

RELATIVE RISK PREMIUM IN CHINA'S URBAN CONSTRUCTION INVESTMENT BOND: VIEWS FROM FINANCIAL MARKET

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This study examines relative risk premium with reference to Urban Construction Investment Bond (UCIB) from the perspective of financial market instrument. We decompose sources of relative risk premium into a spatial layer, and financial instrument level relative risk factor. Based on our research finding, we caution over-prediction on the demise of China's infrastructure investment and argue that an aggregated view based on stock and flow understates the full potential of the financial market to infrastructure as an emerging asset class. UCIB which remains largely domestic, plays a strategically important role in China's systems of infrastructure finance and serves as a bridge between China's emerging capital market and the development of the real economy.

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1. Introduction

This study examines relative risk premium in China's Urban Construction Investment Bond (UCIB) or *Chengtou* Bond from the perspective of financial market. The purpose is to understand the sources of relative risks while decomposing relative risk premium into different layers to understand its dynamic properties. There has been a growing strand of the literature on UCIB in China (Ambrose *et al*, 2015; Ansar *et al*, 2016; Pan, 2017; Huang and Du, 2018; Wu, 2019; Horn *et al*, 2019). We argue existing research tend to focus on *absolute* level rather than *relative* level of risks. Absolute level of risks is associated with the stock and flow of UCIB, whereas relative level of risk, viewed from the perspective of financial instrument and market, is measured by adding an additional risk premium or spread relative to a benchmark such as the return of 10 years government bond. Relative to 10 years government bond, relative risk premium is a mark-up risk premium above the return of 10 years government bond, which is needed to compensate investor for the risk of holding asset such as UCIB. In this paper, we examine both absolute and relative level of risk in China's UCIB from a comparative perspective. Focusing on relative risk premium, our research question seeks to understand where relative risks come from and how relative risks interact with spatial and temporal factors.

Largely confined to domestic holders, Chinese bond market was estimated at around 13 trillion USD, the third in the world after the US and Japan, and becoming increasingly an important region to global asset managers and institutions (CNBC, 2019). UCIB offers an interesting background to study relative risk. UCIB is used primarily to finance infrastructure and classified as sub-sovereign bond. The total outstanding stock of UCIB in China was estimated at 1.14 trillion USD by the end of 2018 (Wind, 2018). To the outside world, there is generally a lack of understanding on the institution of Chinese bond market in general, and the issuance and distribution of UCIB by capital market in particular. Furthermore, these financial instruments remain largely inaccessible to outside investor as China's financial market remained closed. The opening of China Bond Connect in 2017 represented a major milestone in the opening of China's capital market. In this context, the research in this paper provides the background to understand UCIB as an emerging asset class in China's financial market. Our research also offers some utilities, firstly, to understand the role of capital market in financing infrastructure, secondly, to apply the framework of relative risk analysis in the context of Chinese UCIB; and finally, to investigate the sources and dynamic properties of relative risk.

Our empirical research makes several contributions to understand spatial and temporal dynamics of UCIB. Firstly, we find attributes of spatial layer of risk being an important explanation for risk premium across China's region. UCIB issued by different region comes with different location specific risk premium, an important source of relative risk that brings with it benefit of spatial diversification. Secondly, UCIB acts as an important gauge for China's infrastructure and investment driven economy and serves as a bridge between capital market and China's real economy. Our findings offer some practical and theoretical insights: despite some very negative views on China's infrastructure and debt, as suggested by published academic papers (Ambrose et al, 2015; Ansar et al, 2016) we caution over-prediction on the demise of China's infrastructure investment and argue that such a highly aggregated view have understated the full potential and contribution of infrastructure as an asset class to China's financial system, as well as, strategic role played by the state and the capital market in financing infrastructure development in China. We argue institutions matter in the process risk transformation by the state. From the perspective of financial market, UCIB which remains largely domestic, inter-bank debts, historically plays an important role in China's systems of infrastructure finance and serves the real economy against global business cycle. In contrast to the global banking system of the last financial crisis which wreaks havoc with the real economy and pushes the world towards the recession, the banking system in China has seized the opportunity from the crisis to invest in long term infrastructure and pulled the economy out of the recession. As China's financial market continues to mature, UCIB offers new opportunity as an asset class with stable, long-term yield to both domestic and international investors.

The remainder of this paper is structured as follows. First, we critically review the literature on UCIB and explain why relative risk premium offers an alternative approach to understand risk associated with UCIB. Second. We introduce our framework of analysis and provide the context to understand UCIB as an asset class and the role of China's financial market in financing infrastructure from an international and historical perspective. Third. We examine where the risks come from, how relative risks interact with spatial and temporal factors embedded in locality through pricing mechanism. Finally, based on the preceding analysis, we conclude that UCIB is integral to the future development of China's infrastructure systems and capital market. The future of UCIB depends on its potential as an asset class which bridges the real economy with financialisation. The continuous development of capital market

particularly primary and secondary market, and the demand for UCIB placed through different methods offers investment opportunity which helps to provide for China's long-term future.

2. Literature Review

2.1 Yield Spread as Risk 'Barometer'

Yield spread measures the difference between the yield or return from one instrument to a benchmark. In finance and economic literature, there is a long strand of literature on risk attributed to yield spread due to its wide usage by economic forecaster and finance industry. Economic forecasters in the central bank such as the US Fed have used various yield spreads of government bonds to forecast economic recession (Estrella and Mishkin, 1998; Gilchrist and Zakrajsek, 2012; Bauer & Mertens, 2018; Engstrom & Sharpe, 2019). Forecasters believe that yield spread contains information on the likelihood of future economic recessions and the approach has been applied to forecast recession in Euro area (Moneta, 2005), Italy (Brunetti and Torricelli, 2009), Germany (Nyberg, 2010.) and Japan (Hasegawa and Fukuta, 2011).

In finance literature, there are two strands of literature on yield spread. The first strand of literature focuses on corporate yield spread and the impact on yield spread by macroeconomic factors. For example, Guha and Hiris (2002) revealed that benchmark interest rate has direct effect on yield spread - when the economy was depressed, the bond's credit spread would be widened and when the economy improved, the bond's credit spread would be narrowed. In other words, the level of yield spread serves as a 'barometer' of risk to the economy. The change in corporate credit spread responds to the greater impact of the market (Collin-Dufresne and Goldstein, 2001) and the negative correlation between the growth rate of the gross national product and the bond spread is explained by the default risk and the market conditions of bond spread (Tang and Yan, 2008).

The second strand of finance literature focuses on risk premium and volatility associated with yield spread at micro level. For example, Elton *et al* (2001) showed that the default risk, revenue, liquidity risk and other systematic risks were the main factors that affected the bond's credit spread. The liquidity premium, the risk premium and the anticipatory breach of contract were important causes on the bond's credit spread (Brown *et al*, 2001; Covitz and Downing, 2007). Furthermore, there is a growing body of literature which focuses on the volatility of yield spread, starting from Campbell and Taksler's seminal article on option price

and credit spread (2003), Cremers *et al.* (2008) found that implied market volatility is significantly related to credit spreads. To sum, the focus of economic and finance literature has been on the use of yield spread as forecasting tool while seeking to understand the causes of credit spreads particularly ‘micro’ factors that impact on yield spread.

2.2 Government Yield Spreads as Relative Risk Premium

Yield spread contains information about the future state of the economy and is instrumental as a ‘barometer’ of risk to the wider economy. Frequently used by financial analyst, government yield spread or G-spread measures the difference between a bond’s yield to maturity (YTM) to that of matched duration or long duration sovereign bond. The spread or the difference between the two represents ‘micro’ level relative risk or excess return for bearing greater credit and liquidity risks, that is above “risk free” rate of return for the benchmark sovereign yield such as 10 years government bond. Since ‘macro’ aspects of risk premia such as expected inflation rate and expected real rate of interest are already embedded within the subtracted component of the benchmark sovereign yield, government yield spread specifically measures ‘micro’ aspects of relative risk premia such as credit, liquidity and sector risks. The greater the spread above the benchmark, the larger the idiosyncratic, mark-up ‘micro’ aspects of risk premia for holding specific bond or bond indexes.

