THE DETERMINANTS OF CREDIT SPREADS OF CORPORATE BONDS IN CHINA: THE INTERACTION EFFECTS OF FIRM SIZE AND THE LEVEL OF FINANCIAL DEVELOPMENT

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by

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LIST OF ABBREVIATIONS

UK	United Kingdom
GMM	Generalized Method of Moments
CEO	Chief Executive Officer
CPA	Certified Public Accountant
CAMS	China Academy of Management Sciences
CSMAR	China Stock Market & Accounting Research
PBC	People’s Bank of China
SRC	Securities Regulatory Commission
FSB	Financial Stability Board
ST	Special Treatment
GDP	Gross Domestic Products
CEGS	China Entrepreneurial General System
CSYD	China Statistical Yearbooks Database
FinTech	Financial Technology
EPU	Economic Policy Uncertainty
US	United States
POLS	Pooled Ordinary Least Square
FEM	Fixed Effect Model
REM	Random Effect Model
GLS	Generalized Least Square
OLS	Ordinary Least Square
MOF	Ministry of Finance
MPU	Monetary Policy Uncertainty
FPU	Fiscal Policy Uncertainty
CEGS	China Entrepreneurial General System
CMID	China Marketization Index Database

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PENENTU TEBARAN KREDIT BON KORPORAT DI CHINA: KESAN INTERAKSI SAIZ FIRMA DAN TAHAP PEMBANGUNAN KEWANGAN

ABSTRAK

Dalam konteks landskap ekonomi yang berkembang, memahami faktor yang mempengaruhi tebaran kredit pada bon korporat adalah penting untuk memastikan pembangunan teguh dan mampan bagi kedua-dua pasaran bon dan ekonomi sebenar di China. Penyelidikan ini menggunakan data daripada syarikat tersenarai di China dari 2011 hingga 2020. Menggunakan sistem satu langkah panel dinamik Kaedah Detik Umum (GMM), kajian itu bertujuan untuk menganggarkan model dinamik tebaran kredit untuk bon korporat. Secara khusus, ia meneroka kesan pembangunan kewangan digital, tadbir urus korporat, ketidaktentuan dasar ekonomi dan kepercayaan sosial terhadap tebaran kredit. Penemuan utama menunjukkan hubungan songsang yang ketara antara tahap pembangunan kewangan digital dan tebaran kredit bon korporat. Terutamanya, kedalaman penggunaan kewangan digital menunjukkan pengaruh negatif yang besar terhadap tebaran kredit. Tadbir urus korporat muncul sebagai faktor penting yang mempengaruhi tebaran kredit, dengan penumpuan pemilikan, perusahaan milik kerajaan, perkadaran pengarah bebas, pampasan eksekutif, dan kualiti pendedahan maklumat yang menunjukkan hubungan negatif yang ketara. Walau bagaimanapun, saiz lembaga pengarah dan dualiti CEO mempamerkan kesan positif yang ketara ke atas tebaran kredit. Selain itu, ketidakpastian dasar ekonomi didapati dikaitkan secara signifikan secara positif dengan tebaran kredit, menunjukkan bahawa ketidakpastian yang meningkat dalam dasar monetari atau fiskal membawa kepada tebaran kredit yang lebih tinggi. Kepercayaan sosial juga memainkan peranan penting, menunjukkan kesan negatif yang ketara terhadap tebaran kredit,

membayangkan bahawa sistem tidak formal dalam syarikat tersenarai mempengaruhi tebaran kredit. Tambahan pula, kajian ini mendedahkan hubungan yang negatif antara tahap pembangunan kewangan digital (termasuk keluasan liputan, kedalaman penggunaan dan tahap pendigitalan) dan tebaran kredit lebih ketara dalam firma bersaiz kecil berbanding firma bersaiz besar. Begitu juga, hubungan negatif antara kepercayaan sosial dan tebaran kredit lebih jelas dalam syarikat yang terletak di kawasan kewangan yang lebih maju. Implikasi praktikal daripada kajian ini boleh diterangkan dalam tiga aspek. Pertama, bagi penerbit bon, memahami dan mengurus tebaran kredit bon adalah aspek penting dalam pengurusan kewangan korporat. Kedua, bagi pemegang bon, penemuan ini menawarkan pandangan praktikal untuk meningkatkan keupayaan untuk melindungi kepentingan mereka dengan berkesan. Akhir sekali, dari sudut kawal selia, kajian ini menekankan kepentingan pengawal selia mengukuhkan pengawasan dengan memperoleh pemahaman yang menyeluruh tentang tebaran kredit. Kekukuhan penemuan kajian disahkan melalui pendekatan anggaran alternatif dan pengukuran untuk pembolehubah bersandar, bebas dan interaksi.

