its success in using urban investment bonds on the construction of NEOM New City which aims to build a smart city powered entirely by clean energy. It effectively improves sustainability and copes with environmental issues. With the findings, government and policy-makers of countries around the world should take into account with greater scale of promoting urban investment bonds to green financial innovation, which could help the economy more sustainable and cope with environmental issues around the world.

Keywords: Urban Investment Bond; Green Financial Innovation; Literature Review; Case Studies.

1. Introduction

According to corporate data platform Wind, On May of 2022, approximately CNY239.2 billion worth investment bonds were released. But Chinese regulators have begun to take strong measure against the release of UIB through using the way of increasing the credit grading bar and restriction to the use of the funds (Duan, 2022).

Urban investment bond could significantly affect green finance. Taking China as an example. China's green finance market is still working at its initial stage, but is well developing and showing a rapid growth. With the support of green finance systems, investment bonds, government policies. China's goal of achieving a carbon peak is set to be reached by 2030, and carbon neutrality by 2060. In order to achieve these goals, significant amount of investment and transformation of China's economy is definitely needed. This transformation will be met by significantly promoting and using investment to fund the green industries in China. Investment and Green finance market seems to be interactive, and our research will be aiming to illustrate how urban investment bond will impact green financial innovation.

The literature can be classified into three different categories. Firstly, the negative impact of either UIB or green financial innovation. The literature showed negative effects based on focusing on the fact that UIB and green financial innovation leads to exposure of high risk, and UIB market's ineffectiveness. This shows that by using UIB may be not secure as there might be a large potential in failing, and the UIB market might not be a high efficiency tool to use as it might show little effect.

Secondly, positive effect of UIB or green financial innovation. The positive impact generally focused on UIB and green financial innovation benefiting the finance market and financial performance, environment, internal control, and manufacturing industries.

Lastly effect of UIB and green financial innovation leads to both positive effect and negative effect, which stands in a neutral position.

Literatures may also be classified with their main ideas and main head. Firstly, how an social influence or policy effect the use of UIB on green financial innovation. This shows specific events as a starting point to summarize the effect on UIB markets. Secondly, the effects of the issuance and promotion of urban investment bonds on either CO2 emission (environmental factors) or industry.

The majority used China's economy as a case. Thirdly, literatures that study and investigating the factors that impacts urban investment bonds and green financial innovation.

Many studies in studying the effects of urban investment bonds and green financial innovation showed limitation in limiting sample data, or limited countries of where the data is collected. Limited context is an limitation due to short time duration in study and also lack of factors considered in investigating the effect of the UIB and green financial innovation.

Despite the limitation exposed from these studies, this paper will make further investigation about the effects of introduction in urban investment bonds to green financial innovation instead of studying whether UIB or green financial innovation itself shows an positive effect or negative effect to others.

Secondly, this study will take account of various sample data to prevent limitation in lack of data collection which might lead to inaccuracy in the investigation. Many studies have collected data based on one or two countries, and the majority uses China as their object of research. My study will consider using a wider range of country as for investigation, and data collection.

Thirdly, many studies have been using empirical data study method to complete their research, but by using this methodology, it showed most limitation. For my study, I might take account using other method of study such as panel data or event study to prevent encountering the same limitation as other studies.

2. Methodology

2.1 Literature review method

A literature review can be roughly defined as an systematic approach to gathering and summarizing prior research (Baumeister & Leary, 1997; Tranfield, Denyer, & Smart, 2003).

Firstly, the author search relevant literature related to my topic using keywords such as urban investment bonds and green financial innovation. Secondly, the author evaluates each source and select a suitable source, based on evaluating what question the author is addressing/strength and weaknesses of the research, and whether it is a suitable and relevant literature for my research. Thirdly, the author identify the connection between each sources, by identifying similar trends or patterns, such as whether they have the same solution of showing positive effect/ negative effect, and what specific kind of effect it showed, or whether the literatures have similar themes and main idea/opinion. The author have used this method to categorize literatures into three main categories based on its effect, showing either positive negative or neutral. Positive effect mainly showed effects on finance market and financial performance, internal control, and manufacturing industries. Negative effect showed high risk of using UIB and low efficiency (Snyder, 2019).

2.2 statistical analysis method

The process of gathering and examining data to find patterns and trends is known as statistical analysis. It is a technique that uses numerical analysis to eliminate bias from the evaluation of data. Planning surveys and studies, creating statistical models, and gathering research interpretations are all made easier using this method (Simplilearn, 2023).