This relative measure of risk and volatility has its origin in the approach of fixed income analysis (Petitt *et al.*, 2019). Jubinski and Lipton (2012), for example, found that bond yields and spreads respond to changes in equity market volatility in a manner consistent with a flight-to-quality effect, and both short and long-term Treasury yields fall in response to increases in implied volatility. However, little is known about how idiosyncratic, ‘micro’ aspects of government yield spreads across maturities and ratings spectrum systematically influenced and influenced by the volatility of equity and sector specific indexes and broader macroeconomic variables. The present study seeks to expand such understanding by, firstly, incorporating a relative risk framework based on government yield spreads to measure ‘micro’ aspects of relative risk premium; secondly, decomposing relative risk premium into finer risk layers specific to UCIB, an emerging asset class unique to China’s infrastructure financing systems; and finally, further unpacking ‘micro’ aspects of relative risk premium by attribution to spatial difference and the term structure across rating and maturity spectrum.

2.3 Relative Risk Premium in China's UCIB

In terms of the literature on UCIB in China, the focus has been on absolute risk, e.g. the flow and stock of UCIB and its interaction with macroeconomic variables such as growth (Ambrose *et al*, 2015; Ansar *et al*, 2016; Pan *et al*, 2017; Horn *et al*, 2019). Though important, our criticism of this strand of the literature is that they tend to use relatively low frequency economic data instead of high frequency finance data such as yield curve which contains more timely information on the state of the economy. Although the region is looked at by most studies there is very little understanding on the geographical composition of relative risk, other than some absolute measures such as an aggregate of stock and flow. In the quest for generality, the researchers (*ibid.*) seem to have focused on identified factors such as fiscal constraints, growth and GDP but unable to decompose further on financial instrument level, 'micro' aspects of risks. In contrast, the traditional portfolio theory in finance (Markowitz, 1976) see risk as a relative concept which comes with the benefit of diversification, an aspect rarely discussed by existing research.

Province A might have accumulated a higher level of stock while having a larger flow of UCIB but can also achieve, in relative terms, a lower cost of capital due to the presence of well-developed financial market and realised lower financing cost from past UCIB issue. Relative risk as measured by UCIB's spread with government bond in Province A could be much lower than Province B when Province B had lower stock and flow of UCIB but higher cost of capital due to the absence of well-developed financial market and much higher financing cost. Thus, in terms of absolute risk, Province A might be higher than B due to a larger stock and flow of UCIB. However, in terms of relative risk, Province A could be lower than B due to lower government yield spread revealed through past interactions with capital market. The extent to which government yield spreads for China's UCIB are systematically affected by relative risk factors attributed to spatial difference and instrument level 'micro' risk factor is the focus of this paper. Our research therefore differs from the existing approach on China's UCIB which tends to focus on absolute measure of risks such as stock and flow in order to explore aggregate impacts of a broad set of largely, macroeconomic variables (Ambrose *et al*, 2015; Pan *et al*, 2017). Our study incorporates a systems of relative risk measures across space-time, firstly, to empirically assess spatial distribution of relative risks for UCIB, secondly, to understand the impact of 'micro' factors on the pricing of relative risk premium using comparable benchmark.

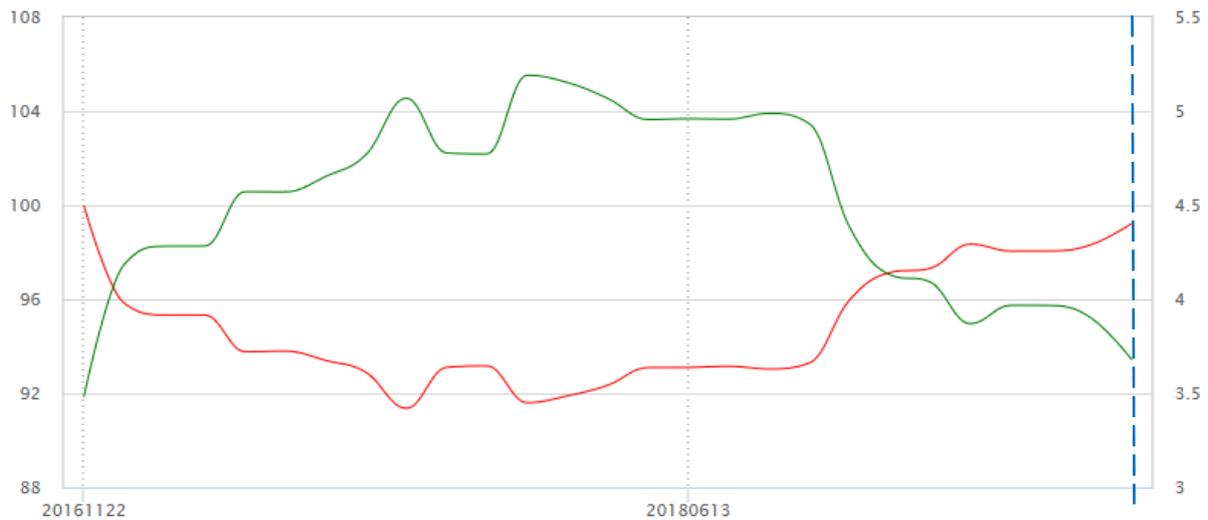
3. Analytical Framework

To understand risk and the volatility of risk – i.e. why bond prices and yields-to-maturity change - is useful to first separate yield to maturity into two components: the benchmark and the spread. The benchmark yield for a corporate bond with 8% yield to maturity and 10 years' time to maturity is the base rate, a 10 years government bond. If the yield to maturity of 10 years government bond is 5%, the government yield spread (3%) is the difference between corporate bond's yield to maturity (8%) and the benchmark 10 years government bond (5%). The higher the level of the spread the riskier the bond. Government yield spread, therefore, serves effectively as excess return or additional compensation for bearing some additional idiosyncratic risks above the benchmark 'risk free' government bond.

Government yield spread can measure the difference between a bond's yield to maturity (YTM) to that of matched duration or long duration (typically 10 years) sovereign bond. The spread or the difference between the two represents 'micro' level, relative risk premium or excess return/risk premium for bearing greater credit and liquidity risks, a mark-up to 'risk free' rate of return of the benchmark sovereign yield. Finance professional typically use 10 years sovereign/government bond as a proxy for 'risk free' rate of return. The meaning of 'risk free' rate is the minimum threshold level of return investor must be satisfied before anything else is considered. Risk in addition to 'risk free' rate requires additional compensation. Since 'risk free' rate already includes key macroeconomic risk factors such as inflation, interest rate and country risk premium. Intuitively, anything above 'risk free' rate would be considered 'riskier' and need to be compensated with a mark-up relative risk premium above 'risk free' rate.

Therefore, government yield spread specifically measures 'micro' aspects of relative risk premia. The greater the spread above the benchmark, the larger the idiosyncratic, mark-up 'micro' aspects of risk premia for holding specific bond or bond indexes. In the context of UCIB, government yield spread measures UCIB's sector risk and spatial risk associated with different regions/cities in China where UCIB was issued, both are mark-up risk premium given the idiosyncrasy of different regions/cities in China and sector specific characteristics of UCIB as construction bond. Additional 'micro' aspects of UCIB such as maturity and default risks are also included and will be 'priced' in the spread above benchmark rate based on equivalent rating and time to maturity.

Figure 1: UCIB Yield and Price (16 Jiang Ning UCIB)



Source: CCDC

For example, as shown in Figure 1, *16 Jiang Ning UCIB*¹ (1680452.IB and 139292.SH) was issued in 10 November 2016 to be retired in 11 November 2023 (7 years' Time to Maturity from issue). On 21 August 2019 (dotted blue line demarcated, end point data on the graph), the bond was trading at a discounted price of 99.217 RMB (red line measured on the left vertical scale) with a coupon rate of 3.48%. Yield to maturity was 3.681% (green line measured on the right vertical scale). On the same day, the yield of 10 years government bond was 2.816%. The difference between the two was 0.86% (86 basis point) - the relative risk premium for holding *16 Jiang Ning UCIB* as compare with holding a 'risk free' 10 year's government bonds.