THE DETERMINANTS OF CREDIT SPREADS OF CORPORATE BONDS IN CHINA: THE INTERACTION EFFECTS OF FIRM SIZE AND THE LEVEL OF FINANCIAL DEVELOPMENT

ABSTRACT

In the context of the evolving economic landscape, understanding the factors influencing credit spreads on corporate bonds is crucial for ensuring the robust and sustainable development of bond markets and China's real economy. This research utilizes data from listed Chinese companies from 2011 to 2020. Employing the dynamic panel one-step system Generalized Method of Moments (GMM), the study aims to estimate dynamic models of credit spreads for corporate bonds. Specifically, it explores the impact of digital finance development, corporate governance, economic policy uncertainty, and social trust on credit spreads. The key findings indicate a significant inverse relationship between the level of digital finance development and the credit spreads of corporate bonds. Notably, the depth of digital finance usage substantially negatively influences credit spreads. Corporate governance emerges as a crucial factor affecting credit spreads, with ownership concentration, state ownership of enterprises, the proportion of independent directors, executive compensation, and the quality of information disclosure showing significant negative associations. However, board size and CEO duality significantly positively impact credit spreads. Additionally, economic policy uncertainty is positively associated with credit spreads, indicating that increased uncertainty in monetary or fiscal policies leads to higher credit spreads. Social trust also plays a crucial role, showing a significant negative impact on credit spreads, implying that the informal system within listed companies influences credit spreads. Furthermore, considering that smaller firms typically face

greater challenges in accessing traditional financial services, making them more reliant on digital financial platforms, the study finds that the negative relationship between the level of digital finance development (including coverage breadth, usage depth, and digitization degree) and credit spreads is more pronounced in small-sized firms compared to large-sized firms. Given that companies in regions with more advanced financial development can more effectively leverage the benefits of social trust, the study finds that the negative relationship between social trust and credit spreads is more pronounced in companies located in financially developed regions. The practical implications of this study can be described in three aspects. Firstly, for bond issuers, understanding and managing bond credit spreads are integral to corporate financial management. Secondly, for bondholders, the findings offer practical insights to enhance their ability to protect their interests effectively. Lastly, from a regulatory standpoint, the study emphasizes the importance of regulators strengthening oversight by gaining a comprehensive understanding of credit spreads. The robustness of the research findings is confirmed through alternative estimation approaches and measures for dependent, independent, and interaction variables.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter introduces the background of the study, problem statement, research question, research objectives, significance of the study, the motivation of the study, the scope of study, definition of key terms, and organization of the study. The default by a bond issuer not only harms the interests of investors but may also result in systemic risk. In order to support the healthy growth of the bond market, the development of digital finance helps corporations make rational and scientific business decisions and optimizes the corporate bond financing environment. Moreover, it is widely acknowledged that corporate governance is a valuable tool for safeguarding investor interests and assisting businesses in lowering their capital expenditures. Furthermore, economic policy uncertainty, as the crucial source of uncertainty in the external environment, affects a firm's prospects and corporate bond default risk. In addition, the issue of social trust in bond markets is crucial and minimizes bond risks.

1.2 Background of the Study

The economy has gained remarkable achievements in China since reform and opening up forty years ago. The Communist Party of China's 19th National Congress report further noted that the economy was transitioning from rapid to high-quality growth. It is a crucial period for transforming the development mode and the driving force of growth and optimizing the economic structure (Zhang et al., 2023). Currently, enterprises are crucial to stabilizing economic growth, expanding reform and opening, adjusting economic structure, ensuring people's lives, preventing significant risks, and solving main social contradictions between the aspirations of individuals for a better living and unbalanced and inadequate development (Dong, 2021; Lian et al., 2023). Therefore, enterprises have always been paid extensive attention.

Since the 1990s, with the acceleration of interest rate marketization and the diversification of financial instruments and market participants, the economy's advancement has diversified the financing channels of enterprises (Hasan et al., 2009). At present, the main financing methods of the corporation are equity financing and debt financing, in which debt financing mainly depends on the loans of financial institutions and the issuance of bonds (Cui et al., 2023). Compared with equity financing, bonds have the advantages of strong binding force, leverage, and protection of ownership status. Compared with loans from financial institutions, bonds are marketable securities with the advantages of strong liquidity and low financing costs. Based on the advantages of bond financing, the study will explore bond financing instead of equity financing and loans.

Compared to developed countries, bond markets in developing nations are much less developed. The turnover rate in China's bond market has remained at 250%-300%, while it is generally above 1,000 percent in developed countries (Wang, 2023). The total market volume of the bond market is in a large gap with that of the stock markets in China (Chen et al., 2021). Total stock market capitalization is nearly three times the size of the bond market in the early twenty-first century. With the growing awareness that bond financing can lead to regional financial stability and economic development, the bond markets in Asian countries have developed rapidly, and the proportion of bonds in GDP in both South Korea (73.6%) and Malaysia (95.3%) is almost the same as that of the United States (160.3%) in 2003 (Prelorentzos et al., 2024). However, the proportion of bonds in Chinese GDP was only 31.3% in 2003 and has not reached an average of 44.3% in East Asia.

In this context, the Chinese government has also proposed to actively develop the bond market, increase the percentage of direct financing of enterprises, and advance the multi-level capital market system (Zhang et al., 2023). In 2015, the Securities Regulatory Commission (SRC) in China proposed to actively promote the improvement of the legal system of bond issuance and trading and provide an institutional guarantee for the expansion of the bond market under the requirements of unified access conditions, unified information disclosure standards, unified credit rating, unified investor suitability system, and unified investor protection mechanism. Therefore, the bond is an essential issue in the current financial reform, and expanding the scale of bond issuance has become an urgent task.

The development of the bond market in China has gradually made remarkable achievements, such as the growing market scale, diverse bond varieties, comprehensive issuers, and growing investor teams. The credit bond market's balance value reached 157.9 trillion yuan at the end of 2023, making it the world's second-largest credit bond market after the United States (Wang, 2023). Meanwhile, the value of corporate credit bonds reached 24.872 trillion yuan in 2023, becoming the largest credit bond category except for local government bonds, treasury bonds, financial bonds. Particularly, the corporate credit bond market includes enterprise bonds beginning from 1984, corporate bonds, medium-term notes, and commercial paper and has two major markets such as exchange bond markets and inter-bank bond markets. As Table 1.1 shows, the bond market in China adopts the multi-head supervision mode, and the supervision institutions are constituted by the National Development and Reform Commission, SRC, and the Dealer's Association.

