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Supervisor: Davide Tomio
Author: Dmitrij Semeniuk
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Analysis of corporate bond spreads in pre- and post-default periods

Is there a Moral Hazard in Chinese Corporate Bond Market?

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ABSTRACT

The aim of this paper is to understand the underlying processes that occurred in Chinese corporate bond market following the first-ever corporate bond default. To author's knowledge, this paper is among the first ones to combine and employ a comprehensive database on corporate bonds, ownership and financial information for China capital markets. First, the paper analyses the rapid development of Chinese corporate bond market, discusses its future opportunities and underlying risks. The paper also tackles the hypothesis of no or just partially implied default risk in the corporate market in China. The results from Fama-MacBeth regression clearly rejects the hypothesis, as it was found out that, among others, that profitability and leverage of a given company significantly affect corporate spreads and there are signs of risk-price correction in post-default periods. Also, this paper is first to quantify the effects of ownership and "illiquidity premiums" that are not common for developed bond markets, but exist in the underdeveloped Chinese corporate bond market. Lastly, the importance of ownership through time is discussed, while results suggest that in post-default period the effect of ownership evens out, meaning that credit risk of both private and non-private companies is now priced on a more similar, but still different basis. The proposed model successfully combines macroeconomic, corporate and bond-specific information, while results are consistent and robust across different estimation procedures.

ACKNOWLEDGEMENTS

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1. INTRODUCTION

While analysts try to predict when China will outpace US in terms of GDP, Chinese companies have already overtaken US counterparts in corporate debt outstanding. According to analysis from Standard and Poor's, non-financial corporate debt in China reached $14.2tn at the end of 2013, which accounts for approximately 30% of the global total (Global Credit Portal, 2014). In comparison, by 2013 the amount of corporate debt outstanding by US companies was estimated to be $13.1tn.

Yet, behind the reasons of this rapid growth in corporate bond demand is an assumption of limited risk inherent in corporate bond offerings. Until recently, the corporate bond market has never experienced a default, while credit ratings remain notoriously high and uniform despite deteriorating financial health of Chinese companies. The notion of risk-free environment eventually leads to misallocation of capital to less efficient or more vulnerable segments of the economy, which ultimately creates more systematic risk in the financial system (Rutkowski, 2013).

There are two reasons behind what investors perceive as risk-free "lunch" in Chinese corporate bond market. First, historically more than 90% of corporate bond offerings have been by state-owned enterprises which are believed to have an implicit sovereign-backing. Alternatively, explicit bank guarantee was required in order to get access to debt capital markets. Second, at every moment over the past few years when enterprises came close to defaulting on their corporate bonds, they have been bailed out by their guarantors, local governments or so-called "bad banks". These conditions ultimately could have created an environment of moral hazard, leading investors in corporate bonds – mostly fund management and insurance companies – to assume that all corporate bonds share little or no risk.

In the case of increasing credit risks, financial regulators may find themselves under pressure to enforce market rules that allow investors to assume the full risks of their investments and to ensure more efficient allocation of capital, which is fundamental to future economic growth. Indeed, China Securities, the underwriter of Chaori's recently and first-ever defaulted bond, is almost entirely owned by the central government so the decision not to bail out the bond can be interpreted by investors as a deliberate signal from Beijing.

One month later, Chinese building materials producer averts what would have been the second default in the nation's onshore bond market, after its guarantor said it would step in to help.

As a result, one of the key topics of discussion among participants of capital markets in China is the impact that this default is having on sentiment toward other bond issuers of dubious financial health.

1.1. PROBLEM STATEMENT

Not surprisingly, that in case of weakened economic condition and increasing credit risks, the probability of defaults especially for private small companies without explicit guarantees will budge (Bloomberg, 2014). As a first step, it is therefore interesting to analyse the underlying processes that occurr in Chinese corporate bond market following the first-ever corporate bond default.

The second goal of the paper is therefore to find factors that have significant explanatory power to determine corporate bond spreads by employing macroeconomic, corporate and bond-specific variables. Especially, the sensitivity of bond yields to changes in key financial metrics for both private and non-private companies serve as the major focus of the paper.

Thirdly, depending on the controlling shareholder, the hypothesis of no or little implied default risk will be tested.

Despite the fact that Chinese corporate bond market has been frequently depicted and criticised by the media for the presence of moral hazard, to author's knowledge, there has been no empirical studies aimed at analysing this problem in pre- and post-default setting.

The paper proceeds in the following way. First, in Section 2, the development of debt capital market in China is presented. Section 3 reviews analytical framework and previous research on determinants of corporate spreads in China and other emerging economies. In section 4, the methodology and estimation procedures are shown. Data and descriptive statistics are available in Section 5, while in Section 6 empirical results are discussed. Section 7 concludes the paper.

2. DEBT CAPITAL MARKETS IN CHINA

2.1. THE GROUNDWORK FOR DEBT MARKET IN CHINA

During the past two decades, the economy of China has taken dramatic strides forward. The country's GDP grew almost 26 times, from US$ 356.9 billion in 1993 to US$ 9.240 trillion in 2013 (WorldBank). Despite having a rapidly expanding economy, the Chinese financial system has been long perceived and characterized by a weak, yet fast-growing, equity and corporate bond markets. [1]

For many decades since People's Republic was founded, the responsibility for sluggish bond markets lied in the hands of central planning. The allocation of credit, usually in form of grants to state-owned enterprises, as well as the control over prices and supply were all governed by most powerful economic decision-making agency – State Economic Planning Commission. The financial system consisted of a single entity – People's Bank of China (PBOC), which served as a central bank and the whole financial system in the country. For three decades until 1980s, the treasury bonds issued mostly served two purposes: assisting the central government in curbing inflation and being an alternative form of savings for its citizens. Naturally, in the absence of a secondary market and real return opportunities, the bonds rarely exchanged hands (Huang & Zhu, 2007).

The interest in Chinese bond market revived in the early 1980s, following the decision by Chinese authorities to open the doors of its economy to foreign businesses. Besides, in mid 1980s, state-owned enterprises (SOEs) were given the rights to issue corporate bonds, which initially were only subject to the approval of PBOC. As a result, the relatively unregulated environment gave rise to internal as well as public funding in a form of corporate bonds, many of which were spontaneously issued by state-owned enterprises (SOEs). Taking no account of associated credit risk, the coupon rate initially was set to 40% on top of the prevailing 1-year bank deposit rate, making these bonds an attractive opportunity for investors (Zeng, 2009).

[1] In Section 2.1 and Section 2.2, corporate bond market is referred to as to market for corporate and enterprise bonds, as well as bonds issued by local government financing vehicles.

The development of debt capital markets continued with the opening of Shanghai and Shenzhen stock exchanges in 1990 and 1991, respectively. As a starting point, the exchanges were primary used for primary issues, secondary trading as well as repurchase operations.

It is, however, worth mentioning, that by no means the surging issuance volumes in quasi-corporate bond market were a full reflection of growing economy, market-driven regulations and/or financial maturity of bond issuers. Rather, since most of these large SOEs de facto were subsidiaries of different levels of government agencies, the issuance "boom" should, in the first place, be associated with a moral hazard issue that management of these SOEs faced during the times of economic transition (Huang & Zhu, 2007). The moral hazard can be explained in the following way: in case of default, the management would hardly be heavily penalized, but they had every incentive and opportunity to borrow and finance projects of it's SOEs even at extremely high coupon rates.

It didn't take long until the overheating Chinese economy and excessive corporate bond issuance were hit by market turmoil in the early 1990s. The economic slowdown triggered a series of defaults within Chinese bond market, which in turn forced the central government to step in and bail troubled companies out. These non-performing assets lied on the balance sheets of commercial state-owned banks, back then being the major holders of those securities (Huang & Zhu, 2007). One might question whether the development of corporate bond market was sincerely in interests of ruling government officials, as a repetition of market turmoil in early 1990s would put the communist party into quandary and/or political unrest.

In 1997, under instructions from the State Council, The People's Bank of China (PBOC) ordered all commercial banks to move their repo and bond trading from the Shenzhen and Shanghai stock exchanges to an interbank market (PBC Notice No. 240, 1997). As a result, the Chinese bond market was divided into three segments: the bank counters, the exchanges and the interbank market, the latest among other playing the dominant role (Zeng, 2009).

A year later, the government responded by further tightening of regulations, specifically in relation to bond issuance approval. Founded in 1996, China Securities Depository & Clearing Co., Ltd. (CSDCC) undertook the official responsibility of bond

custody and settlement for China's interbank bond market. Any bond issued required a one-hundred percent guarantee from a bank, was subject to an annual quota system, while the final permission was at discretion of a regulatory body (CSDCC) (Pessarossi & Weill, 2013). At the same time, so as to restraint the risk within financial system, the regulator's continuous predilection for large state-owned enterprises hampered an early development of debt capital markets in China even within a strictly regulated interbank market.

Complicated access into bond markets encouraged smaller uncompetitive state-owned enterprise (SOE) as well as financially-constrained local governments to fall back on banks. Moreover, as the bond market was considered much more "risky" and less familiar to market participants as compared to commercial bank lending, the latter received additional encouragement from local officials, making the banking system the major source of credit allocation (Huang & Zhu, 2007). By late 1990s, the Chinese financial system, which previously had averted the Asian crisis with relative success, became heavily biased on banks. These decisions still have a major effect on corporate bond market in today's China, especially on its regulatory sentiment and on its structure.

The issuance of bonds within country had fallen from RMB 68 billion in early 1990s to RMB 8.3 billion in 2000, only rebounding in 2004 by reaching RMB 50 billion (Banker, 2004). Starting in 1998, the overhaul of the banking system was the primary concern of financial reform.

Although in early 2000s there were numerous regional and private banks, the "Big Four" banks were the only ones who received a special wide support by communist party. Government-owned Bank of China, China Construction Bank, Industrial and Commercial Bank of China as well as Agricultural Bank of China enjoyed the exclusive privileges to offer investment banking services domestically. As a result, four biggest banks controlled about 75% of the country's deposits and commercial loans (Murphy, 2003).

The vast majority of these loans were provided to state-owned enterprises, which due to political structure and close relations to government officials were loosely

incentivized to pay off their loans. Moreover, by keeping these companies afloat, the "Big Four" was fulfilling government's wishes to keep employment stable and export rising. Eventually, it was estimated that USD 500 billion of "bad loans" were accumulated as a result of these policies (Dorn, 2003). By 2003, the many of these government-backed major banks became technically insolvent, as nonperforming loans were estimated to be in the range from 25 to 40 percent of total outstanding loans (40% of countries GDP) (Tung, 2002).

2.1.1. A RISE OF CORPORATE BOND MARKET

However, it didn't take long until The Chinese Communist party has recognized the necessity to *"…encourage the qualified enterprises to raise funds through issuance of corporate bonds in order to reverse the sluggish growth of bonds financing and diversify products on the securities market and promote the coordinative development of the capital market",* as it was brought up in "Some Opinions of the State Council on Promoting the Reform, Opening up and Steady Growth of Capital Market" in 2014 (Fa, 2004). It was the first time Chinese government admitted that its highly skewed financial system accumulates systematic risks as well as intensifies the inefficiency of capital allocation. More specifically, the Governor of the People's Bank of China (PBOC) stated that "*China's underdeveloped corporate bond market has distorted the financing structure in the economy which poses a threat to financial stability, as well as to social and economic development*" (Xiaochuan, 2004).

Therefore, initially, a set of regulatory reforms, with officials clearing away some of the obstacles that were curbing the development of the bond market, were put high on the priority list. As a first attempt to spur investor interest in fixed income securities, the minimum yields on investment grade bonds have been introduced (Chen, Mazumdar, & Surana, 2011). Previously, all enterprise bonds issued belonged to well-capitalized state companies and offered very similar yields (Balfour, 2009).

The development of the market gained momentum in 2005 and made a significant step in 2006 and 2007, when the first companies were allowed to issue corporate bonds without explicit bank guarantee. Equity markets in China tumbled in late 2007, as investors parked their stock proceeds in deposit accounts, leaving banks

with money that they could not lend due to government limits on loans. Moreover, Beijing halted any new domestic stock offerings, making bonds and loans as the only options for companies to raise capital. So as to utilize excess liquidity and demand, government officials decided to streamline rules on bond issuance (Balfour, 2009).

The situation has evolved, when the China Securities Regulatory Commission (CSRC) published new issuance rules, allowing the issuance of corporate bonds for any general corporate purpose approved by their board and without bank guarantees, at the same time introducing a distinction between corporate and enterprise bonds (Reuters, 2009). The emergence of non-government companies in corporate bond market resulted from attempts to provide investors with better asset allocation opportunities, which also created initiatives for risk assessment, as newly issued bonds neither had explicit nor implicit bank or government guarantees.

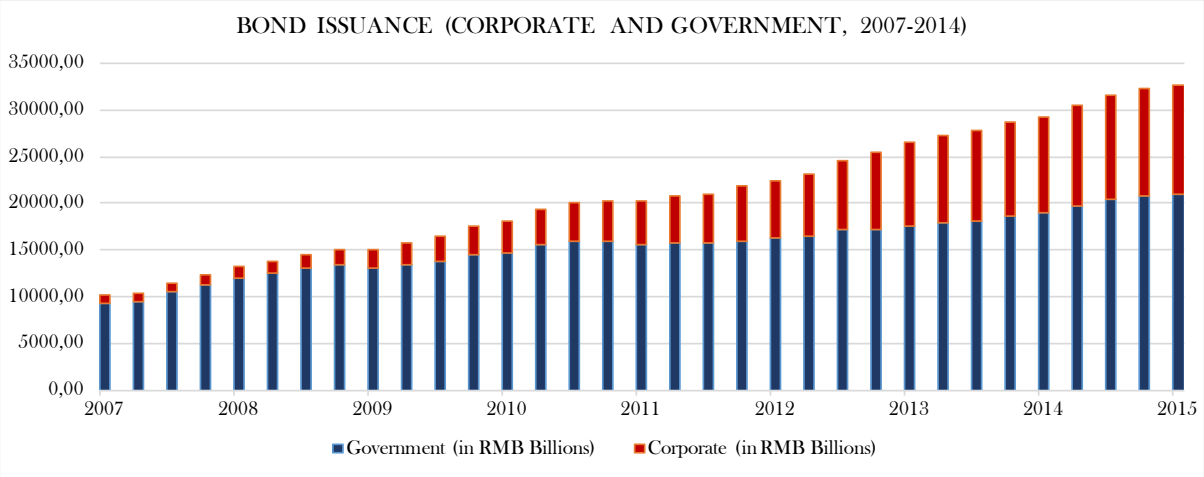
CSRC took over the authority from the National Development and Reform Commission (NDRC) to approve "company bonds" issued by listed companies, while NDRC were left responsible for issuance of enterprise bonds. According to the new regulations, companies that were listed in Shanghai and Shenzhen are permitted to issue corporate bonds without being subject to issuance quotas (Fangqing, 2007). Prior to that, any company willing to issue corporate bonds had to be stock listed, while approval was costly, time-consuming and subject to political whims (Balfour, 2009). Subsequently, the lion's share of issuance was by means of enterprise bonds, when money was raised by state-owned enterprises to finance their fixed-investments projects (Fangqing, 2007). Hubei-based China Yangtze Power Co., the first power firm listed on Chinese stock exchange was also the first company to announce the plans to issue corporate bonds worth RMB 8 billion.

In January 2008, NDRC announced *the* "Notice on Matters Concerning Pushing forward Corporate Bond Market Development & Simplifying Issuance Examination and Approval Procedures", which removed quota system for enterprise bonds that also no longer required a guarantee from a bank (CSDC, 2008). Few months later, the China National Materials Group Corporation issued RMB 500 million of unsecured corporate debentures (without explicit guarantee from a state-owned bank), which was an important step for further marketization of Chinese corporate

bonds.

The growth in corporate bond issuance following the regulatory changes has been astonishing. The corporate bond market that was practically non-existent in late 90s had bond issuance of USD 112 billion in 2007, growing almost 4 times in two years reaching a level of USD 454 billion in 2009.

FIGURE 1: CORPORATE AND GOVERNMENT BOND ISSUANCE SINCE 2007 (SOURCE: ASASIANBONDSONLINE).



As of Q1 2015, bond issuance of corporate bonds in China amounted to USD 1909 billion, recording a compound annual growth rate of 34% since 2007. Figure 1 shows a rapid increase in corporate bond issuance since 2007, which allowed them to catch up with issuance of government bonds in the same period. In comparison, issuance of China's government bonds grew by CAGR of 9% since 2007, reaching USD 3370 billion by March 2015. According to data from CSRC, since year 2000 to 2013 total

bonds outstanding increased by almost 2000%, from USD 202 billion to USD 4,044 billion. A year after, according to data obtained from WIND, total outstanding debt of corporate bonds amounted USD 5.8 trillion.