Pricing *16 Jiang Ning UCIB* as an asset with higher risk than government bond, investors would demand 0.86% or 86 basis point more to compensate for the risk of holding *16 Jiang Ning UCIB* in excess of 'risk free' government bond of 10 years. Because the yield to maturity is inversely related to the price of the bond as shown, the higher the yield/risk the lower the price of the bond and vice versa, with price reflecting the force of demand and supply for bond. Relative risk, as defined here, will vary depending on the spread between individual bond and 10 year's government bonds. The spread narrows as risk decreases. The spread widens as risk goes up. Additional risk measure can also be developed to gauge if the bond has lower or higher maturity risk by reference to equivalent duration, e.g. 7 years UCIB bond.

¹ The issuer is Jiang Ning City Construction Company Limited, a Local Government Financing Platform (LGFP) for Jiang Ning District of Nanjing, the capital of Jiangsu Province. Website: <http://www.jncjtt.com/>

Relative risk premia as described above is the spread difference between UCIB and equivalent duration government bond or 10 years government bond. The level of relative risk represents ‘micro’ aspects of risk in excess of the government benchmark. The first order derivative of risk premia represents the volatility of idiosyncratic, ‘micro’ aspects of risk to the changes to a broad set of ‘macro’ variables such as inflation, interest rate and country risk premium, which have already been included within the yield of government bond. Holding this ‘macro’ risk constant, we can decompose ‘idiosyncratic’, ‘micro’ aspects of risk to two factors: (1) exposure to different region/city given the size of the Chinese economy and sub-sovereign nature of UCIB, (2) exposure to overall sectoral influences, (3) maturity and default risks. From the point of view of spatial change, UCIB has the first layer that is very different from other type of sub-sovereign debt. For this purpose, we use Geographical Information Systems (GIS) to model the spatial risk layer for UCIB and shows how the landscape of risk changes in order understand how changes vary across China’s vast regions.

These relative measures on the level of risk, volatility of relative risk and its dynamic properties across space and time can be used in risk pricing and offer timely measures to understand risk as it emerges from instrument level. Traditionally, economic forecaster and financial analyst have used relative risk as key indicator as they believe yield spread contains useful information. Using these tools, the study seeks to extend the analysis to UCIB and broaden the scope of the existing fixed income analysis to capture risks and geographical dimension of risk. In doing so, the study examines a wide range of ratings and maturities and further investigates maturity and default risks. The approach seeks to decompose geographical and ‘micro’ aspects of risk which made up relative risk premium. In terms of theoretical contribution, the framework offers some general applicability to understand key drivers of relative risks in the context of China’s UCIB and extends such analysis to UCIB as an asset class over 10 years’ time span and using high frequency daily data that have higher time and spatial dimension when comparing with annual data used by most existing studies.

4. International Perspective on China’s UIB and Government Debt

UCIB is one of several forms of infrastructure financing mechanism in China which belongs to a broad category of local government debt or sub-sovereign debt as compared with sovereign debt such as centrally issued Chinese government bond. For the purpose of this section, the focus is whether the level of China’s infrastructure debt, by absolute standard of

stock and flow, as some scholars have argued, increased risk to the Chinese and the global economy. For example, Ansar *et al* (2016) predicted and stated in the conclusion:

“unless China shifts to a lower level of higher-quality infrastructure investments, the country is headed for an infrastructure-led national financial and economic crisis, which is likely also to be a crisis for the international economy. China’s infrastructure investment model is not one to follow for other countries but one to avoid... China’s debt to GDP ratio... exceeding that of many advanced economies, such as the United States, and all developing economies for which data were available, such as Brazil, India, and Nigeria.”

Based on historical IMF data shown in Table 1, except Russia, China’s actual general government gross debt has been low historically and maintained at a reasonable level between 2009 and 2018, when compared with both advanced economies (US, UK and Japan), and comparable emerging economies such BRICS (Brazil, Russia, India, China and South Africa).

Table 1: IMF General Government Gross Debt (2009 – 2023) Percent of GDP

	2009	2013	2017	2018	2019	2020	2023
France	83	93	97	97	96	96	94
Germany	73	78	64	60	56	53	45
Japan	201	232	238	238	237	236	235
United Kingdom	64	85	88	87	87	87	84
United States	87	105	105	106	108	110	117
Average Advanced Economies	92	105	104	104	104	103	103
Euro Area	79	92	87	84	82	80	74
Advanced G-20	99	112	112	111	111	112	113
Brazil	65	60	84	88	91	93	98
Russia	10	13	16	15	15	16	19
India	73	69	71	70	68	67	63
China	34	37	47	50	54	57	65
South Africa	30	44	53	56	57	59	62
Average Emerging Market and Middle-Income Economies	39	39	49	51	52	54	57

Source: IMF Fiscal Monitor 2019

In absolute terms, the Chinese local government debt has been growing, estimated at 4.5 trillion in 2007, 7.9 trillion in 2009 and 15.8 trillion in 2012 by scholars from China (Lin and Zhang, 2017). In 2019, the Ministry of Finance estimated the stock of Chinese local government debt at 18 trillion RMB (2.66 trillion USD) (Xinhua, 2019). However, in relative terms, China's debt level is not as serious as Ansar *et al* (2016) had predicted. The total stock of China's bond market was estimated at 76.45 trillion RMB (11.30 trillion USD) based on custodian figure (CCDC, 2018). The total stock of US bond market was estimated at 42.68 trillion USD in 2018 (SIFMA, 2018). The size of China's bond market is about 8.66% of the US bond market. The total size of China's sovereign and sub-sovereign debt (UCIB plus other forms of local government debts and the central government borrowing) amounted to 33 trillion RMB (4.89 trillion USD). The US sovereign and sub-sovereign (excluding Federal Agency Securities) were 19.28 trillion USD (SIFMA, 2019). The size of China's sub-sovereign debt is about 25% of the US level. By comparison to overall share, however, the share of US sovereign and sub-sovereign debt (45%) is higher than China (43%).

By our estimate, when triangulated from the industry source such as Wind, 7.71 trillion RMB (1.14 trillion USD) stock of UCIB accounted for about 43% of the total stock of local government debt in China. By comparison, the US municipal bond market was estimated at 3.7 trillion USD in 2018 (SIFMA, 2019). The stock of China's UCIB market is about a third of equivalent US municipal bond. Compared with the US, the level of China's sovereign and sub-sovereign debt both seem to be at a reasonable level relative to its size as the second largest economy. Finally, China's government debt such as UCIB is largely confined within China due to the closed nature of China's capital market and could not have possible implication for 'a crisis of for the international economy' as allegedly concluded by Ansar *et al* (2016) compared with the US debt with high percentage of foreign ownership.

5. Classifying Overt and Covert Debts

Defined by the issuing entity, local government debt can be divided into three broad categories. The first category is local government debt issued directly by the local government or via the Ministry of Finance. The second category is the loan directly borrowed by the local government. The third category is local government financing platform (LGFP) or *Chengtou* bond set up by the local government to engage in (1) borrowing loan from various channels, (2) issuing UCIB (Urban Construction Investment Bond), (3) financing short term note, and (4)

financing medium term note. Budgetary debt issued by the Ministry of Finance for local government faces hard budget constraint and is considered as an overt form of debt (*Xian Xing Zhai Wu*), whereas the second and third category (LGFP) tend to be extra budgetary, face soft budget constraints and are generally considered as covert debt (*Yin Xing Zhai Wu*). UCIB is considered to belong to the latter category.