Table 1.1 Overview of Main Varieties of the Corporate Credit Bond Market

Bond varieties	Regulatory bodies	Trading market	Bond balance value (Trillion yuan)
Enterprise bond	National development and reform commission	Inter-bank bond market Exchange bond market	1.925
Corporate bond	China securities regulatory commission	Exchange bond market	11.401
Medium-term note	Dealers' association	Inter-bank bond market	9.414
Commercial paper	Dealers' association	Inter-bank bond market	2.132

Source: Wind; The China bond market (Li, Y. & Wang, F. (2022). The China bond market. Beijing: Social Science Literature Press.)

The unsecured short-term financing bonds launched after 2005 rely entirely on the issuer's credit financing, which represents the real prelude to the growth of China's credit bond market (Zhang, 2023). In 2007, Changjiang Power was approved to issue the first corporate bond, marking the official opening of the corporate bond market in China. In April 2008, the National Association of Institutional Investors in Financial Markets issued the business guidelines for medium-term notes of non-financial firms on the inter-bank bond market (Tang et al., 2017). Since then, medium-term notes have been officially opened for trading and have become a primary financing source for non-financial corporations (Wang et al., 2022). Especially in 2015, the SRC issued and carried out the Corporate Bond Issuance and Transaction Management Measures, which reveals that the issuer of corporate bonds is no longer limited to listed companies but extends to legal persons of the corporate, which brings essential opportunities for the expansion of corporate bonds (Wang et al., 2022). Therefore, the corporate credit bond market has developed rapidly over time.

No bond default emerges after the issuance of corporate credit bonds for a long time, and some investors even believe that corporate bonds are rigid cashing (Liu, 2015). However, with the eleven super day bonds of Shanghai in March 2014 unable to pay the principal and interest, there was a formal default in the corporate bonds market for the first time (Ma, 2020). Coincidentally, the St. Hunan Hubei debt constituted a material breach of contract and could not compensate the interest on time in April 2014. Then, the default of the twelve Zhongfu 01 bonds and the first state-owned corporate bond, eleven Tianwei mtn2, 2015, signified the breaking of the rigorous cashing system in the bond market. Thus, the types of bond defaulting subjects develop from private corporations to state-owned corporations. A total of 108 bonds defaulted throughout the year, with defaults totaling about 30.307 billion yuan (Wang, 2023). The phenomenon of corporate bond default in the capital market is gradually becoming normalized, and the potential credit risk cannot be ignored.

The credit spread of corporate bonds is measured by the yield to maturity of the bond issuance minus the yield to maturity of Treasury bonds with corresponding maturities in the same period (Lin et al., 2019; Li et al., 2022). Wang and Gao (2017), Kou, Pan & Liu (2015), and Lin, Liu & Zhao (2019) pointed out that the higher or lower credit spread of corporate bonds reflects the higher or lower compensation for the issuer's default risk that bond investors are willing to endure, and it also reflects the higher or lower financing cost of the corporate on the bond market. Lowering the default risk or financing cost of enterprises has always been an essential policy for governments to activate the vitality of the real economy. Although corporate financing costs show a downward trend, there is still a certain distance from the national cost reduction goal (Ruan et al., 2020). The credit spreads of the corporate bond market are much higher than the actual default loss rate and the international level for a long time (Wang, 2023). In light of these considerations, this study seeks to investigate factors affecting bond credit spreads from the aspects of digital finance development, corporate governance practices, economic policy uncertainty, and social trust.

First, the development of digital finance can guide the microeconomic subjects in making scientific and reasonable business decisions and then impede the spread of real economic risks to the financial market, which is conducive to the healthy development of the bond market (Chen et al.,2021a). With artificial intelligence, big data, cloud computing, and new-generation information technology breakthroughs, and digital technology showing a strong innovative vitality, digital finance has emerged in recent years (Zhai et al., 2022). As Figure 1.1 shows, the average digital finance, the average coverage breadth, average usage depth, and the average degree of digitization indicator of 31 provinces annually symbolize the degree of development in digital finance. Digital finance development has advanced in China, and the index has increased approximately eight times from 40 in 2011 to 341 in 2020.

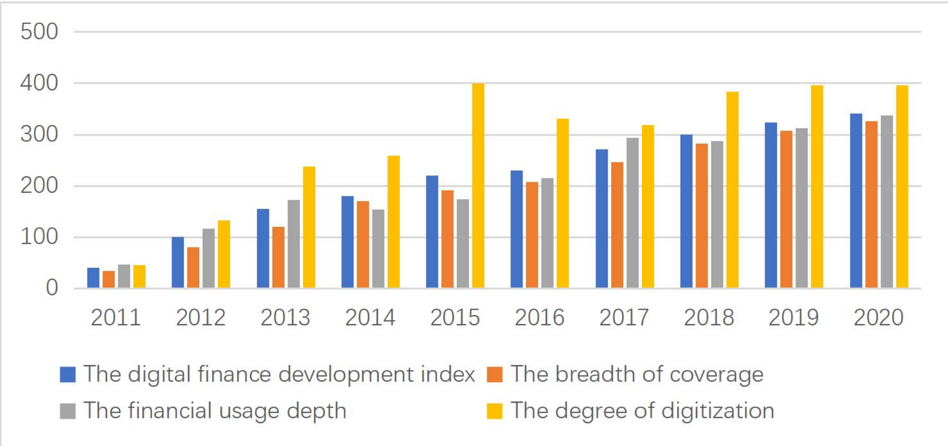

Figure 1.1 The Digital Finance Index and Three Different Dimensions
Source: Digital Financial Inclusion Index of Peking University https://idf.pku.edu.cn/docs/20210421101507614920.pdf