By conducting a statistical analysis, firstly, the author may need to specify hypothesis and plan out the research design in order to collect valid data in the further investigation. A research design, overall strategy for data collection and analysis may need to be planned. In this case the author will use experimental design showing the cause-and -effect relationship of two variables, using statistical test of comparison or regression to test how urban investment bond effects green financial innovation. The author will collect numbers of statistical datas related to UIB and green financial innovation. It could show the recent or past numerical data's about the level or implementation from each country working toward using UIB and green financial innovation, which is a quantitative data that represents amount. Also categorical data representing groupings, which shows the data among the countries that have been using UIB as a tool. There may be various kind of statistical data's such as qualitative data or quantitative data and by describing the nature of each data, and establish a relation between each

type of data, a model can be constructed based on presenting and concluding the relationship between the data's.

2.3 Case study method

A case study is a qualitative design in which a program, event, activity, procedure, or one or more people are thoroughly examined by the researcher. Researchers gather comprehensive data utilizing a range of data gathering techniques over an extended period of time, with the case(s) constrained by time and activity (Priya, 2021).

Case study could be done by making relevant research on various cases of different country's implementation of using urban investment bonds. Conclusion could be made by comparing the cases between each countries, and how results are differentiated. This could be used as an evidence on supporting the effects revealed from using urban investment bonds.

2.4 comparative study method

Comparison study method is a process of evaluating and analyzing with quantitative or qualitative method, a phenomenon or facts among different areas, subject, or objects to detect similarities and differences.

The author will use comparative study method to study the difference between the effects of urban investment bonds on green financial innovation. There may be different results of impact showing on different countries, as the policy or level of urban investment bond used varies between each. By conducting this study method, a unit of comparison must be determined. In this case, the authors study will be comparing the different effects of using UIB on different countries that have been using urban investment bonds. The report of the comparative study must include all research questions and objective of the topic, the characteristic of units of comparison and also the results and conclusion after comparison is made.

3. Case Studies

3.1 Chinese UIB

China Urban Investment Bonds, as an example of green finance, is reflected in the fact that the purpose of the raised funds is in line with the list of projects supported by green bonds.

Here are some specific cases and related information:

Issuance of Green urban Investment bonds: As of the first half of 2019, a total of 70 green urban investment bonds were issued in China, with the issuance scale reaching 62.989 billion yuan. The funds raised by these bonds are mainly used for projects that meet green standards, such as renewable energy, energy conservation and emission reduction, and environmental protection.

China Jinmao Holding Group Co., LTD. Case: The company publicly issued green corporate bonds in 2016 to raise funds for Qingdao Jinmao Smart New City, Hangzhou Binjiang Jinmao Mansion Project Phase I, Jiangdong Jinmao Mansion and other projects, which are all applying for green certification.

Green City Investment Bond and climate investment and financing: Green City investment bond is an important source of financing gap for urban infrastructure transformation and upgrading, and is expected to become the best practice of climate investment and financing. They invest more in climate-friendly industries, contribute to climate change mitigation and adaptation, and broaden sources of financing for climate investment and financing.

Market overview: In 2022, China issued a total of 1.76 trillion yuan of "investment green" bonds, an increase of 32.8%; The scale of issuance of labeled green bonds reached 888.052 billion yuan, accounting for 50.32% of the "green investment" bonds. Among the "green investment" bonds, the issuance scale of local government bonds was the largest, reaching 389.497 billion yuan, accounting for 22.07%.

Typical case analysis: "Hang Lung Properties Limited 2018 First Green Medium-Term Note (Bond Connect)" issued by Hang Lung Properties in 2018 is a typical case, which shows the combination of green building and green bond and the role of green building bond in promoting social sustainable development.

Urban investment bonds, including corporate bonds, corporate bonds, medium-term notes, short-term financing bonds, and non-public targeted financing instruments (PPN), are defined by the Central National Debt Registration and Clearing Co., LTD as bonds issued by local government investment and financing platforms to raise funds for local economic and social development. Most people think that the term "urban investment bonds" solely applies to corporate bonds that are issued by local government financing platforms, i.e., corporate bonds issued by the NDRC. "Notice of The State Council on Strengthening the Management of Local Government Financing Platform Companies" states that "Local government financing platform companies refer to economic entities established by local governments and their departments and institutions through financial allocation or injection of land, equity and other assets, undertake the financing function of government investment projects, and have independent legal personality."