The estimate was rebased using this distinction in Table 2. Overt debt (*Xian Xing Zhai Wu*) is defined by legal contract which clearly states government's liability and can be identified by the budget report. On the other hand, covert debt (*Yin Xing Zhai Wu*) is extra budgetary and generally considered risky because local government either uses its own credit to provide guarantee or guarantee by collateralising the future revenue or publicly owned land or future revenue, hence, the government might be held liable in the future. We argue here drawing a line between covert and overt debt could be a false distinction and causes confusion. The line can be drawn many ways by including different types of state-owned enterprises or according to organisational modes with mixed ownership. The distinction is not always clear in the category of covert debt. Our estimate, presented in Table 2 below, rebased local government debt and national debt taken from various domestic and international sources and found that China's debt is still well below advanced economies and comparable average of emerging and middle-income economies shown by IMF table in Table 1.

Table 2: Rebasing Local Government Debt and Debt to GDP Ratio

Unit: RMB in Trillion	2017	2018
Total Government Debt (Baseline)	29.95	33.35
Sovereign Debt (Central)	13.48	14.96
Sub-Sovereign (Local)	16.47	18.39**
Debt to GDP Ratio (Official Baseline)	36%	37%
Total Government Debt (Rebased)	60.58	65.86
Sovereign Debt (Central)	13.48	15.69+
Rebased Sub-Sovereign (Covert)	16.5	18.80+
Rebased Sub-Sovereign (Over)	30.6	31.37***
Debt to GDP Ratio (Rebased)	72%	73 %
IMF Estimate for China (Table 1)	47%	50 %
IMF Average Advanced Economies	104%	104%

Source: Li & Li (2019); IMF Fiscal Monitor (2019); *S&P Estimate (Reuters, 2019); **Ministry of Finance (2018); + Xiao (2019); ***Based on the average of 17.7 (IMF), 30 (CASS) and 47 (Tsinghua) in trillion RMB

The distinction between ‘covert’ and ‘over’ debt often points to the inclusion of PPP (Public Private Partnership). PPP often comes into the context of the discussion with academics considers it a form of covert debt. For PPP, the boundary between debt and equity is not always clear. The local government can inject capital by collateralising on government owned land or revenue and then advances the loan from the bank to invest in LGFP in the form of equity. Hence, nominally what appears on corporate balance sheet of LGFP as equity is debt held by local government on collateralised land or future revenue reinvested as capital. Yet even by rebasing ‘covert’ local government debt, debt to GDP ratio is only slightly above India (71%, 70%) and below Brazil (84%, 88%) in 2017 and 2018, and well below that of the advanced economies estimated by IMF.

From the perspective of financial market, what matters is whether the entity concerned has debt servicing capacity, in other words, can future stream of cash flow sustain the future schedule of debt repayment. In this context, the basic valuation matrix on debt by the financial market are time to maturity, duration, yield to maturity and debt service coverage ratio, as will be explained by applying relative risk framework. From the perspective of investor, the question is whether UCIB risk premium is appropriately benchmarked above equivalent duration sovereign or government bond and whether the rating accurately reflects the level of risks. In terms of credit, different bonds issued by different local governments come with different ratings which reflect credit-worthiness, liquidity, maturity and yield differences across regions and the state of the local economy. In terms of risks, UCIB is generally considered higher risk than government bond but lower risk than corporate bond or equity, which in relative terms, we argue is an asset class of its own.

6. From Financial Repression to Financial Deepening

Given its size and wide regional disparity, capital market plays an important role in matching capital with different risk reward profiles of different regions. This perspective based on the characteristic of Chinese financial market is essential to the development of the analytical framework proposed and provides the empirical context for understanding infrastructure debt financing in China from historical perspective. Riedel *et al* (2007) described China’s capital market development at the turn of the century as ‘financial repression’ in which the state represses the financial system to maximise the flow of financial resources to

government in order to implement heavy industry development strategy. The early part of the history of infrastructure finance in China can be divided into two broad periods - before and after 1979. The first period covers from the establishment of China in 1949 to the fourth 5 years plans (1949 – 1974). Between 1949 and 1958, China issued ‘State Economic Construction Public Debt’. The first bond ‘Northeast China Production Construction Bond’ (*Dong Bei Zhe Shi Gong Zhai*) was small and first issued between 1949 and 1950 for the construction of the northeast region of China². During the second 5 years plan (1958-1976), certain municipalities and provinces are allowed to issue local economic construction bond following government directive in 1958³. The subscription was by the way of administrative allocation and the funding was used to serve economic development strategy to construct ‘the third front’ (*San Xian Jian She*), namely building heavy industries in China’s ‘hinterland’ should the war ever broke out. For this period, China has paid heavily to achieve late industrialisation. There was little efficiency with the investment made during the period. According to Dong (2005), an eminent Chinese economic historian, the average payback period was 5 years during the first 5 years plan and by the fourth 5 years plan (1967-1976) the payback prolonged to 25 years (Dong, 2001). Efficiency measured by incremental increase of national income per one hundred yuan invested into infrastructure dropped 38.8% by the fourth 5 years plan⁴ due to the political upheaval of the cultural revolution (*ibid.*). Most debts are domestic and the only foreign debt – the Soviet Union debt of 5.162 billion RMB between 1953 and 1959 was quickly repaid due to the deterioration of bilateral relations.

Since the opening in 1976, Chinese government has made major fiscal reform including tax decentralisation (*Fen Shui Zhi*) in 1994 and a new budget law promulgated in 1995, both paving the way for the local government to finance infrastructure by issuing debt after the approval from the central government. In 1992, the central government allowed Shanghai Urban Construction Investment Company to issue 500 million Pudong Construction Bond, China’s first Urban Construction Investment Bond (UCIB). Since then, UCIB has grown year

² Under the planned economy, the bond uses points instead of price as a denomination. The amount is small. By converting point to price, the first issuance amount was equivalent to 35.4262 million RMB with actual amount raised to 42.046 million RMB (Li and Li, 2019). The duration is 5 years. Interest is payable annually with an annual rate of 5%.

³ Between 1958 to 1962, new fixed asset increased to 86.182 billion from 49.218 billion (1953-1957). Between 1967 to 1976, new fixed asset formation increased to 173.648 billion from 36.779 billion (1963-1965).

⁴ Incremental national declined to 28.93 per hundred yuan invested in from 47.28. (Dong, 2001)

by year and accelerated into a major asset class for the bank and financial institutions. Despite significant expansion, the distribution of UCIB across China has been very uneven. Top 5 regions such as Jiangsu, Tianjin, Beijing, Zhejiang and Hunan made up a large share of issuance by number and volume. Jiangsu province, by far, has the largest share of issuance and volume. As shown on Table 3, developed eastern region shared 44.3% of total issues and 37.8% of volume, as well as, lower cost of capital such as yield to maturity.

Table 3: UCIB Issuance, Yield and Maturity by Region

Administrative Region	% of Issuance volume	% of number of Issues	Average Time to Maturity (Year)	Average Yield to Maturity (%)
Northern (Huabei)	16.9%	11.7%	3.21	5.03%
North-eastern (Dongbei)	4.2%	3.9%	3.39	5.79%
Eastern (Huadong)	37.8%	44.3%	3.35	4.84%
Mid-southern (Zhongnan)	19.5%	18.5%	3.57	5.11%
South-western (Xinan)	15.4%	15.4%	3.92	5.41%
North-western (Xibei)	6.1%	6.1%	3.78	4.97%
Average	16.7%	16.7%	3.46	5.11%

Northern: Beijing, Tianji, Hebei, Shanxi, Inner Mongolia; *North-eastern:* Liaoning, Jilin, Heilongjiang; *Eastern:* Shanghai, Shandong, Jiangsu, Zhejiang, Fujian, Anhui, Jiangxi; *Mid-south:* Hennan, Hubei, Hunan, Guandong, Guangxi, Hainan;

South-west: Chongqing, Sichuan, Guizhou, Yunnan, Tibet; *North-west:* Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang

Eastern: Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan; *Middle:* Shangxi, Jijin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan;

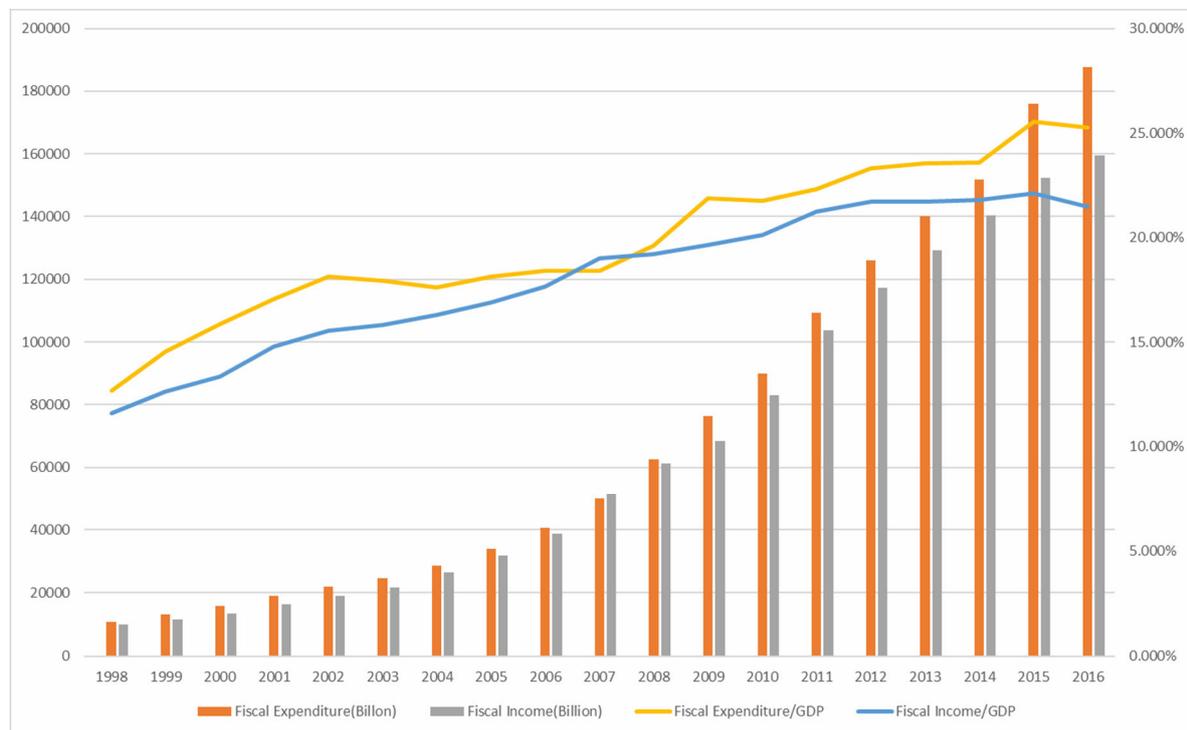
Western: Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Guangxi, Inner Mongolia

Source: Wind

The turning point of the history came in 2008 when faced with an unprecedented global financial melt-down, the government injected 4 trillion stimuli to the economy, a large part of which was to be raised by the local government. The injection coincided with subsequent rises of PPP and UCIB, which are two major forms of off-budgetary financing modes used by the local government to match funding and raised the capital needed for development. As shown in Figure 2, using 2007-08 as a dividing point when the share of fiscal income quickly inverted above fiscal expenditure, the fiscal gap has continued to widen until 2016, as relative share of fiscal expenditure diverged from fiscal income in the decade that follows. Concerned with the

overall level of debt and especially ‘covert’ debt, the National Audit Office (NAO) launched a nation-wide audit in 2011. A new budget law then came into the force in 2015 to regulate local government finance. Since then, the overall growth of local government debt has been on a path of steep decline from 33% in 2014 to 10% in 2018, correspondingly, the speed of growth for infrastructure has come down as well, from around 25% around 2014 to less than 5% in 2018 (Lin, 2019).

Figure 2: Fiscal Stance of the Chinese Government (1998-2016)



Source: NBS, Various Years

By 2015, the Chinese government has decided to put the brake on to deleverage the economy, which resulted in rapid decrease of PPP and UCIB issuance. The government policy followed supply side economics was to deleverage the Chinese economy particularly the real estate sector. As a result, the combined leverage ratio for China, measured by total debt to GDP has come down in 2018 (NBS, 2018). Old debts particularly covert type of sub-sovereign-debt (such as UCIB held by LGFP) have been progressively converted (*Zhai Wu Zhi Huan*) into new debt to reduce maturity risk. By 2019, the local government has almost completed converting 16 trillion of old debt (2.37 trillion USD) into new type of debt instrument such as project bond for local government (CCDCC, 2016, 2017, 2018, 2019; Liang and Liu, 2019).

Ten years since the start of global financial crisis in 2008, China has effectively reversed the course from financial repression to financial deepening. The timing of financial deepening coincided with the onset of global financial crisis as China invested heavily to lift the economy out of global recession. The evidence is particularly strong when we examine the growth at provincial level. If we define financial deepening as the growth of financial sector's value added to the economy. In the ten years between 1997 and 2007, the average growth rate of financial sector gross value added was 9% for all provinces and municipalities. In contrast, between 2007 and 2016, the average growth rate increased to 21%. In 19 years (1997-2016) the absolute growth rate increased by 289% (See Table A in Appendix I).

Financial deepening provides an important background to understand why China's infrastructure financing systems has accelerated so rapidly with rapid urbanisation in the last 10 years. Liang and Liu from CICC (2019) estimated infrastructure sector to be 6.7 trillion RMB (1 trillion USD) in 2011. Of which, traditional infrastructure comprising of rail, road, port, aviation, hydrology and utilities made up about 58% with the remaining 42% attributed to 'new' form of infrastructure such as urban underground rail, urban pipelines, warehousing and environmental facilities for urbanisation. Overall, the ratio of the traditional to 'newer' type of infrastructure was estimated at a ratio of 6:4. By 2018, the total size of China infrastructure sector grew to 17.6 trillion (2.64 trillion USD) with the ratio of the traditional to 'new' type of infrastructure inverted to a ratio of 4:6. In 2018, China reached urbanization level of 58%. The infrastructure sector has grown roughly 263% from 2011, an average growth rate of 33% per year, faster than the growth of financial sector value added.

High saving rate, asset formation, FDI and trade surplus are key drivers behind China's rapid economic development since the start of the reform. Surplus saving and trade deficit translated into infrastructure investment create positive spill-over to FDI. Although public debt can increase the real cost of capital hence 'crowd-out' investment according to neo-classical economic theory, the evidence is not always conclusive and often context specific (Gjini and Kukeli, 2012.). The cyclical nature of public debt, as shown above, is buffered by a consistent inflow of FDI to China and trade surplus which close the gap. At the start of global financial crisis, the state dominated banking systems channel funds to invest in strategic infrastructure project and hold a large part of infrastructure asset such as UCIB in its portfolio. UCIBs are traded in the inter-bank market as other fixed income securities which provide stable yield in

the form of regular coupon payment to the bank and financial institutions. The confluence of strategic timing for anti-cyclical economic policy following global financial crisis coupled with the government's long-term vision for rapid urbanisation explain why China realised substantial investment in infrastructure between 2008 and 2018 to develop the real economy.

7. UCIB As an Asset Class

As an asset class, UCIB is collateralised on real asset and is deemed less risky and more senior than unsecured corporate bond, and more volatile equity. The commercial bank in China accounted for 80% of investment in primary debt market. Specifically, the share of commercial banks in central and local government bonds were 67% and 87% in 2017. In 2018, key investor in UCIB were commercial banks (70%), policy bank (26%) and stock exchange (3%) (CCDCC, 2018). The holding varied by duration with 90% of one-year local government bond and 80% for bond maturity between 2-10 years owned by commercial bank. Policy bank held about 15% of bond maturing between 3-10 years and non-legal person (e.g. individual) held less than 1%. On the long end, typically 15-30 years, insurance company owned around 30% with the remaining shared by commercial bank (12-32%) and non-legal person (16-55%) (ibid.). Stable yield, different maturities and risk profiles associated with UCIB allow Chinese financial institutions to engage in maturity transformation through exposure to UCIB as an asset class.