The development of digital finance has strengthened the effective distribution of financial products and services, shortened the spatial distance between corporations and investors, and facilitated relatively easy access to financial services at lower costs (Ren et al., 2023). Digital technology profoundly impacts the business model, process, and product development of the bond market, driving financial innovation and improving the efficiency and transparency of bond markets (Guo et al., 2020). As a new product formed by technology empowering traditional finance, the rapid development of digital finance has optimized the corporate bond financing environment. Moreover, solvency and willingness to pay are fundamental elements that affect the risk of corporate debt default. Digital finance can increase business resource support, improve business stability, and reduce business agency costs to improve the ability and willingness to repay corporate debt and reduce the risk of corporate debt default (Zhai et al., 2022). Digital financial coverage breadth and depth of usage significantly reduce the likelihood of corporate debt default, while the influence of the degree of digitization on the likelihood of corporate debt default is not significant. Clarifying the relationship between digital finance or different aspects of digital finance and corporate bond credit spreads is of great theoretical and practical significance for realizing digital finance to promote the high-quality development of China's economy.

Second, the risk of default by bond issuers is an essential factor affecting the development of the bond market, as a default by a bond issuer not only harms the interests of investors but may also lead to systemic risk. Corporate governance has been recognized as an effective mechanism for protecting the interests of investors and helping companies reduce their capital costs (Zhou et al., 2017). Suitable corporate governance mechanisms such as ownership structure, board governance, executive compensation, and information disclosure urgently need to be further explored. More specifically, the ownership structure can be interpreted in terms of ownership concentration and the nature of ownership. Ownership concentration is an essential factor influencing debt costs (Bradley et al., 2016), and state ownership of enterprises can help reduce corporate financing costs (Chatterjee et al., 2023).

Regarding board governance, the strength of board independence is more beneficial in lowering debt costs than expanding the board size (Anderson et al., 2004), and CEO duality in US firms was associated with higher yield spreads (Liu & Jiraporn, 2010). Concerning executive compensation, Kabir et al. (2013) indicate that a rise in executive pensions reduces bond yield spreads, but executive monetary compensation does not influence the bond yield spread. For information disclosure, a standard audit opinion enhances trust between the supplier and the business, reducing the cost of business credit (Orazalin & Akhmetzhanov, 2019). Examining the relationship between corporate governance, such as ownership structure, board governance, executive compensation, information disclosure, and corporate bond credit spreads, can help reduce the cost of capital for firms and contribute to improving the bond market.

Third, the rise of international trade protectionism and a series of external shocks, such as the new crown pneumonia epidemic, has brought challenges to China's economic development, and the government has adopted a series of policies to intervene and regulate the macro-economy (Huang & Chen, 2022). However, the complexity and unpredictability of the policy formulation, adjustment, and implementation result in economic policy uncertainty (EPU). Economic policy uncertainty, an essential source of uncertainty in the external environment for firms in transition economies, is an essential factor affecting a firm's business conditions and prospects, inevitably impacting its default risk (Lu et al., 2023). Economic policy includes a variety of policy forms, such as fiscal policy and monetary policy (Ma & Hao, 2022). Monetary policy uncertainty (MPU) are critical drivers of fluctuations in corporate credit spreads during the Great Moderation period (Caldara & Herbst, 2019). The exogenous fiscal policy uncertainty (FPU) positively in the US and negatively in the UK affects the credit spread (Cenesizoglu & Essid, 2012). This research about the impact of economic (monetary or fiscal) policy uncertainty on the credit spreads of corporate bonds in China contributes to the improvement of the risk pricing mechanism of corporate bonds and credit risk assets in the context of the normalization of defaults and is of great significance for the sound development of the bond market.

Figure 1.2 Economic Policy Uncertainty Index
Source:https://economicpolicyuncertaintyinchina.weebly.com/uploads/1/2/2/7/122762465/cnepu_202205.png

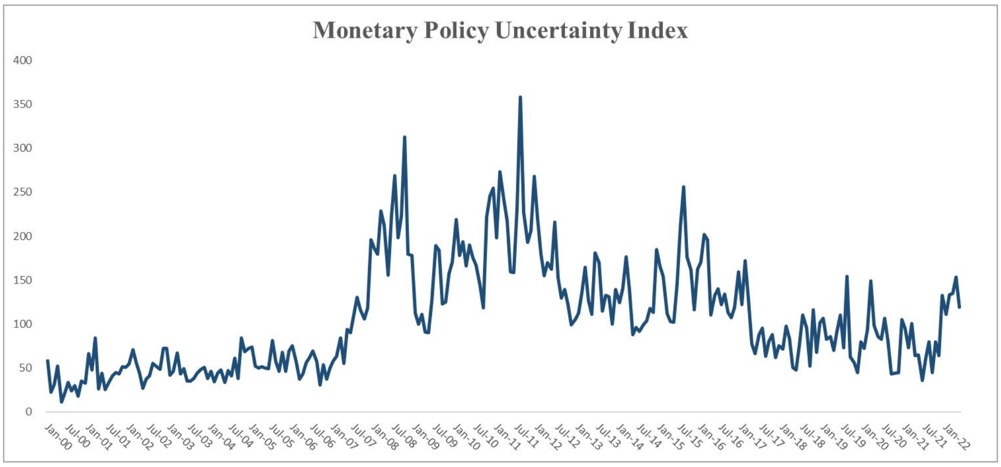

Figure 1.3 Monetary Policy Uncertainty Index
Source:https://economicpolicyuncertaintyinchina.weebly.com/uploads/1/2/2/7/122762465/cnepu_202205.png