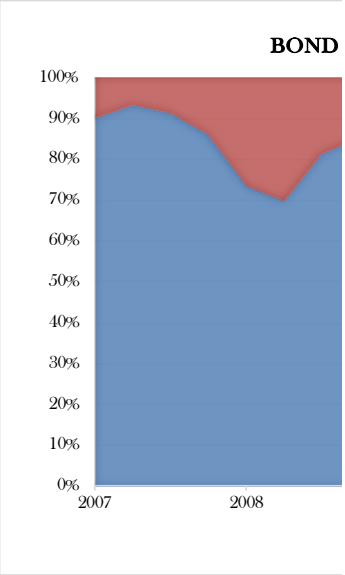


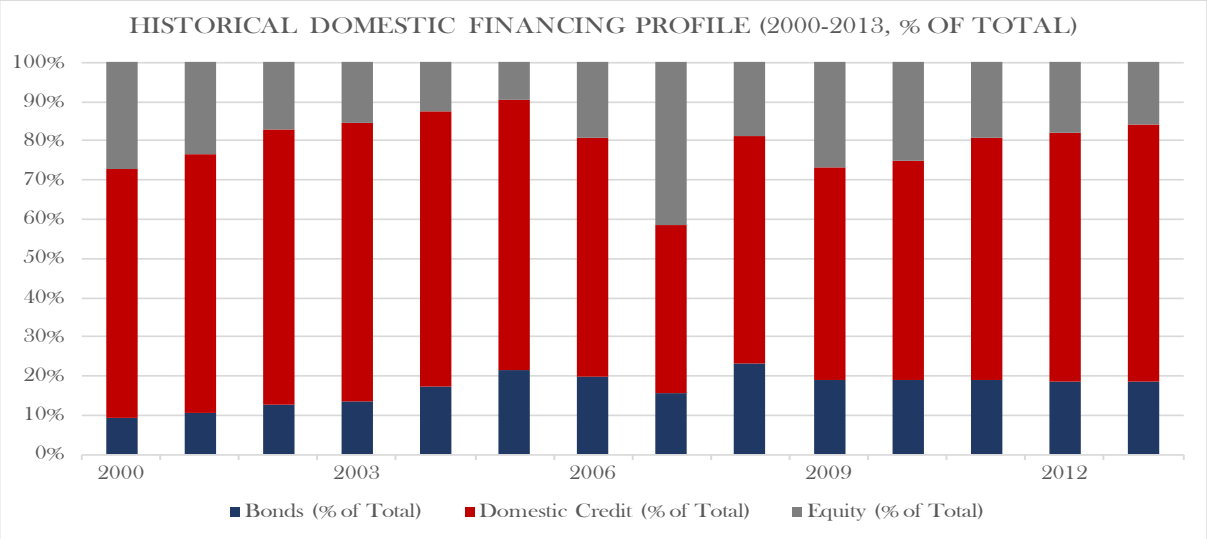
FIGURE 2: BOND ISSUANCE AS A SHARE OF TOTAL (SOURCE:WIND, 2014)

As of the same year, the issuance of non-financial corporate bonds becomes comparable to the amount of local currency government bonds, as shown in Figure 2.

2.2. CHOICE OF FINANCING

As far as credit markets are concerned, previously unseen bond issuance levels improved its positions against bank loans as well.

FIGURE 3: : HISTORICAL DOMESTIC FINANCING PROFILE (SOURCE: ADB, 2015)



According to data obtained from Asian Development Bank (ADB), bank loans, as represented by domestic credit, accounted for 63% market share in 2000 and had been swiftly increasing its importance until 2004, when already 70% of credit was allocated by means of bank loans. Local currency bonds outstanding amounted to just over 9% in 2000, while in 2005 it already made up more than 20% of domestic financing. Following new streamlined market regulations in 2007 and 2008, share of local currency bonds out of total capital raised reached 23%, it's highest level to date.

Overall, starting in 2009 the composition of credit market in China hasn't substantially changed, as demand for bank loans in surging Chinese economy grew at a similar rate to issuance of new corporate and enterprise bonds. By 2013, bank-

lending remained a major source of financing for local businesses and was still ahead of other emerging Asian countries, as shown in Figure 4.

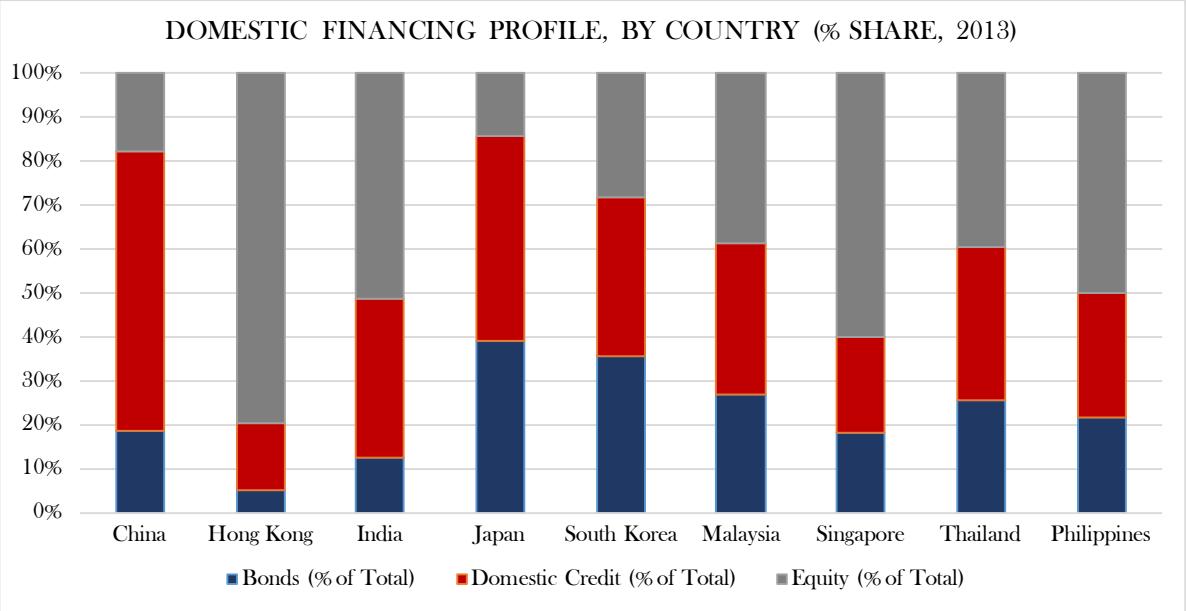


FIGURE 4: DOMESTIC FINANCING PROFILE BY COUNTRY (SOURCE: ADB, 2015)

In emerging economies, given the information asymmetry between borrowers and lenders, small-to-medium firms typically can only rely on internal sources of capital, such as loans from banks, as in this case the lender has greater control and more abilities to screen and monitor the lender (Chen, Mazumdar, & Surana, 2011).

It has to be mentioned though, that to a higher degree a rapid increase in bond issuance in early 2000s was mostly driven by state-owned financial institutions and major industrial corporations, who could easily obtain permission to issues bonds from CSDCC.

Indeed, when considering demand for debt securities and loans by nonfinancial corporations, only 6% of total credit allocated was by means of bonds and other debt securities. Standard and Poor's forecasts the share to grow to 9% by 2018, meaning that a share of bonds markets in China will still lag behind compared to "Global" average and, especially, to developed "western" economies.

FIGURE 5: DEBT SECURITIES AND LOANS AS A PERCENTAGE OF TOTAL NONFINANCIAL CORPORATE DEBT (SOURCE: OWN CALCULATION BASED ON DATA FROM BLOOMBERG, 2014)

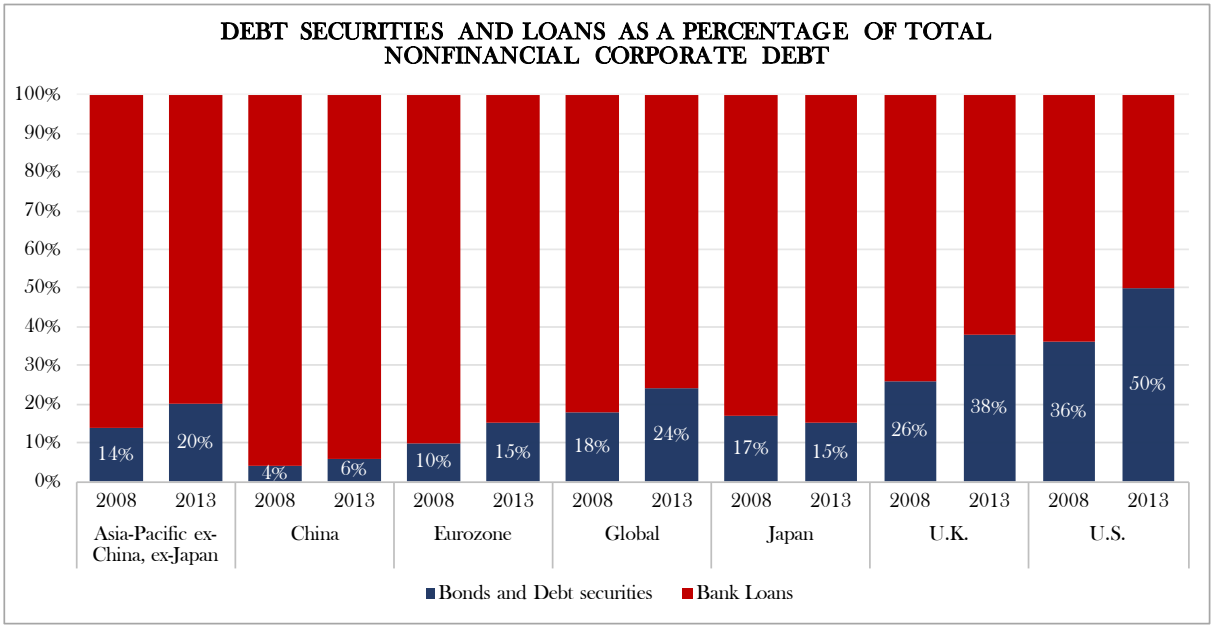


Figure 5 shows that despite successful reforms and a surge in bonds issuance, the importance of Chinese banks to domestic credit markets is still unmatched.

According to the figures from Bank of International Settlements (BIS), non-financial corporate debt in China reached USD 14.2 trillion (30% of global total) in 2013, compared with USD 13.1 in US. It has to be noted, that BIS considers local government financing vehicles (LGFVs) as a contributor to corporate debt, while in practice LGFVs are established to finance municipal infrastructure projects,

successfully bypassing a ban for local governments to participate in bond markets directly and should be regarded as government debt instead. If figures of national audit to be taken into account, as much as USD 2.6 trillion of debt was raised by cities, provinces, counties and towns by means of LGFVs by mid-2013 (The Economist, 2014). By deducting this figure from number reported by BIS, the non-financial debt in China would account to USD 11.4 trillion, below both America and the Euro Area.

As of 2013, outstanding debt securities of nonfinancial corporations in China accounted to USD 821 billion, having already outpaced Japan and United Kingdom, while S&P projects the demand to increase to USD 2,145 billion. If forecast turns out to be correct, by 2018, corporate bond market in China will only fall behind compared to US and Eurozone debt piles. Although being relatively small in size, the corporate bond market has increased substantially in the last 10 years. In 2004, corporate bond market capitalization corresponded only to 0.7% of GDP, 16.7% in 2008 and as much as 58% in 2013[2] (Hale, 2007). Figure 6 shows that China is expected to be a major driver of growth in global debt markets.

However, corporate bond market in China has still been an issue for local companies to penetrate. Despite recent reforms, certain issuers' quality characteristics are going to remain important. For many years, the minimum flotation has been set to USD 141 million, while issuers have been required to have a rating of AAA or AA+ as rated by one of five licensed domestic or join-venture credit rating agencies (Balfour, 2009). Consequently, many small companies, especially private, will struggle to fulfil these requirements and raise capital through bond market.

[2] Own calculations for year 2008 and 2013 based on corporate bond data from WIND and GDP data from WorldBank.

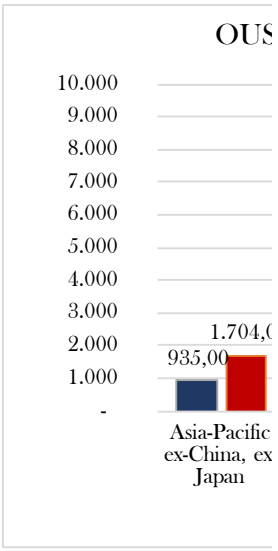


FIGURE 6: OUTSTANDING DEBT SECURITIES BY REGION (SOURCE: S&P, 2013)

Although growth of corporate bond market averaged 40%-60% in 2007-2009, the pace of growth has slowed down to 10%-20% in the years later. As of 2Q-2015, the growth rate of corporate bonds was 16% year-on-year basis, while government saw the amount outstanding of its debt to grow by 8% "only".

2.3. CURRENT STATE OF CORPORATE BONDS IN CHINA

The corporate bond market in China does not consists of conventional corporate bonds only, as securities like enterprise bonds, medium-term notes and commercial papers represent a significant part.

In contrast to corporate bond market in the U.S., where the Financial Industry Regulatory Authority (FINRA) is the only regulator that oversees the entire bond market, there are four major regulating agencies that oversee the market in China:

- Public Bank of China (PBC) – Regulation of Financial Bonds.
- NAFMII – Regulation of Commercial Papers and Medium Term Notes (CP and MTN).
- National Development Reform Commission (NDRC) – Regulation of enterprise bonds (EBs)

- China Securities Regulatory Commission (CSRC) - Regulation of corporate bonds (CBs) of listed companies.

So as to distinguish enterprise from corporate bonds, one can think of former as bonds issued by institution affiliated to Central Government departments. In essence, these are issued by enterprises that are funded by state, fully or partly state-owned and other large state-owned corporations. Similarly to LGFVs, enterprise bonds can be issued by companies financing infrastructure projects, renovations, public welfare undertakings and generally active in fixed asset investments. As shown in Table 1, total amount outstanding of enterprise bonds in 2014 amounted to CNY 2.9 trillion. Bonds issued by these enterprises are also characterised by larger issue size, higher trading activity in interbank and in exchange markets. As of 2014, issuance of enterprise bonds is still subject to administrative approval for a quota from NDRC.

Corporate bonds, on the other hand, can be issued by any company, private or state-owned, but verification from CSRC is required. Most of bond market reforms in 2007-2009 were specifically aimed at corporate bonds sector, making issuance of such securities much quicker, easier and more market-driven compared to enterprise bonds. As opposed to enterprise bonds, CBs can be traded only in exchange market, which is a much smaller compared to interbank.

The interbank bond market is a quote-driven, over-the-counter market governed by the People's Bank of China. Trades and deals are negotiated between two counterparties through an electronic trading system in the interbank market, which serves as a wholesale market for institutional investors. The interbank market had 1,219 institutions and 7,375 registered members by the end of February 2009 (Zeng, 2009). Recently, foreign financial institutions with significant presence in China were allowed to participate in interbank market (Bloomberg, 2015).

As of 2010, more than 90% of bond trading was conducted in interbank market, while the rest was traded in Shanghai and Shenzhen Stock Exchanges. In the recent years, the share of exchanges by volume traded grew to around 20%.

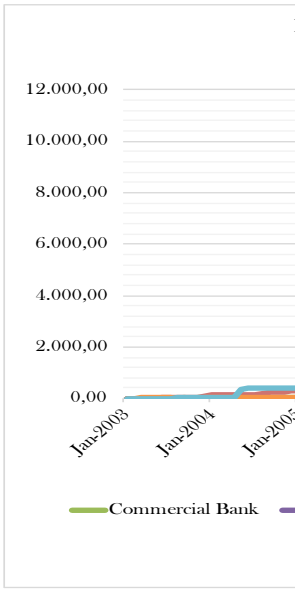
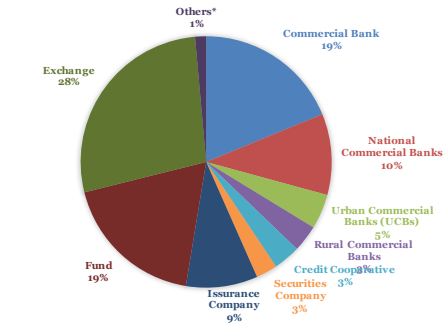
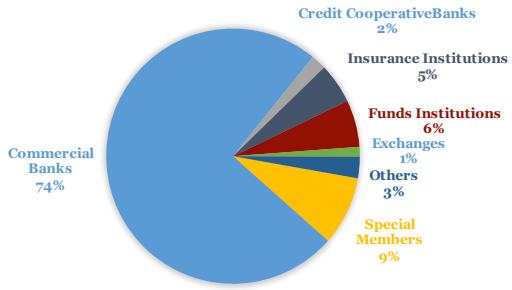


FIGURE 7: CUSTODY VOLUME OF CORPORATE BONDS (SOURCE:WIND, 2014)

By 2014, exchanges represent the largest investor group in enterprise (corporate) bond market, growing from CNY 379 billion in 2008 to 9,711 billion in 2014. From Figure 7 one can see that in April 2013 there was a significant drop in bonds held by biggest financial corporations: national and local commercial banks, insurance companies and fund-management firms. The drop represents efforts of China's Banking Regulatory Commission's to clean up wealth-management products (including corporate bonds) that lack clarity on underlying assets or have unclear use of funds raised (WSJ, 2013). This was followed by CSRC's and Central Bank's bond-market investigation aimed at preventing financial institution from making trades that would temporarily move their bond holdings off their balance sheets (Wei, 2013).

FIGURE 8: MAJOR INVESTORS IN CORPORATE AND GOVERNMENT BOND MARKET (SOURCE: WIND ,2014)





Overall, commercial banks remain the biggest bond investors in Chinese bond markets, as they hold almost three-fourths of all government bonds issued.

Further in the paper, by corporate bonds it will be referred to conventional corporate bonds as described above.

2.3.1. COMPOSITION OF BOND MARKET IN CHINA

Up until now, over 90% of Chinese corporate bonds are issued by state-owned enterprises (SOE), whereas corporate bonds only account for a small, yet increasing fraction of the market. Within the corporate bond market, the financial and industrial bonds are the largest segments.

	No. of Bonds (Number)	Proportion of Total Bonds Out. (%)	Balance (CNY 100M)	Out of Total Debt Out. %
Enterprise bonds	2.115	20,57	28.046,94	8,31
Non-Listed Companies	2.086	20,43	27.560,31	8,28
Listed Companies	29	0,14	486,64	0,03
Corporate bonds	1.040	10,16	7.516,51	2,16
Non-Listed Companies	470	4,59	6.829,27	1,93
Listed Companies	571	5,57	786,46	0,24

TABLE 1: COMPOSITION OF ENTERPRISE AND CORPORATE BONDS (SOURCE:WIND, 2014)

Table 1 shows that as of 2014, total amount outstanding of enterprise bonds was 4 times higher than that of corporate bond market. An average issues size of enterprise bond is approximately CNY 1.32 billion, while it's CNY 0.72 billion for corporate bonds. As of 2014, private companies have issued 571 corporate bonds, while Central and Local state owned companies issued 470. However, despite higher number of bonds issued by privately owned companies, in total they raised just CNY 786 billion, as opposed to CNY 6,829 raised by non-private entities.

Disregarding corporate and enterprise bonds issued by financial institutions, the bond market is skewed towards energy and public utilities sectors. State-owned companies issuing enterprise bonds dominate the list of companies by total bond amount outstanding, as around 7% of the market is covered by 10 largest market participants. Overall, market concentration in China is moderate compared to other BRIC countries.