Other than asset holding reason identified above, the dominance of commercial bank in UCIB financing needs to be understood in the context of policy burden or credit support to the state sector in the context of soft budget constraints (Lin and Li, 2004). However, the government reserves the power to strategically renegotiate the terms as recent example showed 16 trillion RMB of UCIB (2.37 trillion USD) were rolled over and reorganised into project or special bond with longer maturity. Debt conversion is seen as a strategic response by the state to three major issues facing UCIB. First, between 2005 and 2017, LGFP's return on equity (ROE) or cost of equity has been consistently below that of other non-financial entity. In 2017, ROE for UCIB was 2.4%, for other non-financial entity, ROE was 6.4%. Second, debt service coverage ratio (DSCR)⁵ – has been trending downward from 2005 and fell below one since 2010. In 2017, DSCR was 0.4, which meant operating earnings/cash flow was only 40% of current debt obligation. Third, maturity mismatching occurred as average time to maturity was

⁵ Debt Service Coverage Ratio (DSCR) = EBITDA / (debt falling due in one year + interest expense). EBITDA is operating income. DSCR is a measure of the cash flow available to pay current debt obligations.

2.9 years for debt held by LGFP between 2005 and 2017, which meant infrastructure projects with longer horizon of completion are likely to run into difficulty with liquidity to service the debt early (Liang and Liu, 2019). UCIB debt restructuring under the strategic guidance of the central government, in effect, reduces maturity risk by prolonging the repayment period and made the asset more accountable with transformation to new type of project bond.

A secondary market for bond is yet to mature but private sector has already entered the predominantly inter-bank market for UCIB. The liquidity, although thin, is a trade-off with stable yield for this asset class. Overtime, private sector participation in this asset class has given a popular name to UCIB as ‘silver gilded bond’ (*Yin Bian Zhai*). Following recent UCIB debt restructuring, major banking institution such as the Bank of China (BOC) became the first to offer over-the-counter (OTC) service to retail investors (BOC, 2019). The first OTC BOC subscription for RMB 100 million Beijing social housing UCIB was sold out within 3 days of issuance by the Beijing branch of BOC. Agriculture Bank of China (ABC) and Industrial and Commercial Bank of China (ICBC) each obtained RMB 5.6 billion of total subscription for OTC sales and accounted for 56% of RMB 20 billion Beijing social housing project UCIB issuance (Beijing News, 2019). Private capital participation also increased with increasing demand from private equity. The underwriting of the issuance of RMB 2 billion social housing UCIB with 7 years of time to maturity would be appraised by 9 government regulations. The expectation is full interest coverage by project revenue and implicit understanding of 8% Internal Rate of Return (IRR) or the total cost of capital. Table 3 shows a portfolio of UCIB issued through private equity fund.

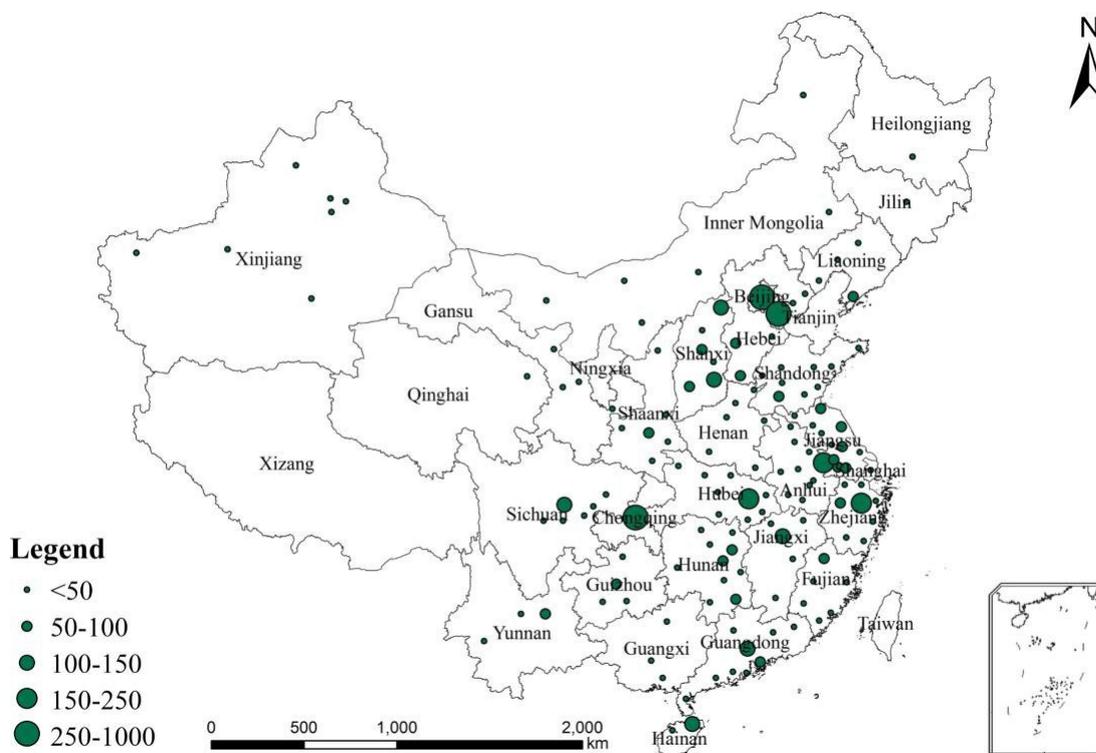
Table 3: Terms of UCIB Issuance

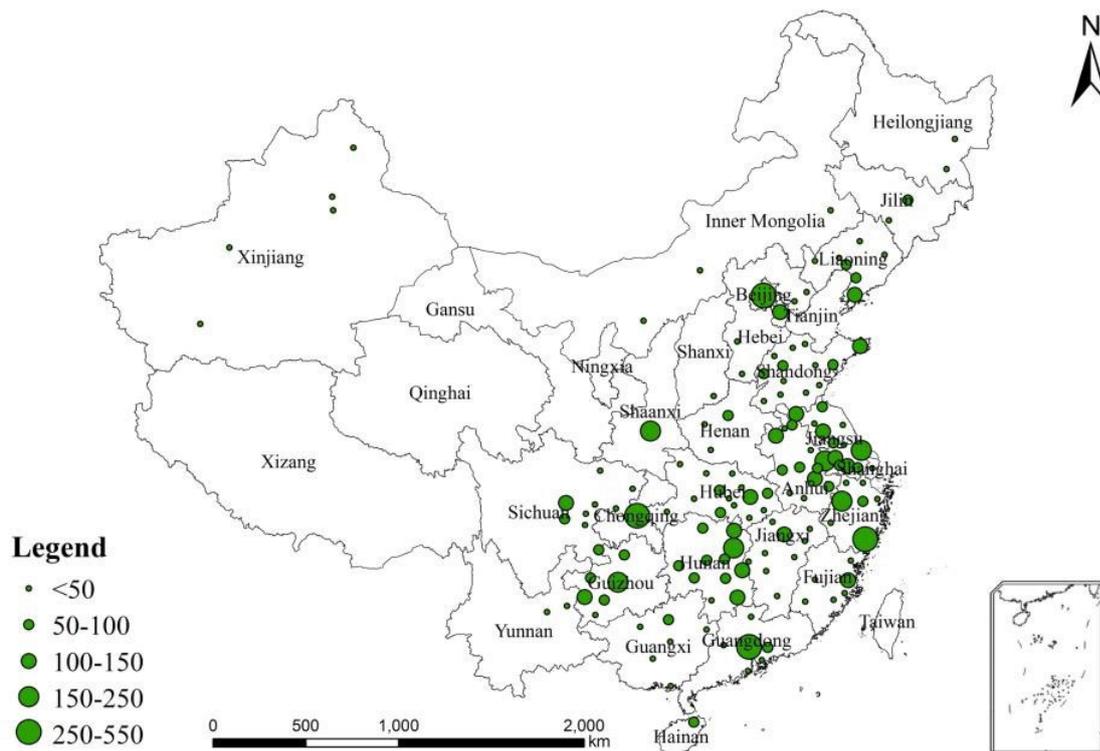
Name	Coupon Date	Rating	Volume (100 M)	Duration (Year)	Coupon Rate (%)	Method
T	2017-9-13	AAA	7.2	10	5.69	PE
U	2017-8-29	AA	4.2	7	7.00	PE
V	2017-8-18	AA+	10.0	5	6.80	PE
X	2017-8-8	AA	6	10	6.98	PE
Y	2017-8-2	AA	5.7	7	6.75	PE
Z	2017-7-20	AA	4.5	5	6.67	PE