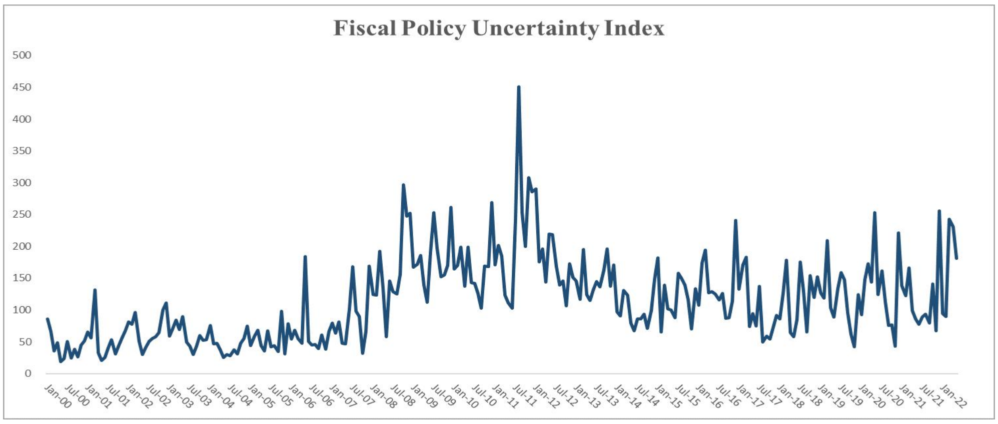

Figure 1.4 Fiscal Policy Uncertainty Index
Source:https://economicpolicyuncertaintyinchina.weebly.com/uploads/1/2/2/7/122762465/cnepu_202205.png

Figure1.2-1.4 illustrates pivotal moments. Following the Lehman Brothers' bankruptcy in 2008, the economy in China shifted from a stabilizing momentum to an overheating situation, and domestic institutional and structural challenges continued accumulating, making the EPU index reach approximately 213. Moreover, the central bank has cut deposit and lending rates and the reserve requirement ratio several times, which has caused the MPU to reach 312. Furthermore, FPU reaches 296, and the four-trillion fiscal package emerges. Another notable shift occurred in August 2015. The stock market experienced sharp rises and falls, leading to severe liquidity problems and an EPU of around 213. The government introduced a series of bailout policies to maintain market stability, and MPU and FPU increased to achieve 256 and 149. Since 2018, trade imbalance-oriented economic and trade friction between the U.S. and China caused foreign exporters to have limited output and product structure imbalance, which increased the downward pressure on China's economy and external uncertainty, making EPU, MPU, and FPU, respectively, climb 161, 115 and 153.

In 2020, the COVID-19 pandemic swept the world, and China's economy and financial sector suffered a significant shock. Monetary and fiscal policies focus on saving the paralyzed real economy in the short term and consider the long-term structural and institutional contradictions. The policy measures inevitably adjust the rhythm and strength, and the level of EPU, MPU, and FPU reached a localized high of 175, 105, and 220, respectively. In 2022, U.S. stocks experienced the most significant retracement since 2009, and the Federal Reserve began the most aggressive interest rate hikes in 40 years. The unexpected outbreak of the Russia-Ukraine conflict triggered sharp swings in the global economy. The EPU, MPU, and FPU in China are 234, 153, and 242, respectively. The central bank will pursue a prudent, flexible, moderate monetary policy. The government has adopted an active fiscal policy, and the Ministry of Finance (MOF) has issued in advance to all localities a new particular debt limit of about US$229 billion.

Fourth, the issue of trust in bond markets is critical, and mitigating risks in the bond market focuses on avoiding a breakdown in investor trust (Li et al., 2020). Compared with the bank credit market, the bond market has many dispersed investors, and the phenomenon of investor free-riding makes the problem of information asymmetry in the bond market even more severe. Moreover, the credibility of China's bond credit rating agencies is highly questionable, which makes it difficult to effectively mitigate the problem of information asymmetry in the bond market (Jiang & Ban, 2021). Furthermore, bond markets require relatively few formal institutions, such as legal and political systems, which leads to a more critical role for informal institutions, such as trust. In addition, trust is a public good at the regional level. Many bond defaults in China in recent years have caused bond investors to distrust some enterprises and have even spread to other enterprises in the same region due to the lack of trust (Chen et al., 2024). A harmonious and civilized society should be a society of high trust (Li et al., 2020a). This research examines the vital role of deep-seated cultural factors or informal systems, such as social trust in the bond market, and enriches the exploration of the economics of trust.

Fifth, as a critical indicator of an enterprise's economic strength and market position, the firm size is related to its development potential and competitiveness (Ozcan et al., 2017). Enterprises of different sizes differ in market competition, optimal allocation of resources, risk management, regulatory adaptability, and social influence (Ren et al., 2023). It is necessary to fully account for the firm size in formulating business strategies and management decisions to achieve sustainable business development (Swastika, 2013). The financing and development situation of small-sized companies is related to the structural transformation of China in the face of economic downward pressure and the new economic normal, as well as to the goal of high-quality economic development (Huang et al., 2021). However, the difficulty of financing in small-sized companies always exists due to size discrimination from financial institutions, and the problem of financing restricts the development of small-sized companies. Digital finance has brought about third-party and mobile payments, smart credit, online credit, equity crowdfunding, financial cloud services, and other financial consumption methods that have greatly extended the reach of financial services such as traditional payment, lending, and securities services, and reduced the cost of financial services (Guo et al., 2020). The long-tail effect of digital finance is expected to ease the access of small-sized companies to finance fundamentally and achieve long-term business development of small-sized companies. Therefore, it is worth exploring the moderating effect of firm size on the relationship between the level of digital finance development and credit spreads of corporate bonds.