Name	Outstanding Amount (CNY billion)	State-Owned	Listed	Industry
1. China Railway	1068,5	Yes	No	Transportation
2. State Grid Corporation of China	450,5	Yes	No	Public Utilities
3. China National Petroleum	370,0	Yes	No	Energy
4. China Power Investment	118,4	Yes	No	Public Utilities
5. Senhua Group	111,6	Yes	No	Energy
6. Petrochina	106,0	Yes	Yes	Energy

7. China Southern Power Grid	90,0	Yes	No	Public Utilities
8. China Petroleum and Chemical	79,5	Yes	Yes	Energy
9. China Guodian	76,2	Yes	No	Public Utilities
10. China Three Gorges Project	74,5	Yes	No	Public Utilities
Total Top 10 LCY Corporate Issuers	2,545			
Total LCY Corporate Bonds	35,563			
Top 10 as % of Total LCY Corporate Bonds	7%			

TABLE 2: TOP 10 ISSUERS OF NON-FINANCIAL ENTERPRISE (CORPORATE) BONDS (SOURCE:ASIANBONDSONLINE, 2015)

Both enterprise and corporate bonds mainly have maturities ranging from 3 to 10 years. Commercial papers are usually issued just for 1 year, while medium term notes are aimed at 2 to 5 years period. In other words, enterprise/corporate bonds, commercial papers and medium term notes cover the long end, the middle part, and the short end of the term structure, respectively.

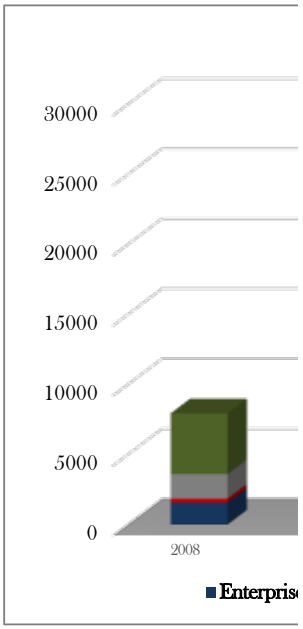


FIGURE 9: ISSUE VOLUME, SELECTED VARIABLES (SOURCE:WIND,2014)

As shown in Figure 9, commercial papers and medium term notes remain to be very attractive for Chinese companies, which is, to a higher extent, explained by an easier access to these submarkets. Moreover, the preference towards short-term securities may be a response to a series of interest rate cuts performed by People's Bank of

China in recent years. By issuing short-term securities, companies retain a chance to refinance their operations in the near future on more favourable conditions.

FIGURE 10: CORPORATE SECURITIES PROFILE BY MATURITY (SOURCE:WIND,2014)

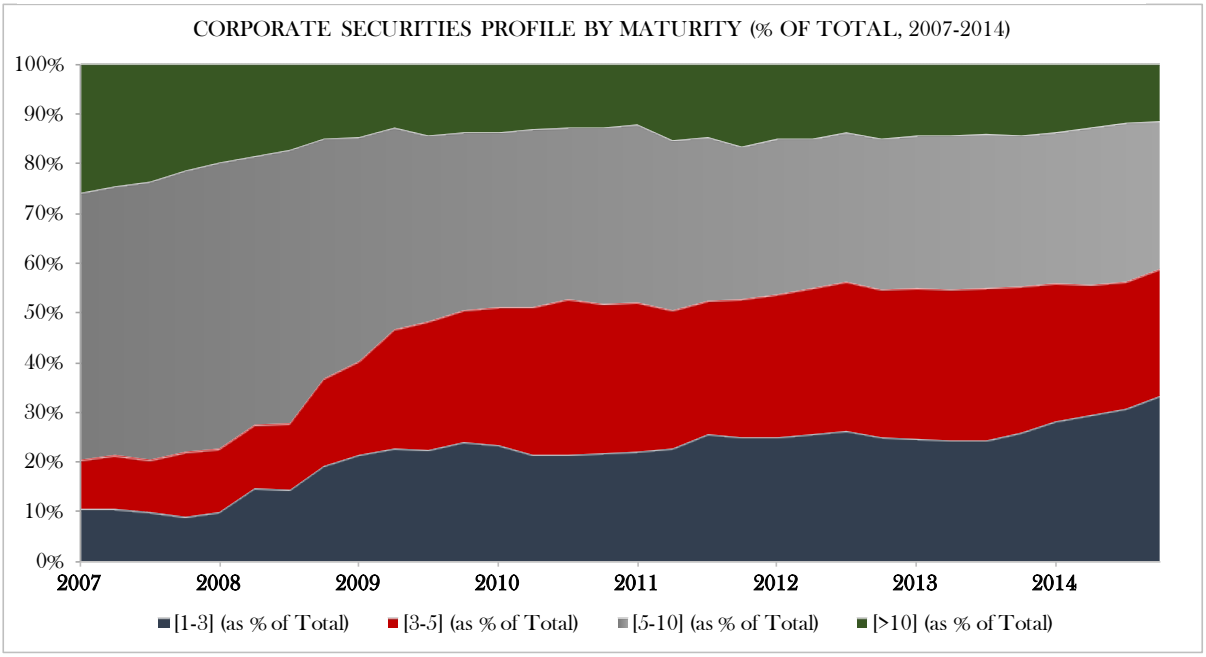
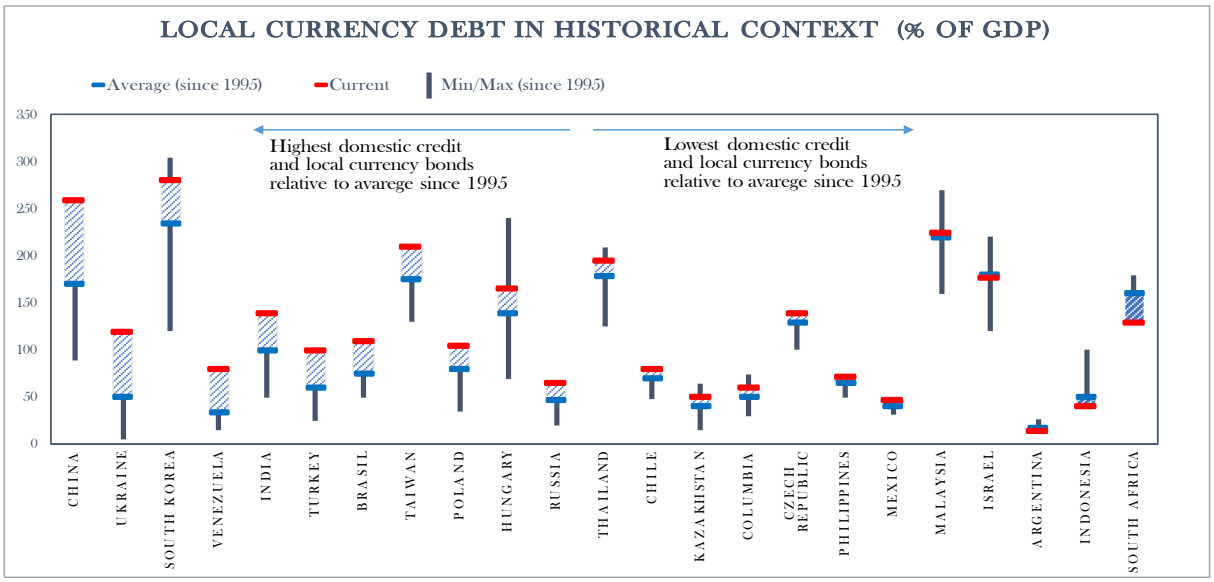


Figure 10 again shows that shot-term securities have gained their popularity in the last years, as more than 30% of total debt outstanding have maturities of 1 to 3 years. On the other hand, bonds with long maturities of over 10 years now account for around 15%, compared to 25% in 2007.

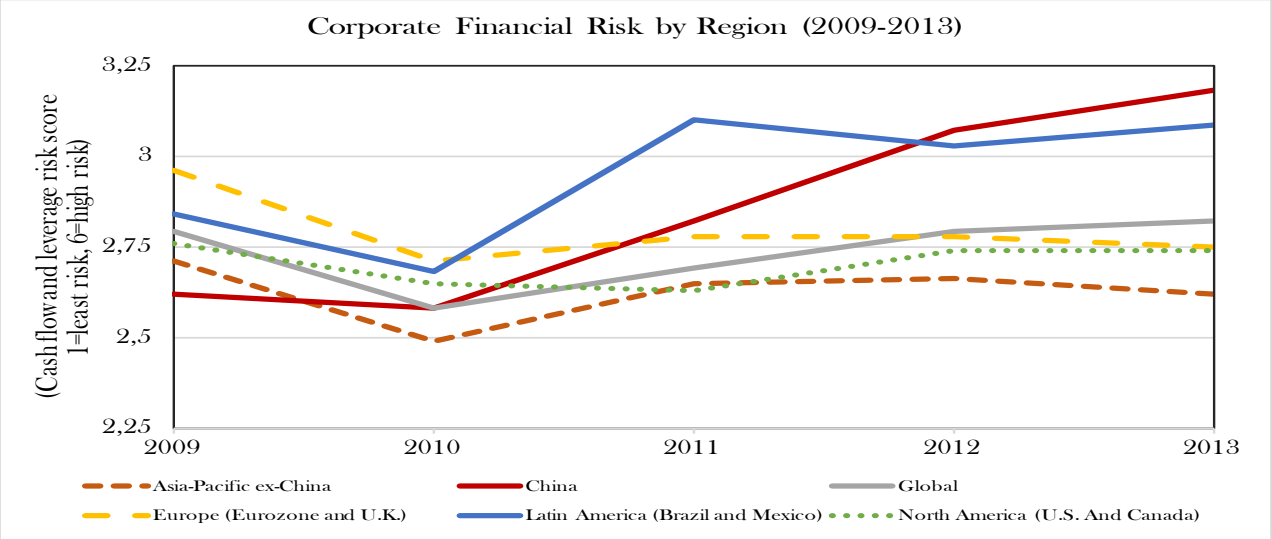
The rapid development of corporate bond market has turned China into a highly leveraged country, as local Debt to GDP ratio reached its all time high level in 2015. As shown in Figure 11, in 2015 local currency debt in China reached a mark of 260%, which much higher than 20 year average of 170%. According to Nomura analysis, as of 2015 China has the greatest deviations of local currency debt to GDP ratio among emerging countries in the analysis. Taking the size of Chinese economy into consideration, such large issues of corporate and enterprise bonds can eventually make Chinese corporate bond market as one of key sources of global financial credit risks.

FIGURE 11: LOCAL CURRENCY DEBT IN HISTORICAL CONTEXT (% OF GDP) (SOURCE: ADOPTED FROM NOMURA, 2015)



Indeed, Standard & Poors has recently started considering China's corporate market as the one with the highest financial risk, as shown in Figure 12. Due to different risks embodied in Chinese corporate bond market and its importance to global markets, it is therefore crucial to analyse and understand factors that may affect financial health of a given company as well corporate spreads on its bonds.

FIGURE 12: CORPORATE FINANCIAL RISK BY REGION (ADOPTED FROM S&P, 2014)



3. PREVIOUS RESEARCH

3.1. ANALYTICAL FRAMEWORK

There is a substantial amount of papers that are researching determinants of corporate bond pricing, but most of these papers are limited to mature and liquid bonds markets. In this subsection, different approaches will be reviewed

The structural approach has evolved following Black and Scholes (1973) and Merton (1974) and links the prices of credit risky instruments directly to the economic determinants of financial distress and loss given default (Ericsson, Jacobs, & Oviedo, 2005). Specifically, these models imply that the main determinants of the likelihood

and severity of default are financial leverage, volatility and risk free term structure. The original Merton model shows that bondholders would receive the entire value of the firm in distress and that interest rates are constant; it also can only deal with zero-coupon bonds and demonstrate that equity and debt can be valued using contingent-claims analysis (Black & Scholes, 1973). However, Merton model cannot produce sufficiently high-yield spreads to correspond to those observed in the market (Eom, Helwege, & Huang, 2004).

The Geske model is different from Merton model, since the former treats the coupon on the bond as a compound option. On each coupon date, if shareholders decide to pay the coupon, the firm stays alive; otherwise default occurs and bondholders receive the entire firm value. In Leland and Toft (1996) model, the company consistently issues stable amount of debt with a fixed maturity that pays continuous coupons and they can be paid from firm's net payout. The Longstaff and Schwartz (1995) model considers the valuation of a coupon bond when interest rates are stochastic. According to Vasicek (1977) model, Default occurs when the firm's asset value declines to a pre-specified level. In the event of default, bondholders recover a constant fraction of the principal and coupon. The Collin-Dufresne and Goldstein (2001) model is the extension of the Longstaff and Schwartz model where stationary leverage ratio is incorporated allowing the firm to deviate from its target leverage ratio only over the short run.

According to Dufresne, Goldstein, & Martin (2001), only about one-quarter of the variation in credit spreads as measured by the adjusted R^2 can be explained with traditional models of default risk. Moreover, on the contrary to the estimation of structural models of default, it is found that much more important element in forecasting credit spread changes is aggregate factors compared to firm-specific factors.

Structural models generate forecasts for what the theoretical determinants of credit spread changes should be and offer a prediction for whether changes in these variables should be positively or negatively connected with changes in credit spreads. Among others, the following determinants are expected to provide significant explanatory power. (Collin-Dufresne, Goldstein, & Martin, 2001; p.2181):

- *Changes in the Spot Rate*

As pointed out by Longstaff and Schwartz (1995), the static effect of a higher spot rate is to increase the risk-neutral drift of the firm value process. A higher drift decreases the possibility of default, and in turn, reduces the credit spreads.

- *Changes in the Slope of the Yield Curve*

Litterman and Scheinkman (1991) find that the two most significant factors driving the term structure of interest rates are the level and slope of the term structure. If an increase in the slope of the Treasury curve increases the expected future short rate, then by the same argument as above, it should also lead to a decrease in credit spreads. A decrease in yield curve slope may suggest a weakening economy.

- *Changes in Leverage*

Within the structural framework, default is triggered when the leverage ratio approaches unity. Hence, it is clear that credit spreads are expected to increase with leverage. Likewise, credit spreads should be a decreasing function of the firm's return on equity, all else equal.

- *Changes in Volatility*

Since option values increase with volatility, it follows that this model predicts credit spreads should increase with volatility.

- *Changes in the Probability or Magnitude of a Downward Jump in Firm Value*

Implied volatility smiles in observed option prices suggest that markets account for the probability of large negative jumps in firm value. Thus, increases in either the probability or the magnitude of a negative jump should increase credit spreads.

- *Changes in the Business Climate*

> Even if the probability of default remains constant for a firm, changes in credit spreads can occur due to changes in the expected recovery rate.

As already mentioned, the results of Dufresne, Goldstein, & Martin's (2001) research reveals that only 25 per cent of the observed credit spread changes can be explained with regression analysis; even though numerous proxies that should measure both changes in default probability and changes in recovery rate are considered. It is also found that the residuals from these regressions are highly cross-correlated, and principal components analysis suggests that they are mostly driven by a single common factor. Thus, the significant aspect here is that if any explanatory variables have been omitted, they are likely not firm-specific. After rerunning the regression with several liquidity, macroeconomic, and financial variables as candidate proxies for this factor, it is still not possible to find any set of variables that can explain the bulk of this common systematic factor. Dufresne, Goldstein, & Martin's (2001; p. 2178) suggest that "*the dominant component of monthly credit spread changes in the corporate bond market is driven by local supplyodemand shocks that are independent of both changes in credit-risk and typical measures of liquidity*". Similarly to Dufresne, Goldstein, & Martin's (2001), Duffie and Singleton's (1999) research shows that both credit-risk and liquidity factors are able to explain innovations in U.S. swap rates. However, when analysing the residuals they are incapable of identifying explanatory factors. They infer that swap-market-specific supply/demand shocks drive the unexplained changes in swap rates. In addition to this, Campbell and Taksler (2003) perform a similar analysis, but use regressions for levels of the corporate bond spread. Their results are similar to Dufresne, Goldstein, & Martin's that firm specific equity volatility is an important determinant and that the economic effects of volatility are large. Moreover, Cremers, Driessen, Maenhout, and Weinbaum (2004) verify this result, and argue that option-based volatility includes data useful for this type of analysis that is different from historical volatility (Ericsson, Jacobs, & Oviedo, 2005).

Another approach for categorizing credit sensitive instruments, in particular corporate bonds, according to the theoretical framework it relies on, is reduced-form models. These models exogenously suggest the dynamics of default probabilities and use market data to redeem the parameters needed to value credit sensitive claims

(Ericsson, Jacobs, & Oviedo, 2005). Even though reduced-form models are a versatile choice for practical applications, however, for the theoretical determinants of the prices of defaultable securities, they remain less applicable. It is suggested to use reduced-form models of default "*to provide a simple framework for estimating credit spreads. However, as they typically abstract from the firm value process, they are much better suited to "fitting" the observed credit spreads than they are at offering insight into the fundamental determinants of credit spreads*" (Dufresne, Goldstein, & Martin's, 2001; p. 2179).

3.1.1. DETERMINANTS OF CHINA'S GOVERNMENT BOND YIELDS

Three types of government bond yields are being researched in this section. Wang & Yu (2014) discusses the determinants of Chinese local government bond yields and describes two types of local government bonds in China: municipal bonds - issued directly by the Ministry of Finance on behalf of municipalities since March 2009, and it was not until November 2011 that some municipalities were authorized to issue bonds by themselves. And urban construction investment bonds which have been in existence for over two decades. Local governments typically set up companies with urban construction as their main business, and these companies then issue urban construction investment bonds to raise capital.

The authors of this paper suggest that pricing of the municipal bonds issued through the Ministry of Finance is to a great extent not related to the economic condition and fiscal performance of the issuing municipalities. Therefore, it is proposed that the investors use these securities as quasi-Treasuries. There is a strong negative relation between their yield spreads and the issue size, which suggests that liquidity is the most important issue for investors. Whereas the pricing of urban construction investment bonds can be explained by the key economic and financial indicators of the bond issuer and the associated local government. It is interesting that when the issuer's leverage ratio is higher, the yield spread of the bond is *lower*, not higher, which seems counterintuitive.