Source: Confidential

From financial repression to financial deepening, China's financial systems play a strategically important, yet constantly evolving role in capitalising and intermediating China's infrastructure investment since 2008. At the start of global financial crisis, China has followed an old fashion approach to engineer an infrastructure led growth and uses the financial systems to serve the real economy. Even before the crisis, China has invested heavily in infrastructure using 2008 Beijing Olympics as a launch board. China's approach is different from what has led the world into 2008 global financial crisis. Since 2012, profound internal structural change has produced dynamics which limits the detrimental effect of debt as China's policy swings towards supply side economics. In contrast to the prediction that China's infrastructure finance is "headed for an infrastructure-led national financial and economic crisis" (Ansar *et al*, 2016). The preceding analysis has showed that such conclusion has not been fully supported by evidences and international comparison. Despite various problems, UCIB has emerged as a(n) asset class in China's financial market with increasing private sector participation, thanks to the strategic role of the state in timing the investment during the financial crisis and proactively regulating UCIB for a soft landing, through debt restructuring, and creating an active, private, secondary market for UCIB.

Figure 3: Changing Landscape (2012 vs 2016)





Source: Wind

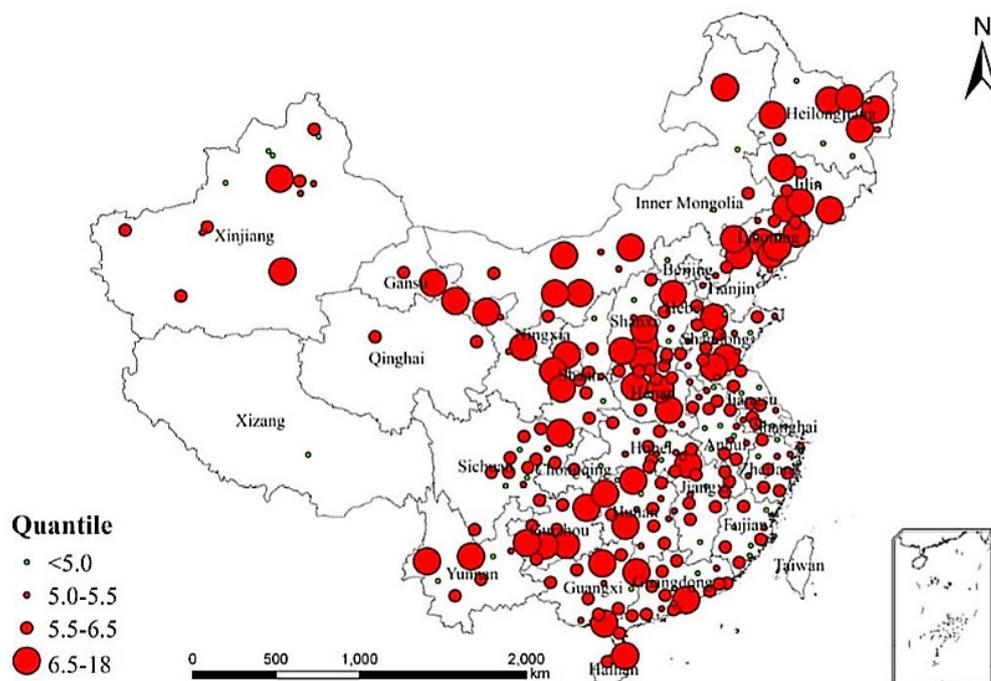
8. Spatial Diversification of Relative Risk

Relative risk framework is proposed by this paper to measure risk premium as the difference between UCIB and the benchmark government bond. Traditional portfolio theory in finance (Markowitz, 1976) see risk as a relative concept which comes with the benefit of diversification. Spatial dimension of risk is modelled using GIS to reveal the broad pattern of concentration and dispersion. As a financial instrument which strong regional/city characteristics, UCIB is best understood in its spatial context for diversification.

Figure 3 reported the spatial distribution of UCIB in 2012 and 2016. Four clusters of concentration have begun to emerge in 2012 along China's geographical division centred on tier one cities such as Beijing, Tianjin, Shanghai, Guangzhou and Chongqing. By 2016, UCIB has spread to a large part of middle China such as Hunan, Jiangxi, Hubei and Anhui, as well as, periphery regions such as Guizhou and Liaoning. A pattern of proximity to tier one cities could also be observed. There are some outliers along the border regions. However, over time the centre has shifted to become more evenly spread between eastern and central China with clusters along major centres also become larger.

Figure 5 depicted average yield to maturity in the last 10 years and how relative risk was distributed across China. As can be seen, in the eastern coastal, southern and Beijing areas, the yield to maturity is relatively lower than middle, north-eastern and western regions. The eastern coastal and southern regions have considerably a higher amount of financial capital and more financial instruments. Even though these regions have issued a higher amount of UCIB their relative risks remain lower. This is consistent with the eastern region reporting the lowest yield in Table 3. Relative risk premium explains spatial difference in terms of proximity to financial centres such as Beijing and Shanghai.

Figure 4: Relative Risk Premium by average UCIB yield (2008-18)



Source: Wind

Different risk profiles as explained by relative risk premium also offer investors benefit of diversification. An important dimension of UCIB is that it is embedded within a locality and serves as a key linkage between financial capital and the real economy serviced by infrastructure. As yield difference emerges between different localities, capital seeking higher

return will be driven to the locality with higher relative yield/return, in the process, equalising the yield/return difference between regions.

Table 4: UCIB Relative Risk Premium ⁶

Maturity	Rating Scale									
	AAA		AA+		AA		AA(2)		AA-	
	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Less than 1 month	0.92	33%	1.22	50%	1.50	64%	1.58	57%	1.96	71%
1 month	1.15	41%	1.34	48%	1.52	52%	1.72	58%	1.96	53%
3 months	1.32	41%	1.58	55%	1.82	66%	1.92	67%	2.30	71%
6 months	1.34	45%	1.68	62%	2.01	76%	2.11	76%	2.54	82%
9 months	1.30	48%	1.52	59%	1.75	65%	1.96	68%	2.30	68%
1 year	1.40	43%	1.77	63%	2.12	78%	2.25	81%	2.72	87%
3 years	1.46	42%	1.90	65%	2.32	81%	2.53	82%	3.05	86%
5 years	1.54	40%	2.05	63%	2.55	79%	2.77	79%	3.32	81%
7 years	1.58	39%	2.14	60%	2.70	74%	2.93	74%	3.51	74%
10 years	1.65	37%	2.25	58%	2.86	73%	3.09	72%	3.69	72%
15 years	1.57	40%	2.17	62%	2.80	77%	3.03	77%	3.64	75%
30 years	1.59	39%	2.20	61%	2.83	76%	3.04	74%	3.67	72%

Source: CCDCC and own computation

9. Pricing of Relative Risk

A crucial question arises whether the asset price in the locality accurately reflects relative risk. This section uses the analytical framework developed by this paper - the concept of relative risk – to decompose temporal aspects of relative risks. The sample covers the time-

⁶ The data were obtained from China Central Depository & Clearing Co. Ltd. (CCDCC), the main institution in China set up by the Ministry of Finance to provide indexes for asset managers and institutions. CCDCC is globally recognised and tracks by leading indexes like MSCI, iboxx and others index across the world as a benchmark for treasury, credit and bond. CCDCC's UCIB yields are based on five rating scales (AAA, AA+, AA, AA(2), AA-).

period between September 8th, 2008 to December 12th, 2018, sourced from Wind and included 2,488 observations across 8 (categories of time to maturity⁷) x 5 (types of credit ratings⁸), or 40 variables of daily frequency for UCIB benchmark. Applying the framework of relative risk, we observe that relative risk/spread increases as maturity increases from less than one month to 30 years. The relative risk/spread also widens as rating quality decreases from AAA to AA-. This is consistent with the finding that as default risk, proxied by rating, increases (AAA to AA-) the relative risk/spread increases to account for rating decrease, vice versa.