Green City Investment bonds can broaden the sources of climate investment and financing funds and effectively fill the funding gap for adaptation to climate change. Green City Bond Investment is a unique credit financing model in China. It mainly invests in environmental infrastructure, sponge city and other urban infrastructure construction and public welfare projects, which are in line with the main fields related to climate change adaptation and can effectively support the realization of climate change adaptation goals. Due to its high capital management and information disclosure requirements, climate investment and financing can also guide the transformation and development of urban investment bonds, broaden the sources of climate financing funds, and fill the funding gap for adaptation to climate change.

With its huge financing scale, urban investment bonds can make up for the large funding gap in climate investment and financing to a certain extent, and provide effective financial support for coping with climate change. According to wind data, the scale of urban investment bonds has grown rapidly in the past 10 years. The balance of urban investment bonds has risen from 1,896.807 billion in 2012 to 1,1323.896 billion now. In 2008, a total of 99.2 billion urban investment bonds were issued nationwide.

According to the data of the International Institute of Green Finance of Central University of Finance and Economics, since 2016, the country has issued a total of 107 labeled green City investment bonds, with a total issuance scale of 117.371 billion yuan; Since 2009, a total of 775 non-labeled green City investment bonds have been issued, with a cumulative issuance scale of 945.625 billion yuan. In 2020, the country (excluding Hong Kong, Macao and Taiwan) issued a total of 26 labeled green city bonds, with an issuance scale of 29.77 billion yuan; A total of 49 non-labeled green city investment bonds were issued, with an issuance scale of 57.3 billion yuan. The proportion of green city investment bonds in the total amount of city investment bonds is not high. At present, some urban investment bonds are invested in non-green industries and some infrastructure investments do not meet green standards. Therefore, in the future, urban investment platforms need to increase investment in green infrastructure, increase the proportion of infrastructure that meets green standards, and actively participate in climate change adaptation investment and financing.

The "Notice on Promoting the pilot work of Real Estate Investment Trust funds (REITs) in the field of Infrastructure" was jointly promulgated by the China Securities Regulatory Commission and the National Development and Reform Commission on April 30, 2020, signifying the official entry of China's infrastructure REITs into the pilot stage. Public REITs, which may effectively renew the stock of assets, build a virtuous investment cycle, enhance the proportion of direct financing, and lower the debt ratio of firms, fill the void left by Chinese financial products; In addition, REITs are a medium-risk, medium-income financial instrument with high liquidity, steady income, and robust security, all of which help to expand the capital market's investment options and open up new avenues for social capital investment. Within the field of green infrastructure, projects that satisfy both the

criteria of sustainable attributes and stable cash flow include subterranean pipe corridors, pollution control, affordable housing projects that are environmentally friendly, urban and rural water supply integration, and sustainable heating projects. Urban investment Platform is a major investor in urban infrastructure and a major issuer of green REITs in the future. Active participation in green infrastructure public offering REITs will bring both climate and economic benefits.

3.2 Public Investment Fund on Green Finance in Saudi Arabia

As an important green financial instrument innovation, green sovereign bonds are still in their infancy, but as sovereign wealth funds play an increasingly important role in the global financial market, this financial tool to promote green development deserves attention. Through the green bond case of Saudi Public Investment Fund, we not only get a glimpse of the latest financial situation of this sovereign wealth fund with a scale of more than 600 billion US dollars, but also draw inspiration and reference for our country.

In October 2022, Saudi Arabia's Public Investment Fund (PIF) announced the successful issuance of a \$3 billion green bond, setting a precedent for a global sovereign wealth fund to issue green bonds. It is expected to inject new momentum into ESG (Environmental, Social and Governance) investment. Through the PIF green bond case, we not only get a glimpse of the scale of more than 600 billion US dollars of sovereign wealth fund's latest financial situation, but also draw inspiration and reference for our country.

The Saudi sovereign wealth fund, PIF, was set up in 1971 to manage the petrodollar alongside the Saudi Arabian Monetary Agency and was set up to manage large foreign exchange surpluses from oil exports. Since 2015, in response to the "Saudi Vision 2030" proposed by Saudi Crown Prince and Prime Minister Mohammed Bin Salman, PIF's assets have expanded significantly and become an important subject in the implementation of Saudi Arabia's national economic development strategy, and this green bond issue is closely related to this.