Loechel, Packham, & Walisch (2013) discusses determinants of the onshore and offshore Chinese Government yield bonds. They propose that the main drivers of the onshore government bond yields are policy-related factors such as the policy rate and money supply. Contrastingly, they suggest that, additionally to the latter constituents, the offshore government bond yields are driven by market-related factors such as consumer confidence, GDP and FX rate expectations as well as liquidity constraints. Besides this, Loechel, Packham, & Walisch (2013; p. 2) concludes that "*at the current stage of market development there are virtually no spillover effects between the onshore and offshore government bond curves*"; "[...] *China's efforts to internationalize its currency results in a simultaneous liberalization of its financial system*".

3.2. DETERMINANTS OF CORPORATE BONDS YIELDS

3.2.1. DETERMINANTS OF CORPORATE BONDS YIELDS IN CHINA

So far, as long as emerging economies are concerned, a big part of corporate bond markets have been analysed under application of Sovereign Ceiling Rule. Šević & Lu (2013) conduct an analysis investigating the determinants of corporate bond yield in the Chinese market that was triggered by the violation of the long standing sovereign ceiling rule. It is possible to develop the sovereign ceiling rule by using the conditional probability theorem and additive property of the probability measure. They include eight independent variables representing sovereign bond risk, bond characteristics and firm financial ratios. In order to perform the regression models to examine the effectiveness of sovereign ceiling rule in Chinese market, they use monthly and quarterly data. Except for the sovereign bond yield factor, there are a number of various firm characteristic factors affecting the corporate bond yields. The results of the analysis show that the sovereign bond yield (SY) is positively correlated with the corporate bond yield (BY) in China. Moreover, it is found that there is a positive relationship between liquidity and corporate bond yield, which is inconsistent with widely accepted bond theory. Besides this, the coefficients of remaining time to maturity and net income margin are both negative. However, the rest of the independent variables are insignificant.

Heyi, Zhengxin, & Chao Ma (2013) in their paper estimate China's expected credit spreads from credit risk measurement perspective. Their analysis is based on Merton structural model of corporate bond credit spreads. This paper selects publicly traded companies from Shenzhen Stock Exchange and Shanghai Stock Exchange that have publicly traded corporate bonds prior to 2010. The analysis investigates the influences of corporate bond spreads on the macro, corporate and issuer level. These influences include factors such as the corporate bond's duration, company's turnover rate, credit rating, ROE ratio, etc. The results show that there still exists a close correlation between corporate credit spreads and output/inflation indicators when the credit risk was eliminated. It shows positive association with bond supply and stock volatility will generate negative spillover effects on corporate bond market. Bond maturity and the company's operating leverage show significant positive correlation to the difference between actual and estimated credit spread while the credit rating exhibits a negative correlation.

By utilizing a set of comprehensive zero yield curve data of China's government bonds and credit bonds, along with China's aggregate credit risk measures, and macroeconomic variables from 2006 to 2013, Luo & Ye (2014) discover a significant and negative relationship between the corporate yield spreads and aggregate credit risk measures, and the result is robust to the choice of the aggregate credit risk measures. In addition, they identify a negative relationship regarding the level of the risk free interest rates in corporate yield spreads of both corporate bonds and commercial papers (medium term notes), but positive relationship regarding the curvature of the interest rates. Moreover, Luo & Ye (2014) adds that the risk premium and the stock index (for higher rating bonds) are positively related, which means that the equity market is a corresponding replacement to the credit bond market for the credit bond investors. It is suggested that "*at the same time, zero default experience plus the explicit or implicit guarantees provided by high profile parent companies or local governments attract credit risk sensitive capital when the overall credit condition deteriorates. This distorted pricing mechanism might funnel the credit risks to the credit bond market instead of diversifying the credit risks. The emergence of the symptom alerts policy makers to focus more on the secondary*

market development and correction of the credit risk pricing mechanism" (Luo & Ye, 2014; p. 3).

In order to substantiate identification of potential distress firms in China, Zhang, Altman, & Yen (2014) develop a model called Z_{China} score and which is based on the Z-score. Their four-variable model is similar to the Z-score four-variable version, Emerging Market Scoring Model, developed in 1995 and it is robust with high accuracy. Moreover, for the companies that are classified as special treatment (ST) (it indicates that they are problematic firms), their model can forecast up to three years with 80 percent accuracy. The four variables that is used in this model are:

- Asset-liability ratio (TL/TA) = *total liabilities/total assets*
- Return on assets (NP/ATA) = *net profit/average total assets average total assets = (current year's total assets + last year's total assets)/2*
- Working capital to total assets (WC/TA) = *working capital/total assets working capital = current asset-current liabilities*
- Retained earnings to total assets (RE/TA) = *retained earnings/total assets retained earnings = surplus reserve + retained profits*

In addition to this, due to the fact that recent China stock prices are mainly driven by technical factors and liquidity, as well as their fundamentals, many financial ratios, such as the stock market value to total liabilities ratio, are not incorporated in their discriminant analysis, even though they are regarded as good indicators of financial crisis by mature markets. Zhang, Altman, & Yen (2007; p. 15) suggest that "*it further shows that the current stock market value in China is not strongly correlated to company performance*". Besides this, according to their calculations, 0.5 appears to be the best cut-off point for Z_{China}-scores; therefore they develop the following pragmatic empirical discriminant criteria:

1. Firms with Z_{China}-scores less than 0.5 ($Z < 0.5$) are classified as technically distressed companies (ST companies);
2. Firms with Z_{China}-scores over 0.5 and less than 0.9 ($0.5 \geq Z < 0.9$) are classified as potential distress companies and close watch is required;

3. Firms with Z_{China}-scores over 0.9 ($Z \geq 0.9$) are classified as financially healthy companies.

The results of their analysis show that the mean of the TL/TA ratio of ST companies is up to 75 per cent while that of non-ST companies is only 42 per cent. For the other three indicators that reflect asset operation efficiency, NP/ATA, WC/TA and RE/AT, ST companies are all negative values, while non-ST companies are all positive.

With the aim to study whether credit ratings help explain the yields requested by investors on corporate bonds in China, Dhawan & Yu (2015) use three types of bonds: commercial paper with maturities of one year or less, medium-term notes with maturities between three to five years, and corporate bonds with longer maturities, which include enterprise bonds and listed company bonds. To collect data for each of these types of bonds, bond issue summary reports were downloaded from the CCXI website. After analysing the variables, the results show that credit ratings help explain yield spreads in the Chinese bond market. Moreover, it is found that bond maturity, firm size, and firm leverage are persistent determinants of yield spreads in the corporate bond sample. When determining their risk premiums on Chinese bonds, investors regard and appreciate credit ratings, since they still exert an important influence on yield spreads, even despite controlling for such underlying firm factors and issue characteristics.

The research of Cui, Liu, & Zhang (2013) examines the changing mode of the credit spread in the Chinese bond market. By using Markov regime switching model consisting of three kinds of variables: the credit risk variables, the asset allocation variables and the liquidity condition variables, the results show that there are two driving factors of credit risk effect for short period and asset allocation effect for longer duration of the state. It is found that the switching of dominance from one effect to another is not closely connected with macro-economy variables, but associated with the turnover of the stock market. It is proposed that "*when the macroeconomic environment takes a turn for the better, changes in credit risk are not that large from the angle of creditors, and the yields from this economic upturn are mostly for equity holders which results in a higher risk-adjusted return in stock investment than in corporate bonds, whereby the investors become more concerned*

with the influence of asset allocation and this weakens the impact of credit risk changes on corporate bond investment" Cui, Liu, & Zhang (2013; p. 262).

The topic of Zhu's (2013) research is the credit rating of bond in China, the short-term financing bonds (STFBs) in particular. The findings show that almost all credit ratings for STFBs have the highest rating (A-1), which has an unfavourable effect on delivery of effective information to the investors. Even though the validity of rating in China is still in its early stage, the results show that credit ratings can have a very strong effect on financing cost of firms that are issuing bonds and therefore, are relevant for investors in risk judgement. Thus, it is suggested that authorities in China should pay more attention to credit rating, in order to encourage bonds market development.

Yu, Zheng, Yi, & Zhao (2014) examines the prediction of credit spreads in China's corporate bond market. It is suggested that the macroeconomic components have a much more significant impact in determining credit spreads, compared to firm and industry specific factors, due to the lack of default sample and the status of China's capital market development. Therefore, the Credit Portfolio View model is employed in order to include macroeconomic factors into credit spread prediction. The results imply that macroeconomic data can be an element that forecasts default probability, yields, and credit spreads from the yield curves of different credit-rating bonds. In addition to this, the predictions of credit spread for low-rating groups decrease notably on condition that both the high-rating group and the low-rating group use the same set of indicators used by the high-rating group to fit the model. The fact that actual results is situated closer to the forecast using indicators of the high-rating group shows that while indicators of the low-rating group fit data better in terms of significance level and R^2, indicators of the high-rating group are more appropriate in terms of prediction.

3.2.2. DETERMINANTS OF CORPORATE BONDS YIELDS IN EM

Cavallo & Valenzuela (2010) carry out a study that investigates the determinants of corporate bond spreads in emerging markets economies. In order to conduct the analysis, they use the determinants of the corporate spreads for 139 bonds issued by 65 corporations in 10 emerging market economies (EMEs), six in Latin America and

four in the East Asian region. The findings of their paper show that corporate bond spreads are determined by firm-specific variables, bond characteristics, macroeconomic conditions, country-specific sovereign risk, and global factors. In addition to this, they discover that firm-level performance indicators account for the bigger share of the variance, whereas external factors that cannot be controlled by the firm management, such as sovereign risk, have a less important effect on the variance, but play a role as well. Besides this, there are two asymmetries prevailing in the data, due to the suggestion that corporate spreads react more intensely to sovereign and global risk increases rather than to decreases. Cavallo & Valenzuela (2010; p. 60) propose that "*the first is in line with a sort of sovereign ceiling 'lite' in emerging markets bonds spreads. It suggests that the so-called 'transfer risk' between sovereign spreads and corporate risk—that is, the risk that if the government encounters difficulties in servicing its debts, it will transfer those problems to the local private sector—is positive and significant. The second asymmetry is consistent with the notion that panics are common in emerging markets where investors are less informed and more prone to herding*".

The purpose of Durbin & Ng's (2005) study is to measure investors' perception about country risk using the price of bonds issued by emerging market firms and governments and which are traded in secondary markets. In order to reach the results, the authors used the yield spread of corporate bonds paired with sovereign bonds issued by the government of the corporation's home country. It allows connecting investors beliefs about the firm's default possibility to their insight about the government's default possibility. The results of the analysis reveal that the sovereign ceiling may be unsuitable for companies that generate hard-currency revenue, have a significant affiliation with a foreign firm, or have strong ties to the government. This can be explained with the finding that sovereign and corporate bond spreads are not in accordance with the utilization of the sovereign ceiling: few companies have bonds that deal with a lower risk premium than that of their government. Durbin & Ng's (2005; p. 647) find that "*perceived corporate and sovereign risk are more closely correlated in countries in which overall default risk is higher. Evidence regarding how industry sector affects the sensitivity of firm*

default risk to sovereign default risk is weak, but does conform to the pattern we would expect".

The purpose of Borensztein, Cowan, & Valenzuela (2013) study is to test whether sovereign credit ratings remain a significant determinant of corporate credit ratings. They use data for advanced and emerging economies over the period of 1995–2009. Foreign-currency long-term corporate credit rating issued by S&P is the main dependent variable, whereas foreign-currency long-term sovereign credit rating issued by S&P, which is an assessment of the probability of default by government debt, is the main independent variable. They decide to include a wide variety of variables at the firm and macro level, in order to control for variables that could have a direct effect on corporate credit ratings. These are: variables that capture the profitability of a firm (the ratio of earnings before interest and taxes (EBIT) to assets and the ratio of retained earnings to assets), leverage (ratio of equity to capital), liquidity (ratio of working capital to assets), interest coverage (ratio of EBIT to interest expense) and size (total assets). Moreover, they include macroeconomic variables, such as per-capita GDP, GDP growth, growth volatility, inflation, and current accounts, so as to remove bias towards the estimate of the influence of a sovereign ceiling on private ratings. The main findings of the analysis suggest that having a sovereign ceiling lite policy is not an absolute restriction. It should be seen more as limitation that has inclination to downgrade corporate ratings, when they are above the sovereign ratings. Moreover, the results show that in countries where capital account control and in countries with high political risk is still present, the influence of a sovereign ceiling on corporate ratings continues to be significantly important.

3.3. PREVIOUS RESEARCH ON CHINA

3.3.1. CORPORATE BOND MARKET IN CHINA

China's financial system has been quite uncertain and risky due to its corporate bond market rapid growth and its imbalanced development in capital market. Compared to the developed countries, China's corporate bond market, with regard to scale, variety and level of the market, is rather underdeveloped. In 2013, its corporate bond

issuance was equivalent to 8% of total social financing on both flow and stock basis (Lei, Lu, & Klaczek, 2014).

The following factors influencing development China's corporate bond market mainly include:

Lack of Innovative Varieties of Corporate Bonds

One of the factors that are restricting the growth of corporate bond market is that China has a monotonous variety of and irregularly issued corporate bonds. Sui (2011; p. 258) suggests that "*there is basically one single pattern for bond pricing, that is, to give a 40% plus on the basis of the savings interest rate of the same period, which seems fixed lacking in flexibility and innovation. In addition, its 3-5 years' period is too monotonous as well*". As a consequence, investors do not find this bond system attractive and since bonds' issuance is not established and the market is non-transparent, investors often cannot get enough of relevant information about issuance.

Excessive Administrative Control over Corporate Bond Issuance

One of the reasons why corporate bonds are moving slowly is due to the fact that newly-issued corporate bond has to go through quite a few departments; even though, in recent years, the reforms in national debt and policy-oriented bank bonds were implemented. It is said that "*due to excessive administrative interference, some enterprises fail to issue their bonds, hence lessening their enthusiasm and leading to corporate bonds' failure in adapting themselves to market requirements in terms of interest rates and period structure and therefore restricting the development of China's corporate bond market*" (Sui, 2011; p. 258).

Lack of Authoritative Credit Rating Institutions

In general, credit rating institutions are able to offer objective and fair principles for investment decisions. Financing cost and difficulty in sales might be affected by the credit degree of bonds as well as enterprises' paying capacity that is signalled with the credit rate of corporate bonds. Besides this, "*in China, however, regardless of the great number, such institutions have a poor reputation with their vicious*

competition with unreasonable prices and promising rates in advance. Unreliable rating conclusions fail to reflect actual risks, hence getting no market recognition" (Sui, 2011; p. 259). According to Lei, Lu, & Klaczek (2014), there is possibility that risk is mispriced, due to the fact that among the 3398 corporate bond outstanding at March 2014, only one of them is below an A rating. As a consequence, investors, such as pension funds (SAFE) or insurance funds, might be reluctant to invest in such products since these ratings may not demonstrate the real underlying risks.

Underdeveloped Secondary Corporate Stock Market

Transactions at secondary corporate stock market are split into internal market and external market that is further separated into national and local markets. Moreover, the process of trading on an organized exchanged is limited, due to the fact that there is no ubiquitous market system, no enough institution investors, no trader or market-maker specialized for corporate bond market as well as the limited availability of risk management products. According to Sui (2011), the development of this market is lagging behind, since the scale of corporate bond issuance is small and they are often traded only for few days, which causes a difficult entrance for institutions to this field, leading to inactive trading at this market along with low hand change rate, inconvenience for investors to invest in corporate bond market and unobvious cost advantages enterprises accumulate through the stock market.

Poor Information Disclosure

According to the relevant laws and regulations that were released after simplified approval procedures in 2008, organizations are required to submit bond raising instruction book, financial report, credit rating report, legal opinion and so on during their application for issuing bonds. In U.S., in order to fully guarantee the creditor's interest, floaters are required to disclose historical credit records including paying records of bank loans, historical credit-violation records, degree of loan concentration, credit records of senior executives in addition to relevant financial and business information. Whereas China compared with developed countries, have relatively lower standards for the disclosure of issuance documents (Sui, 2011).

4. METHODOLOGY

4.1. INTERPOLATION

First of all, dependent variable in our model is calculated as the difference between yield of corporate and government bond and defined as corporate bond spread. To calculate term structure of Chinese government bonds, the Nelson-Siegel-Svensson model is used. For each trading day and for each corporate bond, a government bond yield with matching maturity is calculated. In particular, SAS software was used to minimize squared difference between actual government bond price and model price calculated with Nelson-Siegel-Svensson model.

Given that the basic Nelson Siegel lacks the flexibility to match term structures that are highly nonlinear, the Extended Nelson Siegel model is used. The economist Lars Svensson proposed an extension to the model, which is the one most widely adopted (Veronesi, 2011). The extension is the following:

$$r(0,T) = \theta_0 + (\theta_1 + \theta_2)\frac{1-e^{-\frac{T}{\lambda_1}}}{\frac{T}{\lambda_1}} - \theta_2 e^{-\frac{T}{\lambda_1}} + \theta_3\left(\frac{1-e^{-\frac{T}{\lambda_2}}}{\frac{T}{\lambda_2}} - e^{-\frac{T}{\lambda_2}}\right)$$

where the parameters to be estimated are 6: θ_0, θ_1, θ_2, θ_3, and λ_1 and λ_2. The procedure is otherwise the same as in the case of the Nelson Siegel model. The average parameter estimates obtained are $\theta_0 = 2{,}191$, $\theta_1 = -2.16222$, $\theta_2 = -4.035$, $\theta_3 = 75.148$, $\lambda 1 = 65.476$, and $\lambda 2 = 0.8825$.[3]

4.2. ESTIMATION

As a first step, it is advised to run a fixed effects (FE) model, so as to check whether these or random effects model is more appropriate. In particular, one can be interested in whether bond-specific effects should be treated as random or fixed. According to Mundlak (1978), distinguishing between fixed and random effects is an erroneous interpretation per se, as these effects are random. Green (2000) retells

[3] SAS code is available in Appendix.

that fixed effects is just a conditional analysis on the observed sample and can only be applied to the cross-sectional units in the study, thus leaving out observation out of sample. The exception, however, is when cross-sectional units exhaust the sample. In our case, all bonds being traded on Chinese stock exchanges were selected, but due to illiquidity reasons around 10% of total bond population were removed from the analysis. Moreover, a model allowing for firm (bond)-specific effects (i.e. a fixed effects model that effectively allowed for a different intercept for each bond) can be ruled out on the grounds that there are many more bonds (445) than periods (20 quarters) and thus too many parameters (or dummy variables) would be required to be estimated. Based on theory of the characteristics of the data obtained, none of the models can be excluded with high significance, which is consistent with findings in many researches on relatively immature corporate bond market worldwide (see, for example, Grandes & Peter, 2004). The final decision will, therefore, be made after the Hausman Test is run.