Sixth, the level of financial development is an essential indicator of the maturity of a region's financial system and the efficiency of its services, which is directly linked to the frequency of financial operations in the region and the adequacy of the formal system related to financial activities (Hasan et al., 2017). Curbing corporate bond default risk and maintaining the stability of financial markets can be achieved by building both informal systems, such as social trust, and formal systems, such as the level of financial development (Meng & Yin, 2019). The predominance of formal systems and social trust can depend on economic development and the division of labor in society (Zhang, 2002). In the early stages of economic development, the market system and the legal environment had many deficiencies, so social trust was largely able to compensate for the deficiencies of the formal system. However, as the economy develops and the level of market institutions and legal governance subsequently increases, the laws and rules will gradually replace the governance role of social trust (Li et al., 2018). Hence, this research will further explore how the level of financial development moderates the relationship between social trust and credit spreads of corporate bonds in China.

Therefore, according to actual conditions in China, from the perspective of the level of digital finance development, corporate governance, economic policy uncertainty, and social trust, the determinants of credit spreads on corporate bonds will be further explored.

1.3 Problem Statement

The report from the 19th China Communist Party Congress advocates an increase in direct financing and the enhancement of the multi-level capital market (Chen et al., 2021a). The bond market, a pivotal element of direct financing, is essential in reforming and liberalizing the financial sector because it broadens enterprise financing channels, optimizes the financing structure, improves the efficiency of resource allocation, and attracts international capital. Specifically, corporate bonds are crucial components with a strategic role in the future development of China's financial industry, providing a nuanced reflection of market factors such as enterprise credit status and investor risk sensitivity (Xie et al., 2018). The corporate bond market adopts the credit rating mechanism, bond prices and yields, and market reactions to present the credit status of enterprises, and investment choices of investors, bond market fluctuations and adjustments in investment strategies present investors' risk sensitivity (Chen et al., 2021a). These two factors mutually influence and interact, constituting the bond market's complex and dynamic operation mechanism.

China's exchange corporate bond market, established in 2007, remains immature regarding bond issuance, trading, and information disclosure (Peng et al., 2021). The inadequate information disclosure hinders investors from staying informed about firm dynamics, so investors favor government and financial bonds from the China Development Bank rather than corporate credit bonds (Zhang & Liu, 2021). With the rigidity of the bond market broken in 2014, the corporate bond market defaults have become increasingly severe and even led to systemic risk in financial markets (Zhang & Liu, 2021). The rollover size of the bond market exceeded 200 billion yuan in 2022 and 2023, so there may also be a delay in credit risk (Wang, 2023). Moreover, influenced by factors such as weaker anti-risk ability and complicated external financing environment, private enterprises are still the principal defaults, accounting for more than 60% of the defaults. Furthermore, the balances of real estate and industrial defaulted bonds were 406.24 billion yuan and 200.19 billion yuan, and the balances of bonds of other industries were below 100 billion yuan. In addition, the absence of self-assessment capabilities and technology among individual investors exposes them to more significant losses from credit risk (Liu, 2015).

Corporate bond financing has become the second largest financing channel for real enterprises, except for bank loans (Wang & Gao, 2017), but it has insufficient support for real enterprises in China, from 11.5% in 2016 to 8.35% in 2023 (Wang, 2023). Moreover, the pricing of corporate bonds is critical to secondary market circulation and poses a core challenge in developing the bond market. Existing bond pricing models, including structured and simple models, face limitations in thoroughly estimating bond prices, leading to the credit spread puzzle (Lei & Xu, 2020). The credit spread of corporate bonds, representing the difference between the yield of corporate bonds and the risk-free rate, is central to pricing corporate bonds and reflects the higher or lower credit risk, default risk, and financing cost for the corporate bonds (Lei & Xu, 2020). Hence, it is worth studying the credit spreads of corporate bonds in China.

Compared to advanced countries, the study of the determinants of credit spreads of corporate bonds remains insufficient in China (Kaviani et al.,2020). The prior studies mainly explore the impact of inflation rate and policy factors at macro level (Nejadmalayeri et al., 2013; Kaviani et al., 2020) and credit rating, executive experience, customer concentration, corporate social responsibility, and operating risk in micro level (Ziebart & Reiter, 1992; Lin et al., 2018; Wang & Gao, 2017; Nakashima & Saito, 2009; Zhou et al., 2020; Hsu et al., 2015) on credit spreads. Integrating micro and macro factors contributes to a more comprehensive understanding of the determinants of the bond credit spreads, reveals their interactions and mechanisms at different levels, and enhances the depth and breadth of the study. Therefore, it is essential to ascertain the novel factors influencing the credit spreads of corporate bonds from the micro level, such as the level of digital finance development and corporate governance, and the macro level, such as economic policy uncertainty and the social trust system in China.