The sale, which included \$1.25 billion in five-year bonds with a 5 percent coupon, \$1.25 billion in 10-year bonds with a 5.25 percent coupon and \$500 million in 100-year bonds with a 5.37 percent coupon, attracted widespread demand from investors in Europe, China and Japan, with participation from Citi, jpmorgan Chase and Goldman Sachs. With this issuance, PIF has disclosed updated financial information. According to the prospectus, PIF shareholders have earned an average annual return of 12 percent since 2017 and as much as 25 percent in 2021. As of December 31, 2021, PIF had \$675.2 billion in assets and generated \$25.4 billion in annual net income.

The green bond issue demonstrates PIF's determination to further increase the size of its assets and diversify the country's economy. The bond offering, which was eight times oversubscribed at the outset, will support several ESG projects in Saudi Arabia and optimise its offshore asset mix. PIF also disclosed the purpose of the funds raised, the most important of which is the construction of NEOM New City. The construction of the 26,500 square kilometer new city is expected to cost \$500 billion and aims to build a smart city powered entirely by clean energy. NEOM New City will be fully powered by clean energy sources such as wind and solar power, and will become a maritime trade corridor adjacent to the Red Sea, the Gulf of Aqaba and the Suez Canal. The issuance of the green bond has formed good synergies with NEOM New City, attracting global investors as an organic overall result.

Green sovereign bonds are a subdivision of green bonds, with the dual attributes of "sovereign bonds" and "green bonds", that is, green bonds issued in the name of the government and often held in foreign currency, raised by the financial department or other state institutions. Figure 3 shows that as of December 2021, green sovereign bond issuers involve more than 20 countries and regions, with a total of more than 50 green bonds, with a cumulative scale of nearly 180 billion US dollars.

At present, most of the issuers of green sovereign bonds are European countries, which is mainly due to the earlier deployment of ESG investment in Europe, and the issuance of green sovereign bonds is larger, more frequent and more standardized. China's Hong Kong Special Administrative

Region is also active in green sovereign bonds, with \$7.2 billion of green sovereign bonds issued in 2021.

Sovereign wealth funds have been actively building a green and sustainable image in recent years. By the end of 2021, ESG investments by sovereign wealth funds worldwide have increased from \$7.2 billion in 2020 to \$22.7 billion, and the number of sustainability-related investment deals has also increased from 19 in 2020 to 37. We are committed to integrating global climate change risks and investing in low-carbon economic transition.

In an interview with Bloomberg in 2022, Kuwait Investment Authority Managing Director Ghanem Al-Ghunaiman said the agency is pushing its portfolio to be 100 percent ESG compliant, with a particular focus on the "E" in ESG, which stands for environmental factors. For example, the PIF will be responsible for the development of 70% of the country's renewable energy projects, in the 2021-2025 plan proposed to increase the size of assets under management to 1.07 trillion US dollars, and the issuance of green bonds is one of the important financing means.

A case based on public investment fund on green finance in Saudi Arabia and Kuwait is studied by the author. Green sovereign bonds have been a significant green financial instrument innovation. Saudi Arabia's public investment fund have issued \$3 billion green bonds, and this is closely related to the PIF as becoming an important subject in establishment of Saudi Arabia's national economic development strategy. The sale included \$1.25 billion in five-year bonds with a 5 percent coupon, \$1.25 billion in 10-year bonds with a 5.25 percent coupon and \$500 million in 100-year bonds with a 5.37 percent coupon, attracted widespread demand from investors in Europe, China and Japan, with participation from Citi, jpmorgan Chase and Goldman Sachs. The green bond issued offers for the construction of NEOM New City, which plans to construct 26500 square kilometer new city and to build a smart city powered by clean energy such as wind or solar power. Sovereign wealth funds have been actively building a green and sustainable image in recent years. By the end of 2021, ESG investments by sovereign wealth funds worldwide have increased from \$7.2 billion in 2020 to \$22.7 billion, and the number of sustainability-related investment deals has also increased from 19 in 2020 to 37. Kuwait Investment Authority (KIA) have merged five sovereign wealth funds to aim to intergrating global climate change risks and investing in low-carbon economic transition.

4. Conclusion and Implication

This study have demonstrated evidences based on the impact of urban investment bonds (UIB) on green financial innovation. Although, a range of studies showed a limit in sampling data considered which could even lead to inaccurate results on impact of UIB on green financial innovation. Whereas, this paper used case study method and considered two cases, China and Saudi Arabia, about its implication of urban investment bonds on green financial innovation. Also, compariative study method to compare the different effects shown with UIB between the two cases studied.