Table 5: UCIB Issuance by Jiang Ning City Construction Company Limited (2015-2016)

Code	Name	Issue Date	Volume (100 million)	Duration (Year)	Coupon Rate	Lead Underwriter	Credit Rating	Type
1680452.IB	16 Jiang Ning UCIB	2016/11	9	7	3.48%	Industrial Securities	AA+	Corporate Bond
145011.SH	16 Jiang Cheng 03	2016/9	9	5	3.59%	GF Securities	AA+	Private Equity
135742.SH	16 Jiang Cheng 02	2016/8	15	5	3.60%	Zhongtai Securities	AA+	Private Equity
031664019.IB	16 Jiang Ning PPN001	2016/3	10	3	4.07%	Shanghai Pudong Development Bank & CMSC	AA+	PPN
135054.SH	16 Jiang Cheng Jian	2016/1	9	3	4.60%	Industrial Securities	AA+	Private Equity
031575025.IB	15 Jiang Ning PPN001	2015/11	10	5	5.36%	CMSC & Shanghai Pudong Development Bank	AA+	PPN

Source: Wind

Returning to the example used in Section 3, AA+ rated, *16 Jiang Ning UCIB* was issued in 10 November 2016 to be retired in 11 November 2023 (7 years' Time to Maturity from first issue). On 21 August 2019, the bond was trading at a discounted price of 99.217 RMB with a coupon rate of 3.48%. Yield to maturity was 3.681%. On the same day, the yield of 10 years government bond was 2.82%. The difference between the two was 0.86% (86 basis point) - the

⁷ These five rating scales range from 13 categories in terms of different time to maturity (less than 1 month, 1 month, 3 months, 6 months, 9 months, 1 year, 3 years, 5 years, 7 years, 10 years, 15 years, 30 years, 50 years). We selected 8 maturities from 13 categories of time to maturity to represent (1) short end (6 months, 1 year), (2) medium end (3 years, 5 years, 7 years), and long end (10 years, 15 years, 30 years).

⁸ Although the rating uses the same letter 'A' but to a different combination, the five scales represent five levels of credit risks in UCIB.

relative risk premium for holding *16 Jiang Ning UCIB* as compare with holding a ‘risk free’ 10 year’s government bonds. Compared with sample benchmark such as equivalent duration AA+ rated, 3 years UCIB benchmark provided in Table 4, the average value of yield to maturity is 4.91%. *16 Jiang Ning* achieved lower yield/risk level than the average benchmark of same maturity government bond (3.68% compared with 4.91% = 1.23% or 123 basis point), a signal for lower default risk compared with the average of AA+ rated 3 years UCIB benchmark and holding time to maturity constant. In relative terms, *16 Jiang Ning* also has lower relative risk/spread (0.86% or 86 basis point) compared with 3 years UCIB benchmark’s relative risk (4.91% - 3.54% = 1.37%, 137 basis point).

The issuer of *16 Jiang Ning UCIB* is Jiang Ning City Construction Company Limited, a LGFP located in Jiang Ning district of Nanjing, the capital of Jiangsu province. As shown in Table 5, the issuer has issued six UCIB since 2015 and achieved a good long-term credit rating of AA+ by China Chengxin Credit Rating Group, a key rating agency in China. A variety of debts were raised through corporate bond issue in the inter-bank securities market, private equity bond traded in Shanghai Stock Exchange, and PPN (private placement notes) targeting institutional investors in the inter-bank market. The average volume of capital raised was about 1 billion with average duration 4.67 years and average coupon rate of 4.12%. The company has been able to tap into capital market every few (1-3) months and successfully raised 6.2 billion from capital market between November 2015 and November 2016.

16 Jiang Ning UCIB belongs to a series of three 900 million issuance in 2016. Industrial securities Co. Ltd. was the lead underwriter for the first issue using private equity method resulting in 4.60% coupon rate. By second issue, the company has been able to use another lead underwriter GF securities using private equity method and reduced coupon to 3.59%. By the third issue (*16 Jiang Ning UCIB*), the company further reduced coupon to 3.48% using corporate bond method and Industrial Securities for the second time as lead underwriter. ‘Piggy back’ on the success of its last five issues between November 2015 and November 2016, the coupon rate was reduced from 5.36% to 3.48% with maturity extended from 3 to 7 years. Compared with UCIB benchmark rate of 4.91%, the first issue has much rate (5.36%) but by the second issue, the rate was reduced to less than UCIB benchmark. A well-developed, competitive capital market plays a crucial role for the company’s successful debt financing. Through several rounds of financing, the company has also been able to price in its relative

risk in each round by shopping around for different lead underwriter and sending signal to the capital market on its long-term credibility.

CONCLUSION

The financial market provides a wealth of tools to which relative risk of UCIB could be assessed using comparable benchmark and decomposing further into granularity of risk layers. This instrumental view of financial market is important to understand the future development of bond market in China. After carefully analysing the overall situation of debt and local government debt in China, we caution over-prediction on the demise of China's infrastructure investment by Ansar *et al* (2016). We pointed out institutions matter – by introducing readers to the evolution of China's infrastructure finance systems and international comparison. We further argued China's financial systems plays a strategically important role in terms of strong inter-bank financing of the infrastructure sector.

Financial deepening in China when measured in terms of growth lags the development of infrastructure sector. China has seized the opportunity of global financial crisis to develop the infrastructure sector needed for further urbanization. The existing literature have understated the full potential and contribution of infrastructure as an asset class to China's financial system and to the world economy. We argue UCIB is fast emerging as an asset class which despite being owned in majority by the bank is never the less attracting private capital for financing. As an asset class, UCIB offers benefit of spatial diversification. UCIB is embedded within a locality and serves as a key linkage between financial capital and the real economy serviced by infrastructure. As yield difference emerges between different localities, capital seeking higher return will be driven to the locality with higher relative yield/return, in the process, equalising the yield/return difference between regions.

Using specific example of UCIB we used relative risk framework to assess the pricing of relative risk and how capital market facilitates the financing of UCIB. We conclude that UCIB is integral to the future development of China's infrastructure systems and a competitive capital market is crucial in facilitating risk pricing and debt financing. The future of UCIB depends on its potential as an asset class which bridges the linkage between China's real economy and financialisation. The continuous development of capital market particularly

primary and secondary market, and the demand for UCIB through different methods of issuance offers investment opportunity which could help to provide China's long-term future.

Due to the limitation on the length of this article, we only highlighted key features of relative risk and provided a stylised overview of UCIB as an asset class. In the future, we hope to further decompose relative risks premium into finer granularity when the dynamic relationships could be estimated and modelled to demonstrate how financial instrument changes in respond to shock and business cycle. This paper, by considering the spatial dimension of relative risk, limits the decomposition to idiosyncrasies associated with spatial layer of relative risk and the instrumental level risk factor, which would have been considered by asset manager in practice when it comes to the pricing and hedging of risk.

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