Following Petersen (2009) and Thompson (2010), depending on the model, one and two-way clustering is used in order to control for bond and time effects. According to Petersen, time effects take place when residuals of a given year may be correlated across different bonds (cross-sectional dependence), while firm effects are observed when residuals of a given firm are correlated across years. By clustering standard errors by bond or time, it becomes possible to correctly account for dependence in the data common in panel data set and produce unbiased estimates.

The initial model is based on the explanatory variables found to be significant in previous works in the field, namely Altman (2007) and Dufresne (2001).

Variable	Description	Expected Sign
Log_AmountIssued	Log of bond issue size	-
ALR	Total Liabilities/Total Assets	+
WC	Working Capital/Total Assets	-

RE	Retained Earnings/Total assets	-
ROA	Net Income/Total Assets	-
Eq_volatility	Volatility of company's shares on stock exchange	+
Zeros	Measure of bonds liquidity	-
Private	Dummy variable (1 if Private, 0 if not)	+
Time_to_maturity	Time left until maturity of the bond	+/-
Gov5y	Yield on 5 year China government bond	+
GDPGrowth	China GDP growth rate	-
VIX	Measure of options implied volatility	+

TABLE 3: EXPLANATORY VARIABLES

In order to check whether results obtained are consistent, additional, but similar by nature, variables are also tested.

As a general case, the following model is considered:

$$CS_t^i = \alpha + \beta_1^i \text{Log\_AmountIssued}_t + \beta_2^i ALR_t + \beta_3^i WC_t + \beta_4^i RE_t + \beta_5^i ROA_t + \beta_6^i \text{Eq\_volatility}_t + \beta_7^i \text{Zeros}_t + \beta_8^i Private_t + \beta_9^i Time\_to\_maturity_t + \beta_{10}^i Gov5y_t + \beta_{11}^i \text{GDPGrowth}_t + \beta_{12}^i \text{VIX}_t + \epsilon_t^i$$

4.3. LIQUIDITY MEASURES

This papers relies on two common liquidity measure that are widely known for their accuracy and simplicity at the same time. Lesmond, Ogden, and Trzcinka (1999) propose the proportion of days with zero returns as a proxy for liquidity.

$$\text{Zeros} = (\#\text{ of days with zero returns})/T,$$

where T is the number of trading days in a month (Goyenko, Holden, & Trzcinka, 2009).

Amihud (2002) develops a price impact measure that captures the "daily price response associated with one dollar of trading volume". Specifically, in our case

$$Illiquidity = Average\ (\frac{|r_t|}{Volume_t}),$$

r_t is the bond return on day t and $Volume_t$ is the CNY volume on day t. The average is calculated over all positive-volume days, since the ratio is undefined for zero-volume days (Goyenko, Holden, & Trzcinka, 2009).

5. DATA AND DESCRIPTIVE STATISTICS

5.1. COLLECTION OF DATA

One of the biggest challenges that the author faced during preparation of this paper was the collection of data. Since Chinese corporate bond market is hardly accessible to foreign investors, most widely known sources of financial information fail to provide with unique, accurate and complete information on corporate bonds. To author's knowledge, this paper is first to combine corporate bonds, macroeconomic figures, balance sheet and ownership information in one database.

First of all, general information on corporate bond market was obtained from WIND Terminal, which is a leading source of financial information for Chinese corporate market. Besides, WIND provides its clients with detailed information on bonds traded in exchange and interbank markets. Prices, yields and trading volumes of bonds obtained from WIND were double-check with information on Bloomberg. The latter, despite also being accurate, does not necessarily include intra-day information and occasionally miss daily observations of corporate bond prices. As of 2015, corporate bond information on Wind is mostly available in Chinese language only.

Second, combined balance sheet and income statement data was obtained from Bloomberg and Thomson One Banker. As a prime source, Bloomberg was chosen, while all missing values were supplemented with figures from Thomson One Banker. Unfortunately, neither of these two has accurate information on controlling shareholders or nature of Chinese corporations, which was therefore retrieved from CSMAR and China Securities Co. databases.

Lastly, information on prices of government bonds as well as macroeconomic figures were downloaded from Datastream database.

5.2. CORPORATE BONDS

In total, 571 corporate bonds were considered for the analysis. Further, 50 bonds were removed due-to no constant trading activity, while 17 bonds were dropped as they were suspended (risk "alert") from trading by CSRC. Also, outliers and bonds issued by financial institutions were removed, making a final sample size of 445 bonds issued by 332 companies. In some instances, bond sample size is reduced to 332 (1 bond per firm). Alternatively, firm (bond) fixed effects are imposed. The combined issue size of corporate bonds used for analysis represent over 80% of total corporate bond market.

The analysis of this papers relies on corporate bond spreads calculated as described in methodology section. For the model specified, quarterly average spreads are used. In general, yields of corporate bonds in China closely track the development of government bonds, as seen in Figure 13.

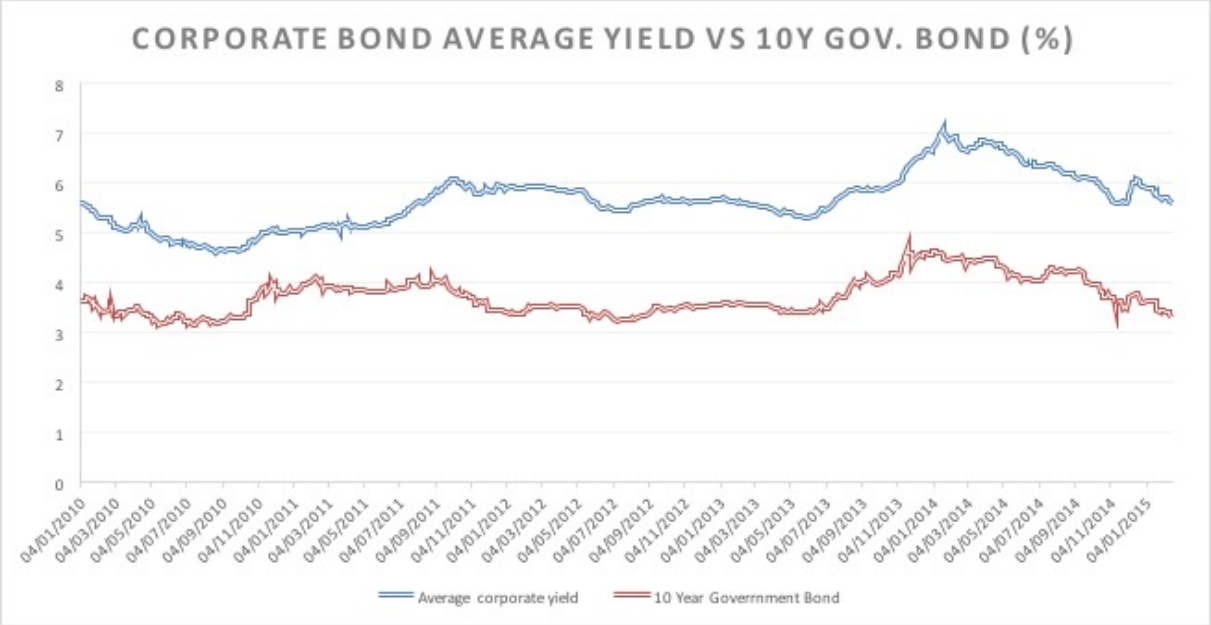
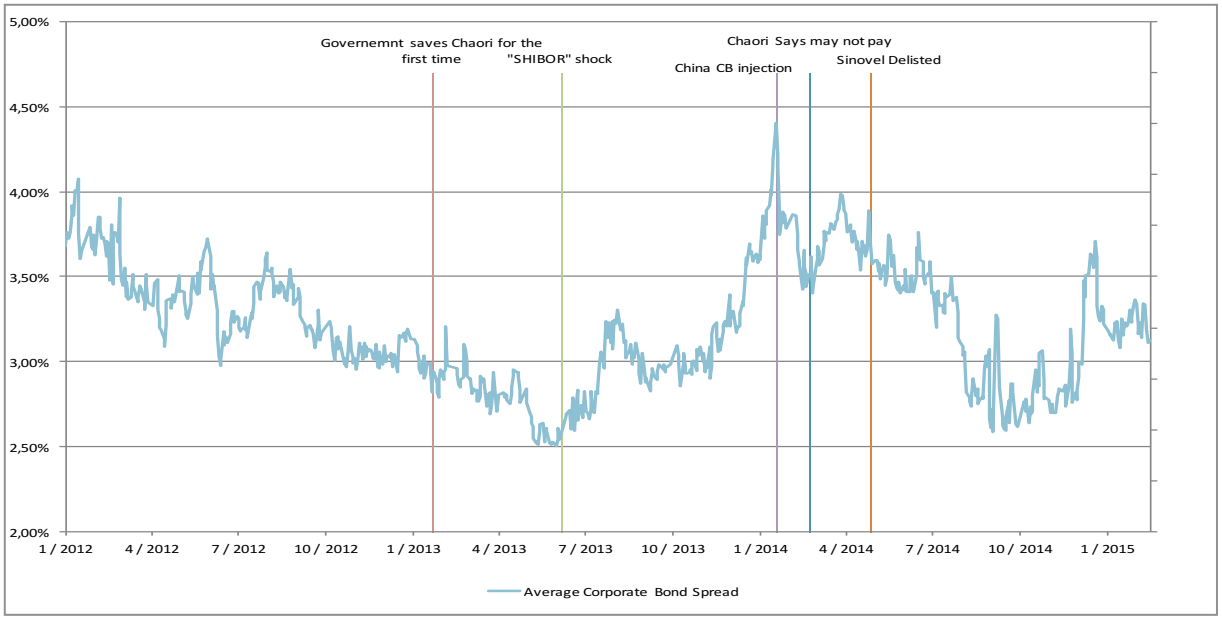


FIGURE 13: YIELD DEVELOPMENT OF CORPORATE AND GOVERNMENT BONDS (SOURCE:OWN CALCULATIONS, BLOOMBERG, 2015)

Despite high correlation with yield of government bonds, interpolated corporate spreads have been fluctuating significantly in the period between 2010 in 2015.

Figure 14 shows the reaction of corporate bond spreads to major shocks in Chinese financial system starting in year 2012. In that period, spread has fluctuated from 2.5% in Q2 2013 to 4.5% in Q1 2014.

FIGURE 14: MAJOR EVENTS IN CORPORATE BOND MARKET (SOURCE: AUTHOR,2015)



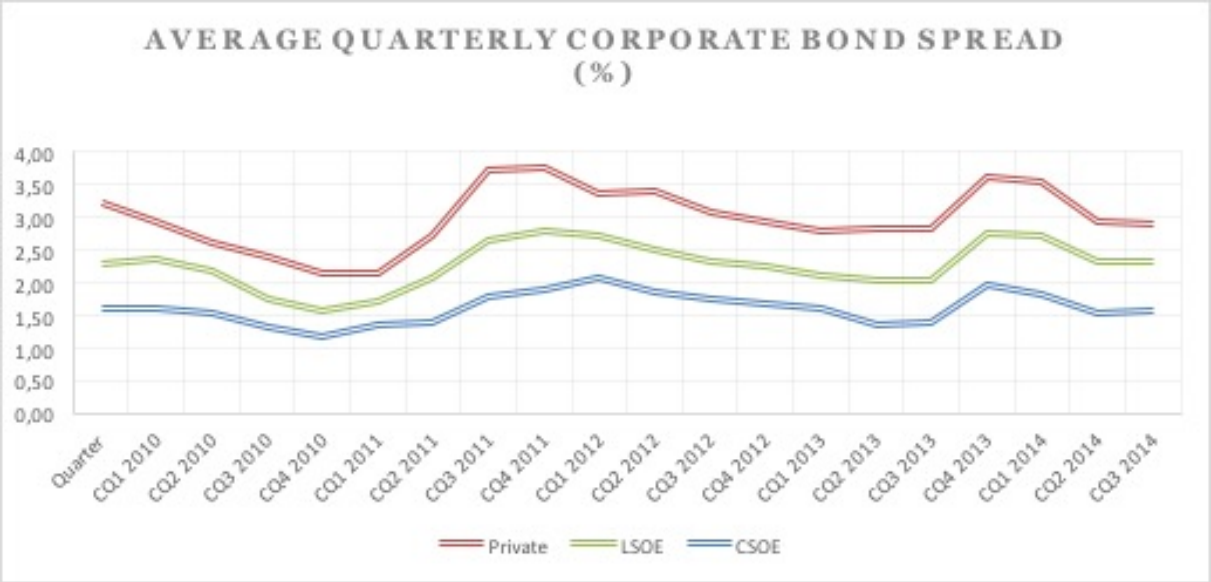
Besides sharp reaction to "crash crunch" (Q2 2013), Chinese banking liquidity crisis and credit squeeze in Q2 2013 – Q1 2014, average corporate spread has also significantly reacted to first-ever corporate default in Q1 2014, when Chaori missed coupon payment. It was believed that post-default investors would start pricing bond

according to underlying characteristics, therefore one could expect a structural break to appear in March-April 2014.

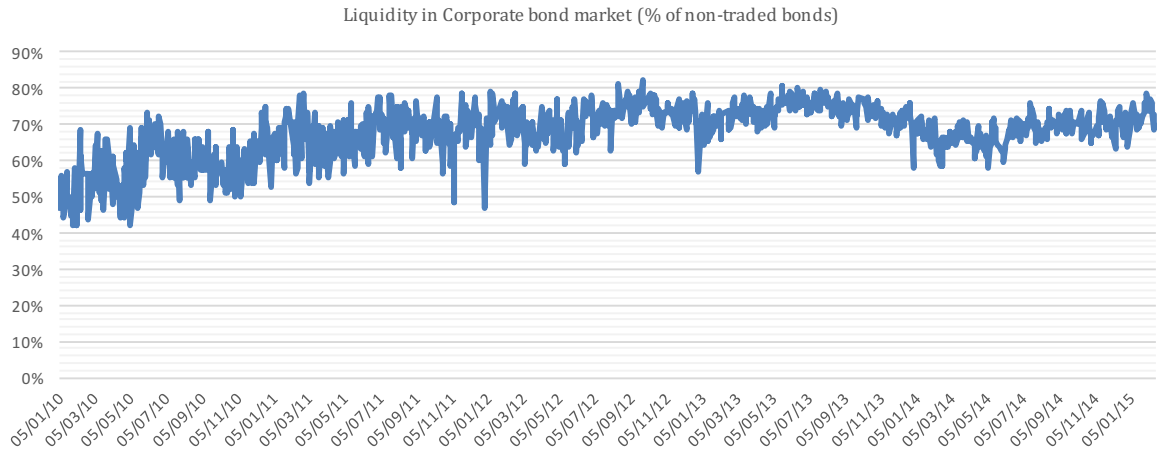
Ownership does not seem to effect the trajectory of corporate bond, as bonds issued by private and non-private companies also covariate. However, difference between spread of private to non-private bonds tends to increase during turbulent times by 10 to 30 basis points, but eventually stabilizing at a mane of around 90 basis points.

Overall, corporate bonds issued by private companies are usually traded at discount compared to bonds of Central or Local state-owned enterprises, which is an interesting feature given that analysis of balance sheet data reveals that private companies are generally “healthier”.

FIGURE 15: AVERAGE QUARTERLY SPREADS BY OWNERSHIP (SOURCE: OWN CALCULATIONS, 2015)



Having in mind that corporate bond market in China is still hardly accessible to smaller investors, a rapidly increasing number of these bonds issued has negative consequences on liquidity figures. Averages of both Zeros and Amihud measures calculated for each bond show a decreasing liquidity in bond market, even though trading activity has surged since 2007, as shown below.



Corporate bonds trading statistics

Year	2007	2008	2009	2010	2011	2012	2013	2014*
Trading Volume (CNY 100M)	2,11	329	347	477	610	1.573	2.297	2.539

FIGURE 16:LIQUIDITY IN CORPORATE BONDS (SOURCE: OWN CALCULATIONS, 2015)

TABLE 4:TRADING STATISTICS IN CORPORATE BOND MARKET (SOURCE: WIND, *OCTOBER 2014).

Chinese regulators seem to be aware of illiquidity issue in both equity and debt capital markets. In an effort to boost volumes, since March 2015 domestic mutual funds are allowed to buy and sell shares between Shanghai and Honk Kong (Noble, 2015). In may 2015, 32 new foreign financial institution received an access to participate in inter-bank market, hoping that bonds traded in exchange will benefit due to spillover effect (Trivedi, 2015).

5.3. KEY FINANCIAL METRICS

Balance sheet and income statement data of 332 companies was obtained, of which 142 are private enterprises, 125 local state (LSOE) and 65 central state-owned companies (CSOE). Amid government's aims to decentralize its economy, 22 companies have switched from being CSOE to LSOE. Since 2005, out of 332 companies only 5 (1 nationalized and 4 privatized) saw a change in controlling shareholder, which allows to assume that ownership remains constant throughout the period of analysis.

Altman's Z-Scores, as suggested by methodology in Zhang et al. (2014), were calculated for 332 companies. As a reminder, a figure below 0.5 suggests that a

company is classified as technically distressed, while the Z-Score of up to 0.9 would point at a potentially distressed enterprise. The development of average quarterly Z-Score is shown in Figure 17 and distribution by quarters is shown in Figure 18.

FIGURE 17:DEVELOPMENT OF ALTMAN'S Z-SCORE (SOURCE: OWN CALCULATIONS, 2015)

As of Q4 2009, the average Z-score across 332 companies was set at 0.72, significantly higher than 0.58 calculated for Q4 2014. Approximately every third company in the sample has a Z-Score of below 0.5, which is an intriguing statistic given that Chinese corporate sector can hard be described by extensive default history.