First, digital finance essentially belongs to finance and is not detached from the negative externality and pro-cyclicality of financial risk (Ji et al., 2022). Under the effect of advanced technology and networked transmission, it is very likely to significantly increase the sudden probability of risk contagion and the amplitude of volatility, expand the risk exposure of the real economy, and ultimately influence the corporate financing environment (Lv et al., 2022). Meanwhile, digital finance poses significant regulatory challenges. The current financial regulatory framework is based on prudential regulation, functional regulation, and behavioral regulation, but it is limited by lagging regulatory technology, which makes it difficult to effectively monitor digital financial innovation activities. Coupled with the fact that some firms that are not engaged in financial business but have a significant impact on financial stability still reside outside the regulatory framework, this has led to the continued exposure of regulatory loopholes and the expansion of financial risk exposures (Xu et al., 2023). The rise in financial risks will inevitably raise the risk aversion of financial investors, which will ultimately affect the stability and sustainability of the bond financing of real enterprises. An in-depth study of the level of digital finance development and credit spreads of corporate bonds is essential for systematically assessing emerging financial modes' effectiveness in alleviating enterprise financing difficulties.

In China, Huang et al.(2021) found that the total assets of firms with less than 13.3 billion dollars are small-sized companies, but those with more than this value are considered large-sized companies. Traditional financial institutions have a significant tendency to consider firm size, and firms of different sizes may have different resources and capabilities (Huang et al., 2021). Various types of digital finance innovation constantly try to carry out regulatory arbitrage, and the actual effect of digital finance services on small-sized enterprises' financing can be significantly reduced (Xu et al., 2023). Therefore, whether or not firm size as a moderating variable can affect the relationship between digital finance and credit spreads is worth studying.

Second, the corporate governance situation, such as ownership structure, board governance, executive compensation, and information disclosure in China, differs from that of other countries. Unlike the UK and the US, high ownership concentration is common among listed companies in China and the principal-agent problem between controlling shareholders and small and medium-sized shareholders has become a significant governance problem (Huang, 2020). The average shareholding ratio of the first largest shareholder of A-share listed companies in China reaches about 40 percent, which is much higher than 20% of developed economies such as the United Kingdom, the United States, Japan, Canada, and South Korea (Wang, 2023). Moreover, agency problems are severe in state-owned enterprises and the critical reason for the default events of private enterprises such as Yabang Group and Yurun Group is the occurrence of actual controller risks in the historical default cases (Chen, 2019). Conflicts between the company's board of directors and management continually have occurred, such as the internal fight between the managerial level and the board of directors of Dalian Shengya (Gao & Liu, 2022). In addition, accounting standards and auditing services do not effectively safeguard the interests of shareholders and do not result in high-quality information disclosure (Zhang et al., 2020). Based on these issues, this study examines the effect of ownership structure, board governance structure, executive compensation, and information disclosure on the credit spreads of corporate bonds in China.

Third, the economic policy uncertainty index increased from 38.2 in Jan of 2000 to 160.27 in Jan of 2022, which increases the external environmental risks firms face, negatively affecting their solvency and operation performance and exacerbating the likelihood of bond defaults (Jin & Wen, 2020). Especially in the US, the unexpected adjustments of the monetary policy target interest rate are positively correlated with the bond credit spreads (Cenesizoglu & Essid, 2012), and 40% of economic policy uncertainty was derived from fiscal policy uncertainty (Baker et al., 2016). This research further explores how the increase of economic policy uncertainty or different aspects of economic policy uncertainty affect bond defaults in China.

Fourth, the insufficient supply of social trust and its inherent imbalance in development are severe (Wu et al., 2016a), and the social trust index ranges from 0.655 to 0.869 (Jiang & Ban, 2021). The frequent occurrence of scandals has prevented investors from establishing a relationship of trust with the bond market, which has directly led to a situation of low investor participation and low participation efficiency in China's bond market (Li & Zhang, 2022). Corporations in the UK and Germany with a higher level of societal trust have lower bond yield spreads and the cost of borrowing debt (Meng and Yin, 2019). Therefore, it is very worthy to explore further the relationship between social trust and credit spreads in China.

The sustainable development of the bond market cannot be achieved without the cultivation of informal systems and the construction of formal systems (Qiu & Cheng, 2021). During China's social transformation, the formal system remains inadequate. Although China has a unified system for enforcing the legal system, the level of financial development is not consistent between regions, and there are considerable differences in the effectiveness of law enforcement (Qiu & Cheng, 2021). Social trust and the level of financial development may substitute or complement for each other (Álvarez-Botas & González, 2021). Thus, the level of financial development (formal system) as a moderating effect may affect the relationship between the social trust (informal system) and credit spreads of corporate bonds, which is not considered by prior empirical studies.

In conclusion, this study addresses the issues above and challenges, examining factors influencing credit spreads to reduce corporate bond credit spreads. Moreover, the research further seeks to enable investors to evaluate the rationality of corporate bond prices, elevate awareness of corporate bonds, and contribute to the sustainable development of the bond market in China.

1.4 Research Questions

This study will respond to the following research questions.

1. Does the level of digital finance development affect the credit spreads of corporate bonds in China?

2. Does corporate governance influence the credit spreads of corporate bonds in China?

3. Does economic policy uncertainty affect the credit spreads of corporate bonds in China?

4. Does social trust influence the credit spreads of corporate bonds in China?

5. Does the firm size moderate the relationship between the level of digital finance development and credit spreads of corporate bonds in China?

6. Does the level of financial development moderate the relationship between the social trust and credit spreads of corporate bonds in China?

1.5 Research Objectives

This research respectively examines the influence of the level of digital finance development, corporate governance, economic policy uncertainty, and social trust on the credit spreads of corporate bonds in China. Moreover, this research separately examines the interaction effects of firm size and the level of financial development on the relationship involving the credit spreads of corporate bonds in China.