We found that by using urban investment bonds, and with its significant financing scale, urban investment bonds can make up for the large funding gap in climate investment and financing to a certain extent, and provide effective financial support for coping with climate change. This is in contrast with results concluded by Yan et al. (2023) who affirm that UIB have been an ineffective tool to use.

The practical implication of this result is that by increasing the scale of investment bonds, it could be a highly effective way of dealing with environmental issues, where governments that is coping with climate change issues can consider the apply of UIB.

Secondly, the study found the urban investment bond can scatter and reduce risk in investing of investors, hence the efficiency of green financial market could be improved and increase the transparency of green financial projects (Yan, 2023; Clapp, 2014).

The practical implication of this results is that urban invest ent bond can scatter risk of investors on investments, as green financial projects generally have long payback period from investment, and requires a relatively high initial investment cost. By releasing urban investment bonds, risk of this

investment can be distributed to multiple investors, which reduces the risk exposure of each individual investor.

The limitations of this paper includes needing to dig into more on cases of each country to gain sufficient evidences to find accurate results and resolution, such as expanding case study of UIB in the European countries, as this paper only reports cases on two Asian countries. Second, this paper have not consider empirical study which might have mutual causality to affect the accuracy of the results. Overall, the study can be developed more closer to perfection in future by considering multi aspects, and this is just a start for investigating the multi effects of the urban investment bond on green financial innovation.

References

- [1] Duan Siyu. "China's Urban Investment Bond Issuance More than Halves in May on Stricter Monitoring." *Www.yicaiglobal.com*, 7 June 2022, www.yicaiglobal.com/news/china-urban-investment-bond-issuance-more-than-halves-in-may-on-stricter-monitoring. Accessed 16 Mar. 2024.
- [2] UNEP. "Green Financing." UNEP - UN Environment Programme, 23 Jan. 2018, www.unep.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/green-financing.
- [3] Leal-Millán, et al. "Green Innovation." *Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship*, 2017, pp. 1–7, link.springer.com/referenceworkentry/10.1007%2F978-1-4614-6616-1_200021-1, https://doi.org/10.1007/978-1-4614-6616-1_200021-1.
- [4] "What Is Statistical Analysis? Types, Methods and Examples | Simplilearn." *Simplilearn.com*, 16 Nov. 2021, www.simplilearn.com/what-is-statistical-analysis-article.
- [5] Priya, Arya. "Case Study Methodology of Qualitative Research: Key Attributes and Navigating the Conundrums in Its Application." *Sociological Bulletin*, vol. 70, no. 1, 2020, pp. 94–110. Sagepub, journals.sagepub.com/doi/full/10.1177/0038022920970318, <https://doi.org/10.1177/0038022920970318>.
- [6] "China's Green Finance Market: Policies, Incentives, Investment Opportunities - China Guide | Doing Business in China." *Www.china-Briefing.com*, www.china-briefing.com/doing-business-guide/china/sector-insights/china-s-green-finance-market-policies-incentives-investment-opportunities.
- [7] Aneja, R., Kappil, S. R., Das, N., & Banday, U. J. (2023). Does the green finance initiatives transform the world into a green economy? A study of green bond issuing countries. *Environmental Science and Pollution Research*, 30(14), 42214-42222.
- [8] Alamgir, M., & Cheng, M. C. (2023). Do Green Bonds Play a Role in Achieving Sustainability?. *Sustainability*, 15(13), 10177.
- [9] Yan, X., Li, Y., Ming, M., & Chong, H. Y. (2023). Impact of Nonstandard Default Risk of the Urban Investment and Development Companies on the Urban Investment Bond Market. *Systems*, 11(2), 68.
- [10] Clapp, C. (2014). Climate finance: capitalising on green investment trends. *The Way Forward in International Climate Policy*, 44, 44-48.
- [11] Ye, Zhen, et al. "China's Urban Construction Investment Bond: Contextualising a Financial Tool for Local Government." *Land Use Policy*, Nov. 2020. Accessed 26 July 2021.
- [12] Snyder, Hannah. "Literature Review as a Research Methodology: An Overview and Guidelines." *Journal of Business Research*, vol. 104, no. 1, 2019, pp. 333–339. ScienceDirect, www.sciencedirect.com/science/article/pii/S0148296319304564, <https://doi.org/10.1016/j.jbusres.2019.07.039>.