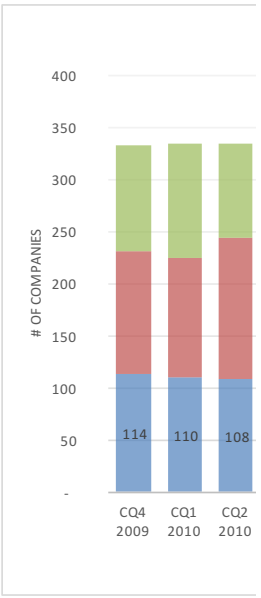


FIGURE 18: Z-SCORE DISTRIBUTION BY QUARTER (SOURCE: OWN CALCULATIONS, 2015)

Figure 18 reveals that the number of distressed companies (Z-Score < 0.5), as defined by Altman (2010), have barely changed since 2010, while the number financially healthy companies has decreased substantially. By breaking down the factors of Altman model, one can see how key financial metrics for 332 companies have developed.

FIGURE 19: KEY FINANCIAL METRICS (SOURCE: OWN CALCULATIONS, BLOOMBERG 2015)

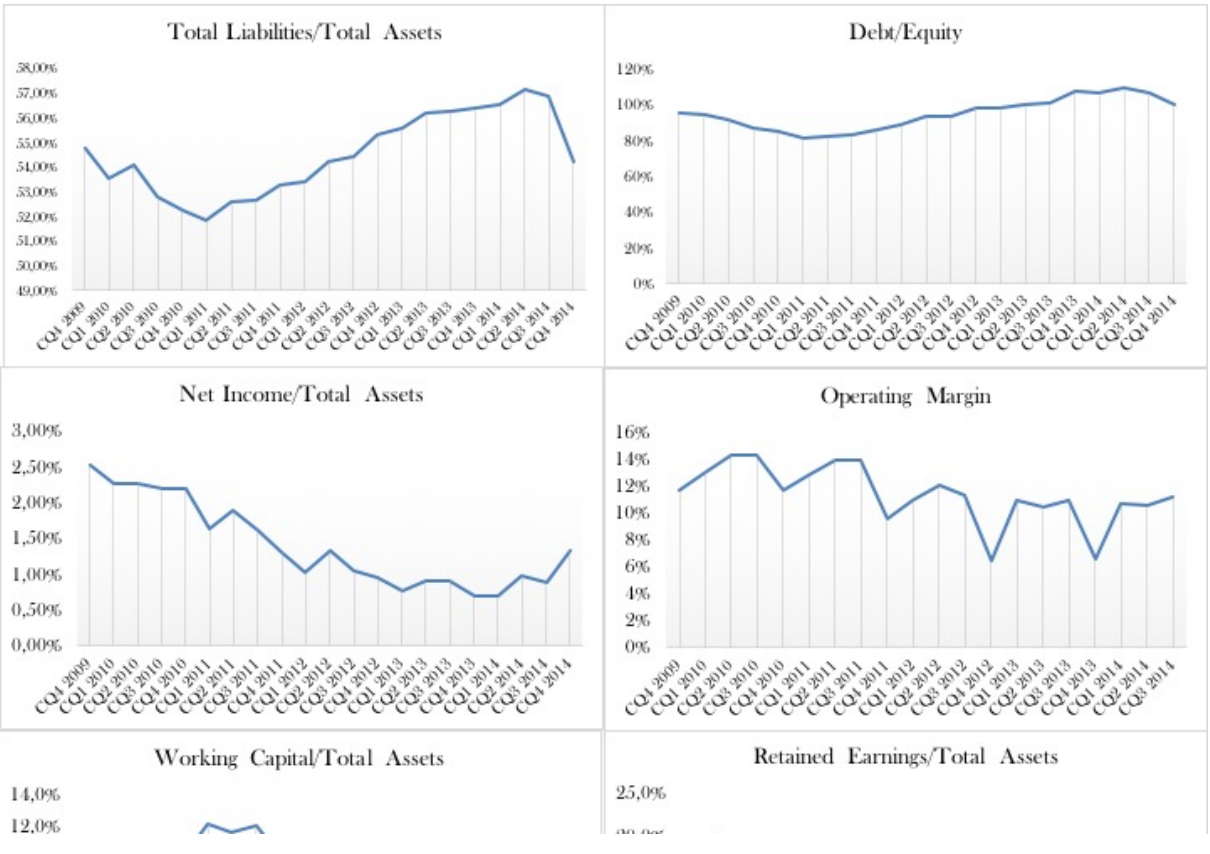


Figure 19 presents the development of key financial ratios used as proxies for companies' financial health. Overall, throughout the period under analysis, all 6 ratios have experienced a downward trend until Q4 2014.

Lastly, the data collected shows that private companies on average are healthier than CSOEs and LSOEs. A comparison shows that private companies are characterised by lower leverage ratio, better utilisation of working capital, higher profitability but also having a lower operating margin

Financial Ratio	Private	Non-Private
Total Liabilities/Total Assets	53,7%	54,9%
Net Income/Average Total Assets	1,6%	1,3%
Working capital/ Total Assets	11,7%	8,1%
Retained Earnings / Total Assets	18,3%	17,8%
Debt/Equity	78,2%	116,9%
Operating Margin/Total Revenues	11,7%	16,4%

TABLE 5: AVERAGE QUARTERLY FINANCIAL RATIOS SINCE 2010 (SOURCE: OWN CALCULATIONS, BLOOMBERG 2015)

Notwithstanding these differences, corporate bonds issued by private companies still have higher corporate spreads, a feature that still cannot be described by balance sheet items only. In the following section, the importance of each item will be estimated.

6. EMPIRICAL RESULTS

6.1. FAMA-MACBETH REGRESSION

As a first step, Fama-MacBeth regression is performed on balance sheet as well as on bond-specific items. Three different models depending on set of independent variables employed are tested. Even in the presence of "time effect", Fama-MacBeth produces unbiased standard errors and correctly sized confidence intervals (Petersen,

2009). In order to correct for correlation of error terms over time, a Newey-West standard error adjustment is used.

Table 6 present the results of Fama-MacBeth regression performed for three different models. Parameter estimates for each variable are shown ant their test statistics are provided in parenthesis. All variables in MODEL1, except for time to maturity, asset liability and working capital ratios, are significant at 5% confidence level. As expected, profitability ratios ROA and RE have a negative effect on corporate spreads, while higher equity volatility is also associated with higher spreads. Dummy variable "Private" shows that bonds issued by local or state-owned enterprises usually have lower corporate spreads, which is consistent with observations in Section 5.2.

FAMA-MACBETH REGRESSION (QUARTERS 1-20)			
Variable	MODEL1	MODEL2	MODEL3
Intercept	12.044***	12.641***	9.477***
	(6.33)	(7.15)	(6.48)
Log_AmountIssued	-0.420***	-0.446***	-0.344***
	(-5.11)	(-5.52)	(-4.97)
ROA	-10.793**	-10.270**	-15.782***
	(-2.40)	(-2.15)	(-3.28)
RE	-0.991***	-0.776***	
	(-3.65)	(-3.14)	
ALR	-0.113		0.037
	(-0.53)		(0.59)
WC	0.191	0.330	0.121
	(0.91)	(1.49)	(0.59)
Zeros	-0.012***	-0.012***	
	(-4.97)	(-4.60)	
Eq_volatility	0.007**		0.005*
	(2.36)		(1.87)
Time_to_maturity	-0.037	-0.038	-0.038
	(-1.37)	(-1.35)	(-1.45)
Private	0.364***	0.370***	0.666***
	(5.79)	(5.48)	(6.65)
D_E		0.000	
		(1.24)	
Avg_Share_price		0.001	
		(0.62)	
Operating_Margin			-0.532**
			(-2.48)
Amihud			-21.862***

			(-3.09)
R-Squared	0.603***	0.597***	0.511***
	(21.13)	(22.90)	(12.29)
Adj. R-squared	0.570***	0.563***	0.470***
	(21.87)	(24.37)	(11.84)
Start Quarter	1		
End Quarter	20		
Range	20		
Observations	4354		

TABLE 6: FAMA-MACBETH REGRESSION FOR QUARTER 1Q2010-4Q2014

In MODEL2, Debt-to-Equity (D_E) ratio is issued as a substitute to ALR. Again, leverage does not seem to be an important factor in measuring corporate spreads. It is worth mentioning though, that the sign of D_E in MODEL2 is positive, meaning that higher leverage, if significant, would lead to higher corporate spreads.

Although being statistically insignificant, the signs of ALR and WC variables are opposite to the ones that could have been expected. At the same time, signs for remaining variables are consistent with the theory. Also in MODEL2, it is checked whether a quarterly averaged share price of a given company can serve as a reliable predictor of changes in company health and prospects, that would theoretically lead to lower corporate spreads. However, the effect of share price on spreads is insignificant. Two variables introduced in MODEL2 turned out to be insignificant and consequently are not considered for MODEL3.

In order to confirm the findings of MODEL1, a different profitability metric is employed, namely the operating margin. In line with initial model, profitability of a given company remains to be one of the most important factors determining the corporate spreads of their bonds, as operating margin variable is significant at 5% confidence level.

Also as expected, variable "Log_AmountIssued" representing the issue size of bond is significantly and negatively related to corporate bond spreads. Bigger companies are generally healthier, more stable and have stronger relations to central government, which usually allows them to raise funds on more attractive conditions.

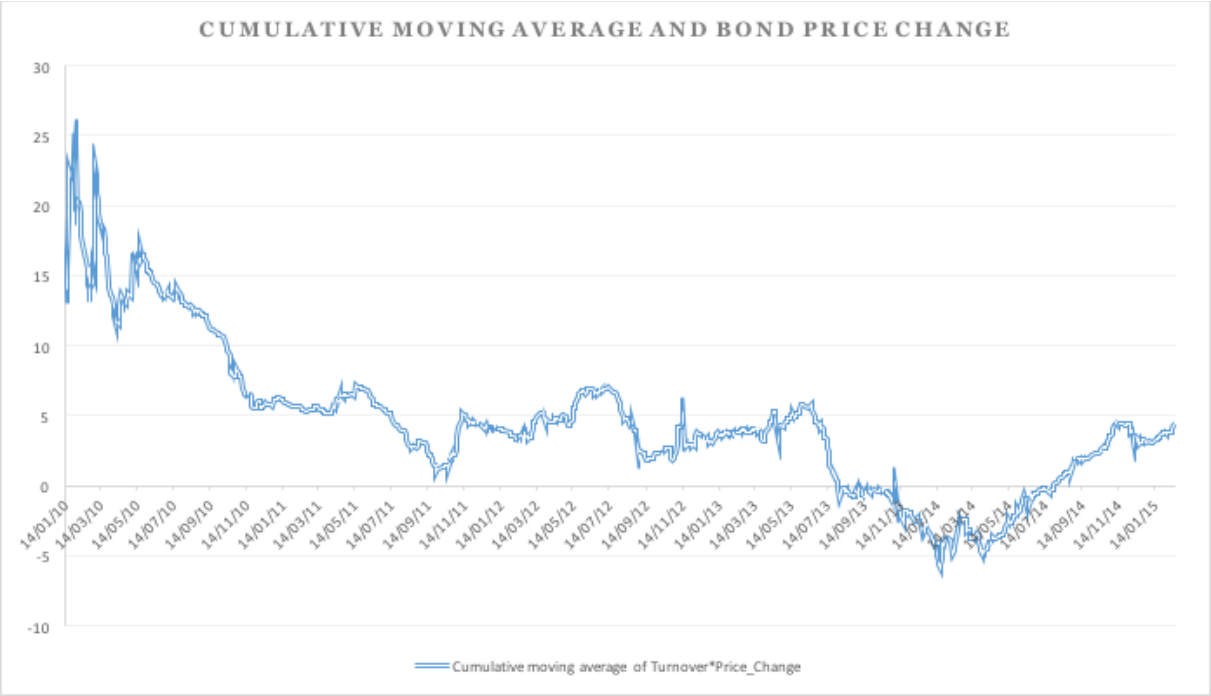
Variable "Zero" as measure of illiquidity in the bond market shows that there is "illiquidity premium" in China, meaning that more liquid bonds usually have higher

spreads, which is a contrary finding to a previous research in the field. There are two main aspects that have to be mentioned in order to confirm the validity of "Zero" variable.

First, given that bonds in China are frequently held until maturity ("buy and hold"), one can expect that trading usually takes place whenever a negative information related to a company is announced.

In order to check for this hypothesis, volume and bond price development since 2010 is tracked. A cumulative moving average (volume multiplied with price changes) variables is created and calculated for each day a certain bond was traded. A downward trend points at a negative balance for particular trading day, meaning that bonds with negative price changes had higher volumes than bonds with price increases. Figure 20 confirms that indeed since 2010 to Q1 2014, high volume was usually associated with negative price changes.

FIGURE 20: CUMULATIVE MOVING AVERAGE OF VOLUME AND PRICE CHANGE (SOURCE: OWN CALCULATIONS)



It has to be pointed out that above-mentioned method would be inaccurate in presence of a strong and negative trend of bond prices for the period of analysis. However, by looking at Figure 15 it can be seen that despite notable fluctuations, the average corporate bond spread has "mean reversed" in the last quarters of 2014.

Secondly, in MODEL3 Amihud liquidity measure is used, which again confirms the "illiquidity premium" in China corporate bond market.

In all cases, a sufficient fit is achieved, as minimum adjusted R-squared is 0.47. Overall, Model1 provides most significant results and superior fit compared to others. Consequently, variables in that model well be used for further analysis.

Further, same three models are tested in two different time periods, specifically quarters 1-16 (1Q2013-4Q2013, "pre-default") and quarter 17-20 (1Q2014-4Q2014, "Post-default"). A point-time between quarter 16 and quarter 17 was chosen as it captures a turmoil period in Chinese corporate bond market driven by default of Chaori company. Exactly the same Fama-MacBeth procedure is used and results are reported in Table 7 and Table 8.

FAMA-MACBETH REGRESSION (QUARTERS 1-16)			
Variable	MODEL1	MODEL2	MODEL3
Intercept	11.094***	11.833***	8.755***
	(5.21)	(5.84)	(5.20)
Log_AmountIssued	-0.388***	-0.417***	-0.311***
	(-4.00)	(-4.33)	(-3.86)
ROA	-6.800*	-6.129	-11.470***
	(-1.93)	(-1.60)	(-3.55)
RE	-0.724***	-0.527***	
	(-3.81)	(-3.21)	
ALR	0.067		0.057
	(0.37)		(0.75)
WC	0.243	0.409	0.241
	(0.97)	(1.60)	(1.13)
Zeros	-0.010***	-0.010***	
	(-5.58)	(-5.08)	
Eq_volatility	0.008**		0.007**
	(2.60)		(2.45)
Time_to_maturity	-0.056*	-0.058*	-0.056*
	(-2.04)	(-2.01)	(-2.02)
Private	0.339***	0.346***	0.595***
	(4.62)	(4.30)	(6.90)
D_E		0.001***	
		(3.27)	
Avg_Share_price		0.002	
		(0.66)	
Operating_Margin			-0.341*

			(-1.79)
Amihud			-21.127**
			(-2.40)
R-Squared	0.626***	0.619***	0.544***
	(23.85)	(27.53)	(13.61)
Adj. R-squared	0.587***	0.578***	0.497***
	(23.28)	(28.14)	(11.67)
Start	1		
End	16		
Range	16		
Observations	2750		

TABLE 7: FAMA-MACBETH REGRESSION FOR QUARTER 1Q2010-4Q2013

The adjusted R-squared for quarter 1-16 is higher compared to estimation for quarters 1-20, as approximately 59% of variation in dependent variable is explained by explanatory variables in the model.

The comparison of regression for quarters 1-16 and 17-20 reveals that leverages becomes an important factor for estimation of corporate spreads. Specifically, debt-to-equity ratio is significantly positive for pre-default period and significantly negative post-default. The ratio of total liabilities to total assets is also negative for quarters 17-20 and is highly significant. The results might be driven by the fact that local and central state-owned enterprises have better access to credit markets, have higher leverage ratios as previously discussed, but in general are characterized by lower corporate spreads. If this interpretation is correct, the models proposed lack another control variable beyond dummy "Private" to control for these deviations.

FAMA-MACBETH REGRESSION (QUARTERS 17-20)			
Variable	MODEL1	MODEL2	MODEL3
Intercept	15.845***	15.877***	12.366***
	(13.70)	(15.14)	(27.84)
Log_AmountIssued	-0.547***	-0.566***	-0.474***
	(-15.69)	(-17.63)	(-42.24)
ROA	-26.767***	-26.833***	-33.029***
	(-13.90)	(-15.85)	(-8.81)
RE	-2.058***	-1.773***	
	(-11.62)	(-7.29)	
ALR	-0.837***		-0.043
	(-14.67)		(-0.60)
WC	-0.017	0.014	-0.362**
	(-0.16)	(0.14)	(-5.04)

Zeros	-0.019**	-0.019**	
	(-4.34)	(-4.48)	
Eq_volatility	0.001		-0.000
	(0.70)		(-0.06)
Time_to_maturity	0.041*	0.044*	0.034
	(2.71)	(2.84)	(1.20)
Private	0.464***	0.466***	0.947***
	(35.52)	(31.93)	(6.49)
D_E		-0.001***	
		(-6.04)	
Avg_Share_price		-0.001	
		(-0.28)	
Operating_Margin			-1.295***
			(-6.92)
Amihud			-24.802**
			(-4.77)
R-Squared	0.512***	0.511***	0.379***
	(8.64)	(8.60)	(21.84)
Adj. R-squared	0.501***	0.500***	0.365***
	(8.30)	(8.25)	(20.85)
Start	17		
End	20		
Range	4		
Observations	1604		

TABLE 8: FAMA-MACBETH REGRESSION FOR QUARTER 1Q2014-4Q2014

Speaking of "Private" dummy, it remains to be significant and positive for both regressions. Moreover, time left until maturity also becomes significant. The switch from negative value in Q1-Q16 to positive in Q17-Q20 may reflect a change in investors' perception with regards to "long" risk, as post-default, bonds with longer maturities acre considered to be riskier due to uncertainty factor.