Therefore, this research attempts to achieve the following objectives.

1. To examine the impact of the level of digital finance development on the credit spreads of corporate bonds in China.

2. To evaluate the effect of corporate governance on the credit spreads of corporate bonds in China.

3. To analyze the effect of economic policy uncertainty on the credit spreads of corporate bonds in China.

4. To examine the impact of social trust on the credit spreads of corporate bonds in China.

5. To examine the moderating effect of the firm size on the relationship between the level of digital finance development and credit spreads of corporate bonds in China.

6. To examine the moderating effect of the level of financial development on the relationship between the social trust and credit spreads of corporate bonds in China.

1.6 Scope of the Study

The scope of this study incorporates the determinants of credit spreads of corporate bonds in the Chinese exchange bond market from 2011 to 2020. The description of this scope is reasonable for the following reasons.

First, China's bond market has gone through four major stages such as germination, start-up, consolidation, and accelerated development, since the Ministry of Finance resumed the issuance of treasury bonds in 1981. During this process, with the increase in market demand and the deepening of the financial market, the bond market has gradually formed a diversified structure. The exchange bond market and the interbank bond market co-exist in China, which is totally different from other countries. The exchange bond market started early in China in the early 1990s, while the interbank bond market was gradually established after 1997. The exchange bond market, including the Shanghai and Shenzhen Exchange markets, is an essential venue for bond issuance and trading, while the interbank bond market is an important channel for monetary policy transmission. Therefore, to explore the factors that influence bond credit spreads, this research will use data from the exchange bond market.

Second, compared with mature bond markets in advanced countries, China's corporate bond market started late in 2007 but developed rapidly. In recent years, with the continuous growth of China's economy and the deepening of the financial market, the corporate bond market has become an essential part of China's capital market, with its scale and influence expanding. Therefore, it is essential to comprehensively study the factors affecting credit spreads of corporate bonds from the four aspects of the level of digital finance development, corporate governance, economic policy uncertainty, and social trust to understand the operating mechanism and risk characteristics of Chinese financial market. Due to the uniqueness and complexity of the Chinese market, the research cannot gain some data from social trust and digital finance after 2021 and before 2011 and only explores the actual situation from 2011 to 2020, which provides valuable insights for other emerging markets.

1.7 Motivation of the Study

The study of corporate bond credit spreads has essential academic value. By constructing theoretical models and empirical analysis, the formation mechanism and influencing factors of credit spreads can be explored to provide new perspectives for research in finance and economics. The new research results not only enrich the theoretical finance system but also provide more scientific guidance for bond investment and risk management in practice. Most studies on corporate bond credit spreads focus on traditional financial factors, such as macroeconomic indicators and corporate financial conditions. This study aims to fill this research gap to a large extent and reveal new trends and internal patterns in financial markets. This research promotes academic and theoretical innovation in related fields by comprehensively introducing emerging factors such as three aspects of digital finance such as coverage breadth, usage depth and the degree of digitization, four aspects of corporate governance such as ownership structure, board governance, executive compensation and information disclosure, two aspects of economic policy uncertainty such as the fiscal or monetary policy uncertainty and social trust, and moderating variable such as firm size and the level of financial development.

Based on this, studying the determinants of credit spreads of corporate bonds helps financial institutions better assess enterprises' credit risk or default risk and provides more accurate and efficient financing services for the real economy. This research can identify key factors affecting market stability to provide policy recommendations and risk warnings for regulators, help to maintain the stability and healthy development of the financial market, optimize the allocation of marketresources and improve market efficiency.

1.8 Significance of the Study

The current study has theoretical significance, practical significance, and methodology significance.

The theoretical significance includes the four aspects. First, it extends the literature on the impact of digital finance development, corporate governance, economic policy uncertainty, and social trust on the credit spreads of corporate bonds. With the rapid expansion of corporate bonds in China, investors are more interested in bond investments, and the trading and investment of bonds will become more active. At present, the literature reviews of the influence of digital finance development and different dimensions of digital finance development, such as the breadth of coverage, the usage depth, and the level of digitization on credit spreads of corporate bonds, remain rare, which provides the opportunity to fill this study gap. Moreover, the literature reviews of the effect of corporate governance and different dimensions of corporate governance, such as ownership structure, board governance, executive compensation, and information disclosure on credit spreads, get very little attention in previous empirical studies. Furthermore, this present study broadens the understanding concerning the influence of economic uncertainty policy and different dimensions of economic policy uncertainty on the credit spreads of corporate bonds. In addition, the study will give empirical support for the missing link between social trust and corporate bond credit spreads, which can significantly contribute to the current theoretical study.

Secondly, depending on the viewpoint of corporate heterogeneity, the present study examines the interaction influence of the firm size on the link between the level of digital finance development and credit spreads of corporate bonds. Previous studies suggest that firm size as an interaction variable affects the association, such as between the level of digital finance development and financing constraints and between the level of digital finance development and corporate debt financing costs. The findings will broaden the understanding of whether size discrimination interacts the association between the two.

Third, the present study provides evidence of the unexplored interaction influence of the level of financial development on the relationship between social trust and credit spreads. Previous studies mainly found that the level of financial development as an interaction variable can influence the relationship between trust and the cost of equity and the relationship between trust and the credit spreads of municipal bonds. Therefore, the study will enhance the understanding of whether the level of financial development affects the relationship between social trust and credit spreads of corporate bonds in China.