Overall, by using Fama-MacBeth procedure it was found out that balance sheet and bond-specific characteristics play an important role in determining corporate bonds spreads. Specifically, it was shown that profitability of a given company decreases corporate spreads, while findings on effects of leverage are ambiguous. Control variable "Private" remains important in both pre- and post-default periods, while time until maturity perfectly captures the change in investors' perceptions after first-ever corporate default. Moreover, illiquid bonds with high issue size have lower corporate spreads.

6.2. MACROECONOMIC MODEL FOR CORPORATE SPREADS

As a first step, the Hausman Test for fixed effects was performed and confirmed the presence of these effects in the model. In the following model, in order to obtain robust standard errors and eliminate "bond effect", the standard errors are clustered by bond.

It is believed, that immature or emerging bond markets are also highly dependent on macro variables (Cavallo & Valenzuela, 2010). Partly following Dufresne et al. (2001), the following macroeconomic variables were added: China 5-Year government bonds, China GDP growth rate and VIX volatility measurement.

As shown in Table 9, all three additions are significant and have signs as expected. Similarly to Fama-Macbeth procedure, same set of company and bond-specific variables are significant, despite a change in the model, a fixed effects and standard error estimation.

MACROECONOMIC MODEL WITH FIXED EFFECTS (QUARTERS 1-20)				
Variable	Both	Non-Private	Private	Expected Sign
Intercept	**15,736** (13,930)	**15,034** (10,600)	**18,356** (9,630)	+/-
Log_AmountIssued	**-0,521** (-10,270)	**-0,507** (-8,600)	**-0,600** (-6,060)	-
ALR	-0,418 (-1,360)	-0,096 (-0,210)	-0,455 (-0,900)	+
WC	-0,108 (-0,530)	0,141 (0,530)	-0,296 (-0,920)	-
RE	**-1,389** (-2,920)	-0,966 (-1,420)	**-1,861** (-3,040)	-
ROA	**-17,194** (-7,140)	**-16,026** (-5,350)	**-18,914** (-5,120)	-
Eq_volatility	0,005 (1,800)	0,002 (0,710)	0,009 (1,660)	+
Zeros	**-0,015** (-11,970)	**-0,015** (-7,920)	**-0,014** (-8,880)	-
Private	**0,420** (4,240)			+
Time_to_maturity	-0,009	-0,016	**0,830**	+/-

	(-0,240)	(-0,390)	(1,970)	
Gov5y	**0,194** (5,970)	**0,131** (3,420)	**0,328** (6,990)	+
GDPGrowth	**-0,280** (-10,180)	**-0,236** (-7,930)	**-0,419** (-7,670)	-
VIX	**0,062** (12,720)	**0,058** (11,640)	**0,076** (6,890)	+

TABLE 9: FIXED EFFECTS MACROECONOMIC MODEL (QUARTER 1-20)

Further, separate regressions are run for bonds issued by private and non-private companies. Even though they both tend to react in a similar way to macroeconomic development, retained earnings is not a statistically significant factor for non-private bonds, while it is for private. Moreover, higher time until maturity increases spreads of bonds issued by private, but does not affect spreads of LSOE- or CSOE-bonds. This finding might indicate, that contrary to private companies, LSOEs and CSOEs are not affected as much by "long" risk, meaning they are assumed to have a better access to debt capital in the future regardless of prevailing interest rates. The results suggest that, other things being equal, private companies have corporate spreads higher by 0.42%.

Later, the model is tested for different time periods, namely pre- and post-default. Results in Table 10 reveal in post-default case the yield on government on bonds is negatively correlated with corporate bonds spreads. It is very likely that post-default, investors worried about further potential defaults have switched to government bond market by selling corporate bonds and buying government's securities.

However, one has to be careful with interpretation of results in post-default regression due to a limited time frame of the analysis (just 4 quarters).

MACROECONOMIC MODEL WITH FIXED EFFECTS (QUARTERS 1-16, 17-20)			
Variable	Quarters 1-17	Quarters 17-20	Expected Sign
Intercept	**14,797** (17,190)	-3,897 (-1,100)	+/-
Log_AmountIssued	**-0,502** (-12,000)	**-0,554** (-6,600)	-
ALR	-0,133 (-0,450)	-0,741 (-1,760)	+
WC	-0,119	0,028	-

	(-0,730)	(0,080)	
RE	**-0,854** (-2,370)	**-2,159** (-2,380)	-
ROA	**-11,480** (-4,780)	**-21,738** (-6,330)	-
Eq_volatility	0,004 (1,510)	0,002 (0,370)	+
Zeros	**-0,012** (-9,820)	**-0,019** (-10,230)	-
Private	**0,429** (5,180)	**0,441** (2,950)	+
Time_to_maturity	-0,035 (-0,870)	0,041 (1,400)	+/-
Gov5y	**0,138** (8,180)	**-0,952** (-2,690)	+/-
GDPGrowth	**-0,274** (-10,300)	**-3,063** (5,770)	-
VIX	**0,068** (12,480)	**0,163** (-2,330)	+

TABLE 10: FIXED EFFECTS MACROECONOMIC MODEL (QUARTER 1-16,17-20)

Overall, the estimation with fixed effects allows to test how major macroeconomic variables effect corporate bond spreads in China. A different procedure still provides with results similar to the ones obtained by Fama-MacBeth regression. The "post-default" regression potentially reveals the changes in investors behaviour, as bonds with longer maturities in that period are considered to be riskier. Moreover, the change of sign of "Gov5Y" is likely a representation of "substitution effect" between corporate and government bonds in post-default period. Overall, the results obtained are consistent with theory and can be served as a solid foundation for future development of the model.

6.3. WILCOXON-MANN-WHITNEY TEST

In order to further analyse the effect of default on corporate bond market, 11 quarterly regression for period 3Q 2012 – 4Q 2014 from Fama-MacBeth procedure are used.[4] Specifically, the t-values of control variable "Private" are retrieved and used for further analysis. The dummy is statistically significant in all eleven quarters, expect for Quarter 19.

[4] The time period of the analysis has been reduced to 11 quarters, as the number of observations of "private" bonds in first 10 quarters is too little to draw an inference.

Figure 21 shows how importance of ownership has evolved in the period. With the naked eye it can be seen, that the significance of "Private" dummy has fallen in quarter 15, when news on potential first default appeared for the first time.

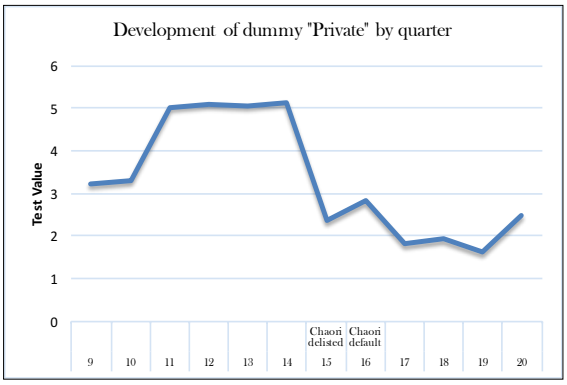


FIGURE 21: DEVELOPMENT OF DUMMY "PRIVATE" BY QUARTER

So as to check whether difference in pre- and post-default is statistically significant, a Wilcoxon-Mann-Whitney test is performed. The results presented in Figure 22 suggest that there is indeed a statistically significant difference between the underlying distribution of "private" dummy loadings in the period before and after default of Chaori. The effect of company being private is much lower in the quarters following default, meaning that "ownership premium" that CSOE and LSOE used to have is now less apparent. This finding is generally in line with hypothesis that since the first default, CSOE and LSOE become subject to default risk as well. The central government's decision not to bail Chaori out has sent a strong signal to corporate bond participants to rethink their bond pricing mechanism. As a result, investors start considering both private and non-private companies, everything else being equal, as having a similar default risk, or as it can be put in China, "a risk of not being bailed out".

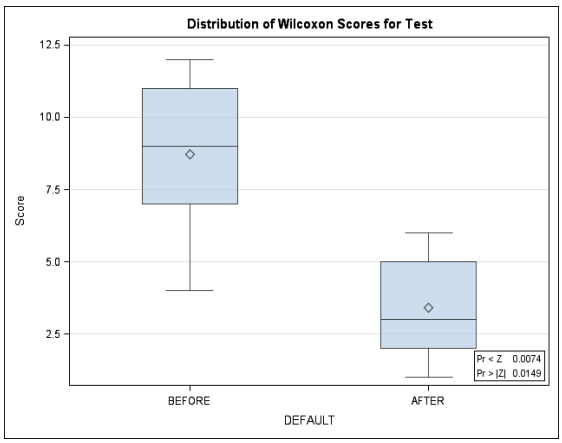


FIGURE 22: WILCOXON TEST ON "PRIVATE" DUMMY

The Wilcoxon-Mann-Whitney methodology is also used to compare whether financial metrics and bond-specific characteristics depending on ownership have different effects on corporate spreads, especially in the post-default period. In line with hypothesis discussed above, in post-default period LSOEs and CSOEs become more sensitive to quarterly reports compared to private companies, potentially pointing out

at price correction of non-private bonds[5]. Eventually, bonds issued by both private and non-private companies should similarly react to changes in balance sheet data.

6.4. ROBUSTNESS CHECK

Even though results obtained by Fama-MacBeth and fixed effects model are similar, the following robustness checks are performed. First, fixed effects model but now with standard errors clustered by time is tested. The change in standard errors is not big enough to make any of parameters to change its significance.[6]

Furthermore, the macroeconomic model is once again tested, but now a pooled OLS estimation is used. As long as regression residuals are uncorrelated across both bonds and time, the standard OLS standard errors are consistent. However, market-wide shocks as mentioned before in Section 5.2 will induce correlation between bonds at the moment of time, while bond-specific shocks will be pose correlation across time. Therefore, following Petersen (2009(two-dimensional clustering (bond x time) is used, which gives unbiased standard errors and produces correctly sized confidence intervals irrespective whether firm effect is permanent or temporary (Petersen, 2009).

POOLED OLS WITH TWO-DIMENSIONAL CLUSTERING (QUARTERS 1-20)				
Variable	Both	Non-Private	Private	Expected Sign
Intercept	**15,736** (17,590)	**15,034** (16,200)	**18,356** (14,380)	+/-
Log_AmountIssued	**-0,521** -(26,130)	**-0,507** (-19,640)	**-0,600** (-22,790)	-
ALR	**-0,418** (-4,760)	-0,096 (-0,620)	**-0,455** (-2,370)	+
WC	-0,108 (-1,200)	0,141 (1,160)	**-0,296** (-2,520)	-
RE	**-1,389** (-7,070)	**-0,966** (-2,470)	**-1,861** (-8,120)	-
ROA	**-17,194** (-8,420)	**-16,026** (-9,000)	**-18,914** (-5,450)	-
Eq_volatility	**0,005** (2,490)	0,002 (1,050)	**0,009** (2,280)	+

[5] Wilcoxon Scores are available in Appendix A.
[6] Results for fixed effects model with SEs clustered by time is available in Appendix B.

Zeros	**-0,015** (-6,720)	**-0,015** (-6,550)	**-0,014** (-5,810)	-
Private	**0,420** (21,930)			+
Time_to_maturity	-0,009 (-0,630)	-0,016 (-1,020)	**0,041** (1,970)	+/-
Gov5y	**0,194** (2,990)	**0,131** (2,450)	**0,328** (3,550)	+
GDPGrowth	**-0,280** (-4,020)	**-0,236** (-3,640)	**-0,419** (-3,840)	-
VIX	**0,062** (5,920)	**0,058** (5,510)	**0,076** (4,340)	+

TABLE 11: POOLED OLS REGRESSION WITH TWO-DIMENSIONAL CLUSTERING

Again, pooled OLS produces results that are very similar to fixed effects model with one-dimensional clustering. Given that standard errors in two-dimensional clustering model are not much higher and significance of the variables is held across different specifications, it is possible to presume that both bond and time effects are too small to bias results that are obtained.

Lastly, it is worth mentioning, that the list of macro variables used in the model is by no means exhaustive, as alternative factors like inflation, industrial production, US corporate bond spread, Treasury yield, PMI and many other were considered. However, a decision was made to stick to variables that were widely used in previous researches and found to be significant, especially having in mind that corporate bond market in China is still rather underdeveloped.

7. CONCLUSION

The aim of this paper was to understand the underlying processes that occurred in Chinese corporate bond market following the first-ever corporate bond default. To author's knowledge, this paper is among the first ones to combine and employ a comprehensive database on corporate bonds, ownership and financial information for China capital markets.

First, the paper analysis the rapid development of Chinese corporate bond market, discusses it's future opportunities and underlying risks.

Second, the paper points out the worsening financial health of Chinese corporations, as based on key financial metrics every-third company in the sample can be considered as technically distressed. However, this deterioration is not fully reflected in corporate bond spreads, which potentially suggest that credit risk might be mispriced.

Therefore, the paper tackles the hypothesis of no or just partially implied default risk in the corporate market in China, meaning that firm and bond-specific financial information has little to no effect on determining the corporate spreads. The results of Fama-MacBeth regression clearly rejects the hypothesis, as it was found out that, among others, profitability and leverage of a given company significantly affect corporate spreads.

Third, this paper is first to quantify the effect of ownership and "illiquidity premiums". Private companies, even though generally being healthier, are penalized by investors due to their ownership. Precisely, it was found out that spread on corporate bond increases by 36 basis points in case the controlling shareholder of the company is a private entity. Moreover, buy and hold strategy used in Chinese corporate bond market results in a negative "liquidity premium", in this paper therefore defined as "illiquidity premium". Bonds that are traded on more frequent basis have higher corporate spreads and these results are consistent across different models and various liquidity measures.

Fourth, several macroeconomic variables have been found to have significant explanatory power. Also, the methodology proposed in the paper potentially captures the "substitution effect", a switch by investors from corporate to government bonds in post-default period.

Lastly, the importance of ownership through time is discussed. A Wilcoxon-Mann-Whitney test suggests that in post-default period the effect of ownership evens out, meaning that credit risk of both private and non-private companies is now priced on a more similar, but still different basis. One can argue, that governments decision to allow first corporate default has made investor to revaluate their perception of no default risk, especially with regards to CSOEs and LSOEs.

Overall, our results reject the hypothesis of no default risk pricing in Chinese corporate bonds as long as private companies are concerned. On the other hand, companies that are owned by state and local government enjoyed lower bond spreads due to reasons not fully captured by the models proposed, but the ownership premium they have had is rapidly disappearing. It is therefore concluded, that first ever default in Chinese corporate bond market has had a positive effect on risk pricing, as based on the results obtained, in that period company and bond-specific characteristics play a more significant role.

One of the drawbacks of this paper is the relatively short post-default period of 4 quarters, which in most cases indicate that results should be interpreted with cautiousness. For this reason, a model of fixed effects was preferred to the method of first differences, as this would significantly reduce the sample size.

It would be interesting to compare findings of this paper with results when more post-default observations are available. Further work in this area can dedicated to further analysis of ownership and illiquidity premiums. Moreover, it is difficult to justify a negative sign for leverage ratios, probably showing that there should be additional factors that the proposed model does not account for.

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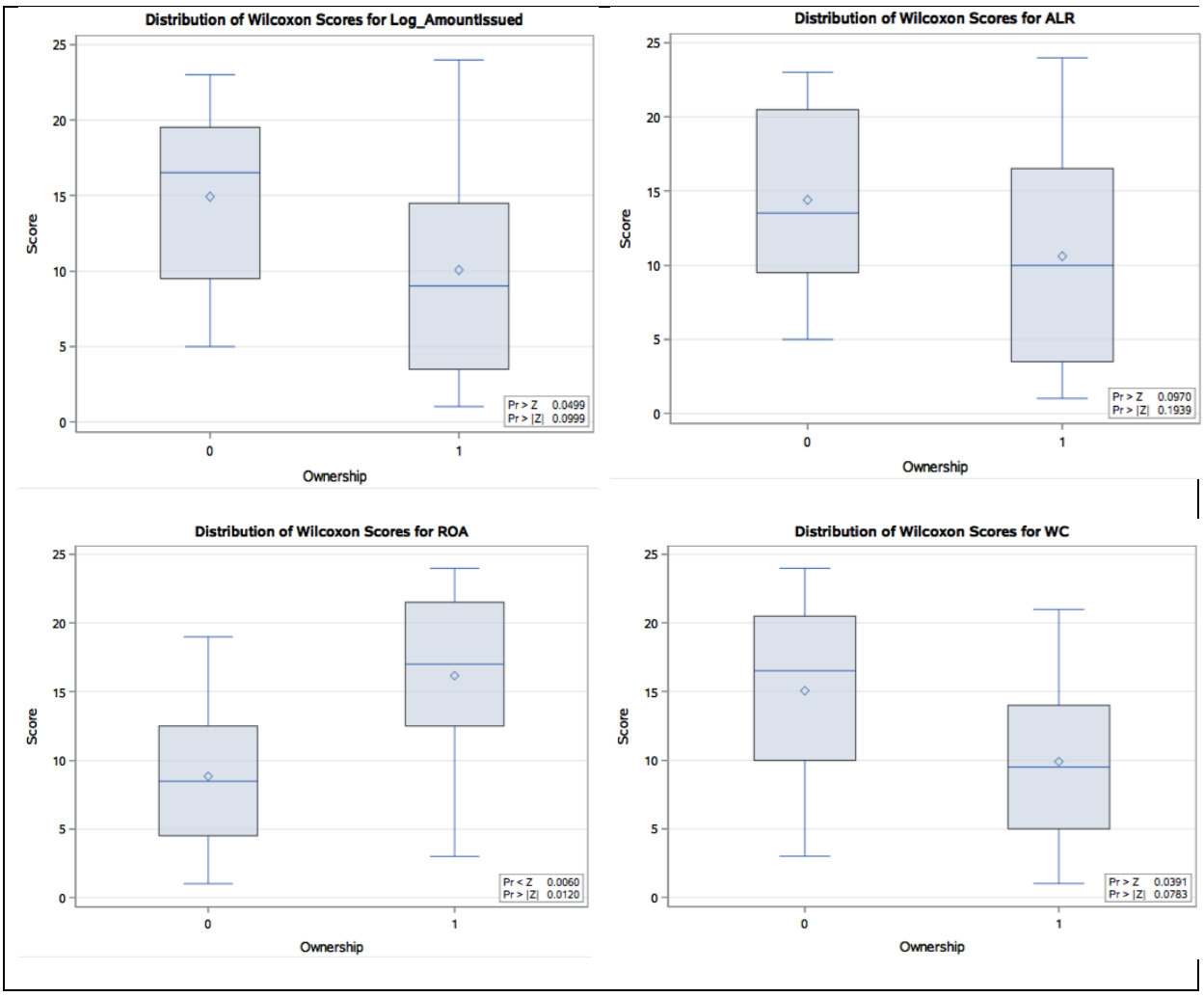
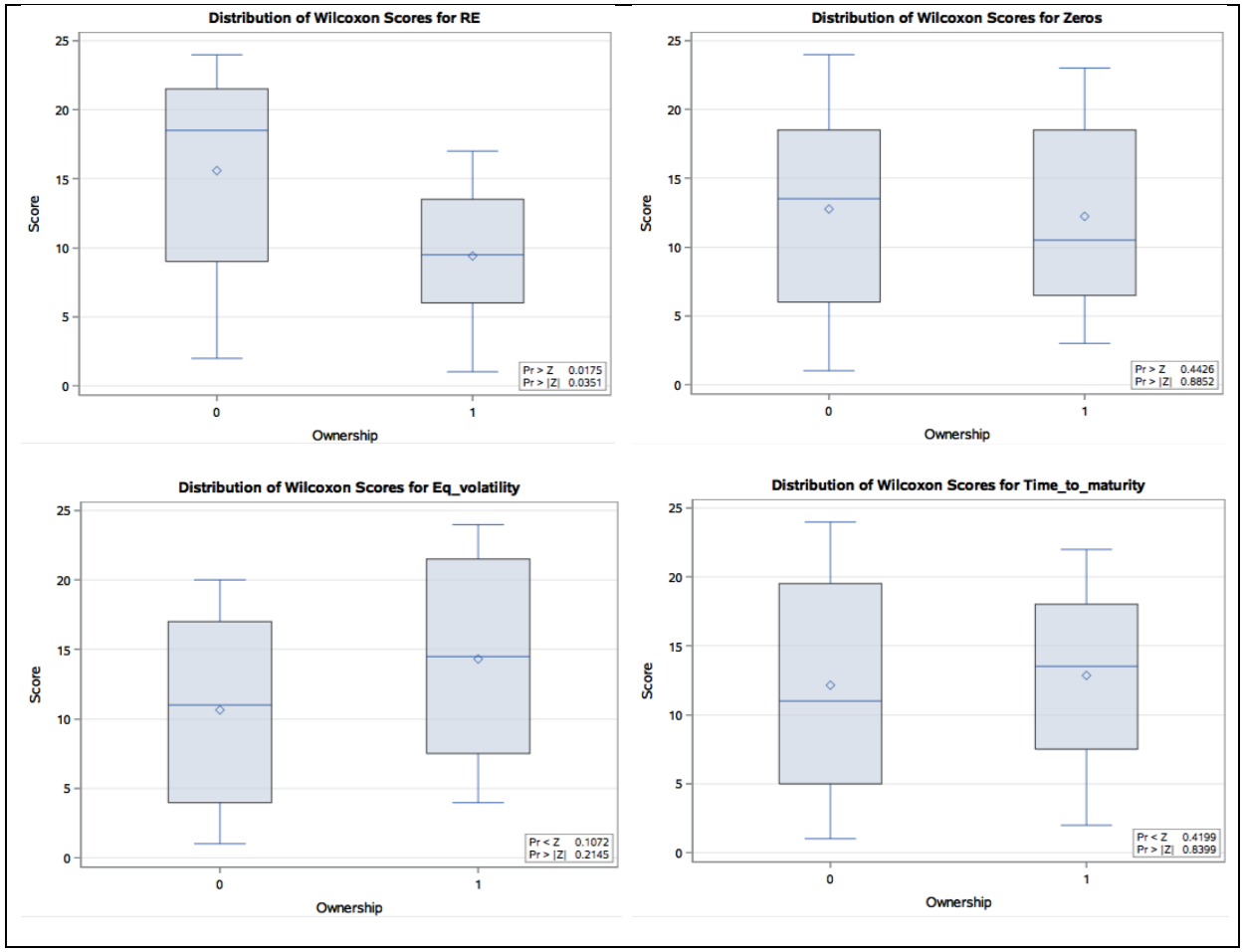
APPENDIX A. WILCOXON-MANN-WHITNEY TEST





APPENDIX B. FIXED EFFECTS MODEL WITH CLUSTERED STANDARD ERRORS BY TIME

Table: Fixed effects model with clustered standard errors by time (Quarters 1-20)

Variable	Both	Non-Private	Private	Expected Sign
Intercept	**15,736** (17,590)	**15,034** (16,200)	**18,356** (14,380)	+/-
Log_AmountIssued	**-0,521** -(26,130)	**-0,507** (-19,640)	**-0,600** (-22,790)	-
ALR	**-0,418** (-4,760)	-0,096 (-0,620)	**-0,455** (-2,370)	+
WC	-0,108 (-1,200)	0,141 (1,160)	**-0,296** (-2,520)	-
RE	**-1,389** (-7,070)	**-0,966** (-2,470)	**-1,861** (-8,120)	-
ROA	**-17,194** (-8,420)	**-16,026** (-9,000)	**-18,914** (-5,450)	-

Eq_volatility	**0,005** (2,490)	0,002 (1,050)	**0,009** (2,280)	+
Zeros	**-0,015** (-6,720)	**-0,015** (-6,550)	**-0,014** (-5,810)	-
Private	**0,420** (21,930)			+
Time_to_maturity	-0,009 (-0,630)	-0,016 (-1,020)	**0,041** (1,970)	+/-
Gov5y	**0,194** (2,990)	**0,131** (2,450)	**0,328** (3,550)	+
GDPGrowth	**-0,280** (-4,020)	**-0,236** (-3,640)	**-0,419** (-3,840)	-
VIX	**0,062** (5,920)	**0,058** (5,510)	**0,076** (4,340)	+

Table: Fixed effects model with clustered standard errors by time (Quarters 1-16, 17-20)

Variable	Quarter 1-17	Quarter 17-20	Expected Sign
Intercept	**17,797** (17,750)	**-3,8967** (-4,120)	+/-
Log_AmountIssued	**-0,502** (-22,520)	**-0,5540** (-18,250)	-
ALR	0,1332 (-1,560)	**-0,7416** (-10,600)	+
WC	-0,119 (-1,540)	**0,0278** (0,280)	-
RE	**-0,854** (-6,810)	**-2,1595** (-8,580)	-
ROA	**-11,480** (-5,150)	**-21,7383** (-7,220)	-
Eq_volatility	0,0043 (1,870)	0,0017 (0,720)	+
Zeros	**-0,0117** (-5,800)	**-0,019** (-4,840)	-
Private	**0,4287** (16,85)	**0,4406** (19,85)	+
Time_to_maturity	**-0,035** (-2,70)	**0,0407** (2,820)	+/-
Gov5y	0,1386 (1,880)	**-0,9523** (-11,870)	+
GDPGrowth	**-0,2745**	**-3,0631**	-

	(-3,410)	(21,340)	
VIX	**0,0677** (6,230)	**0,1626** (-13,120)	+

APPENDIX C. SAS CODES

Some of the codes that have been used to produces results of the paper:

Nelson-Siegel-Svensson interpolation

```
data input (keep=Date     y1       y2       y3       y4       y5       y6       y7       y8       y9       y10
        y12      y15      y20

) ;

set sasdata.input;

format date yymmdd10.;

run;

proc sort data=input out=input2;

by date;

run;

proc transpose data = input2 out = trans;

options obs=MAX;

    by date;

    var y:;

run;

data trans;

    set trans;

    years = input(compress(tranwrd(_NAME_, "_", "."), "y"), best.);

    rename COL1 = yield;

    drop _:;

run;

/* Use by group processing, store estimates, plot the line */

proc nlin data = trans method = newton;

ods output parameterestimates=parest;

    by date;

    parms beta0 = 3 beta1 = -3  beta2 = 0.0001  beta3=0.0001 lambda1 = 2.5  lambda2 = 3;

         model yield =(beta0)+(beta1*((1-EXP(-years/lambda1))/(years/lambda1)))+ (beta2*((((1-EXP(-
years/lambda1))/(years/lambda1)))-

(EXP(-years/lambda1))))+(beta3*((((1-EXP(-years/lambda2))/(years/lambda2)))-(EXP(-years/lambda2))));

run;

quit;

data results (keep=date parameter estimate);
```

```
set parest;

run;
```

Two-dimension clustered standard errors

```
%MACRO REG2DSE(y, x, firm, time, multi, dataset, output);

proc surveyreg data=&dataset;
cluster &firm;
model &Y = &X /covb ;
ods output covb=firm;
ods output FitStatistics=fit;
run;quit;


proc surveyreg data=&dataset;
cluster &time;
model &Y = &X /covb ;
ods output covb=time;
run;quit;

%if &multi=1  %then %do;

proc surveyreg data=&dataset;
cluster &time &firm;
model &y = &x /  covb;
ods output covb=both ;
ods output parameterestimates=parm;
run;quit;

data parm; set parm;keep parameter estimate;run;

%end;


%else %if &multi=0  %then %do;

proc reg data=&dataset;
model &y = &x /hcc  acov  covb;
ods output acovest=both ;
ods output parameterestimates=parm;
run;quit;

data both; set both; parameter=Variable; run;

data both; set both;drop variable  Dependent  Model;run;

data parm; set parm;parameter=Variable;Estimates=Estimate;keep parameter estimates;run;

%end;

data parm1; set parm;
n=_n_;m=1;keep m n;run;

data parm1;set parm1;
by m;if last.m;keep n;run;

data both; set both;
keep intercept &x;
run;
data firm; set firm;
keep intercept &x;
run;
data time; set time;
keep intercept &x;
run;

data fit1; set fit;
parameter=Label1;
Estimates=nValue1;
if parameter="R-square" then output;
run;

data fit1; set fit1;
n=1;
keep parameter Estimates n;
run;
proc iml;use both;read all var _num_ into Z;print Z;use firm;read all var _num_ into X;print X;
use time;read all var _num_ into Y;print Y;use parm1;
read all var _num_ into n;print n;B=X+Y-Z;C=I(n);D=J(n,1);E=C#B;
F=E*D;G=F##.5;
```

```
print B;print G;
create b from G [colname='stderr']; append from G;quit;

data results; merge  parm B ;
tstat=estimates/stderr;n=0;run;

data resultsfit; merge results  fit1;by n;
run;

data &output; set resultsfit;
drop n;
run;

%MEND REG2DSE;
%REG2DSE(y=average_yield, x=C_ALR Gov5y Gov5YSquared Swapy10y_y1 ShanghaiComp  VIX CVI   , firm=BondID,
time=Quarters, multi=0, dataset=sasdata.predefault2, output=sasdata.Clusters);
```

FAMA-MacBeth procedure:

```
proc sort data=sample; by Quarters;run;

let %y = depvar; *define dep var here;

proc reg data=sample outest=FB noprint;

 by Quarters;

 model &y = indvars1 /adjrsq;

 model &y = indvars2 /adjrsq;

quit;

proc sort data=FB; by _model_ Quarters; run;

data FB2; set FB; drop  &y _TYPE_  _DEPVAR_  _RMSE_ _IN_  _P_  _EDF_;

 rename _model_=model; run;

proc transpose data=FB2 out=FBny name=name prefix=coef;

 by model Quarters; run;

data FBny; set FBny; retain code;

 by model Quarters; code=code+1; if first.Quarters then code=1;run;

proc sort data=FBny; by model code name;run;

%let lag=3;*lags for Newey-West t-stat;

proc model data=FBny;

 by model code name;

 parms a; exogenous coef1 ;

 instruments / intonly;

 coef1 =a;

 fit coef1 / gmm kernel=(bart, %eval(&lag+1), 0);

 ods output parameterestimates=param1  fitstatistics=fitresult

 OutputStatistics=residual;

quit;

data param1; set param1;

 tvalue2=put(tvalue,7.2); if probt<0.1 then p='*  ';

 if probt<0.05 then p='** '; if probt<0.01 then p='***';

 T=compress('('||tvalue2||')'); PARAM=compress(put(estimate,7.3)||p);

 run;

data param1a; set param1; keep model code name coef _name_;
```

```
 _name_='PARAM'; coef=PARAM; run;
data param1b; set param1; keep model code name coef _name_;
 _name_='T'; coef=T; run;
data param2; set param1a param1b;run;
proc sort data=param2; by  code _name_ model;run;
proc transpose data=param2 out=param3;
 by code name _name_; id model; var coef; run;
data param3; set param3; if _name_='T' then do;
 code=. ;name=.;end;run;
proc sort data=fb out=fb3; by _model_; run;
data fb3; set fb3; keep _model_ Quarters num; num = _edf_+_p_;
 rename _model_=model; run;
proc sql; create table num(where=(model='MODEL1')) as select
 model, min(Quarters) as start, max(Quarters) as end, count(Quarters) as range,
 sum(num) as obs from fb3 group by model;quit;
proc transpose data=num out=num; by model; var start -- obs; run;
data num; set num; rename _name_=name; MODEL1=put(col1, 7.0);
 drop model col1; run;
data param3; set param3 num; run;
```

APPENDIX D. TIMELINE – DEVELOPMENT OF CHINESE BOND MARKET (COPIED FROM BLOOMBERG)

1983 - China allows companies to issue bonds for the first time since the Communist Party came to power in 1949.

Aug 1, 1991 - Hainan Energy Co is the first Chinese firm to issue convertible bonds for its yuan-denominated A shares. The company has since been restructured several times and is now a property developer named Lvjing Realestate Co 000502.SZ.

1992 - Corporate bond issues reach 51.8 billion yuan ($7.6 billion), an annual record that stands until 2006.

2000/2001 - After several defaults in the 1990s, the government requires that most corporate bond issues be approved by the top economic planner, now known as the National Development and Reform Commission (NDRC). Beijing also sets an annual quota system and requires bonds be guaranteed by banks, pushing corporate bond issuance below 10 billion yuan in 2000. Convertible bonds issued by listed companies are exempted from the quota system, however, and subject to approval by the China Securities Regulatory Commission (CSRC).

May 2005. The People's Bank of China, the central bank, allowed firms to begin issuing corporate bills with a tenure of one year or less to break through the logjam of bureaucratic approvals. Companies were required only to register for issuance and did not have to wait for approval. The short-term CP market allowed firms to raise capital more cheaply than through bank loans and grew rapidly.

May 2006. The China Three-Gorges Project Corporation, operator of the world's biggest hydroelectric project, was the first company since the early 2000s to issue bonds without a bank guarantee, after receiving official approval, signaling government's intentions to revive the corporate bond market.

October 2006. The central bank governor, Zhou Xiaochuan, commented that China's corporate-bond market was in a "deep coma" and warned that a poor corporate-bond market implied "serious macroeconomic risks due to an imbalance of corporate direct and indirect fund-raising." [7]

August 2007. China launched a key reform to allow CSRC to take over authority from the National Development and Reform Commission (NDRC) to approve listed companies to issue corporate bonds of one year or more. CSRC-approved bonds were called "company bonds," to distinguish them from "enterprise bonds" approved by the NDRC. Under the new regulations introduced by the CSRC, Chinese firms listed in Shenzhen, Shanghai, and overseas were permitted to issue corporate bonds *for any general corporate purpose* approved by their boards and *without bank guarantees*. Issuance quotes were removed.

September 2007. Hubei-based China Yangtze Power Company, the country's first listed power firm, became the first Chinese firm to issue bonds without bank guarantees.40

January 2008. The NDRC abolished the quota system for enterprise bonds and allowed all *unlisted companies* to issue bonds without bank guarantees. NDRC's new streamlined approval process replaced a quota and case-by-case approval system that had been tedious for applicants seeking to issue bonds. The new process was designed to "further promote market-orientated development of the enterprise bond market and to expand enterprise bond issuance sizes," according to the NDRC. The NDRC listed clear requirements for bond issuance, and any company meeting these requirements could now file an application. According to the rules, the money raised could be used in fixed-asset investment projects as well as to repay bank loans and shore up a company's capital base, but speculative investment in property, stocks, and futures continued to be banned. The NDRC set limits on itself, requiring

[7] ("Timeline—Major Events in China's Corporate Bond Market," Reuters, April 3, 2009)

approval or rejection of a bond application within three months. Previously, companies would wait months or even years after applying to issue bonds. In 2007, issuance of corporate bonds approved by the NDRC totaled RMB170.9 billion, a tiny amount compared to total bank loans.

March 26, 2008. The PBC issued a notice that required credit rating agencies to conduct on-site interviews with senior management personnel of issuing companies, and refined regulations governing the administration of credit-rating agencies.

April 8, 2008. The China National Materials Group Corporation issued a total sum of RMB500 million unsecured corporate debentures. This was the first unsecured corporate debt issue after the NDRC streamlined the listing process in January 2008.

April 2008. The PBC, in a radical move underlining its impatience with existing bureaucratic procedures, allowed firms to issue medium-term corporate bills of three to five years, enjoying the same advantages as short-term corporate bills.

June 2012. Creation of a high-yield market for SMEs. Small domestic companies, which are not listed on the stock exchange are eligible to participate. Issuance will be conducted through private placement.

March 2014. China experienced its first domestic corporate bond default. Chaori Solar Energy, a manufacturer of solar energy products was not able to pay a full amount on interests owed.[8]

May 2014. China will allow local governments to sell bonds directly for the first time in two decades. For years, local governments have circumvented this ban by setting up companies known as local government finance vehicles (LGFVs) that issue bonds or take loans on behalf of the local authority.[9]

[8] http://www.ft.com/intl/cms/s/0/d4ccd956-a5cb-11e3-9818-00144feab7de.html#axzz36Ivn5tSE
[9] http://www.ft.com/intl/cms/s/0/79e0d5e6-e0b4-11e3-875f-00144feabdc0.html#axzz36Ivn5tSE