

Article

Impact of Nonstandard Default Risk of the Urban Investment and Development Companies on the Urban Investment Bond Market

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Abstract: Under the general trend of reducing leverage and strictly controlling new implicit debts of local governments, the risk of nonstandard defaults by urban investment and development companies (UIDCs) continues to be released, which will increase the credit risk of UIDCs. This paper examines the impact of nonstandard default events of municipal investment platform companies on the urban investment bond (UIB) market through event analysis using 252 nonstandard default events of 32 municipal investment companies from 2018 to 2021 as sample data. The findings show that the UIB market is ineffective and affected by nonstandard defaults and that bond returns show abnormal short-term significant negative fluctuations. This study has important implications regarding the early warning of UIB default risk and the improvement of the sustainable development of urban investment enterprise financing.

Keywords: investment and development companies; urban investment bond; nonstandard default events; event study; sustainable development



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1. Introduction

In China, local governments actively participate in the market through urban investment and development companies (UIDC), known in Chinese as chengtou [1]. As a distinctively Chinese institution, the core function of the UIDC is to take charge of the investment and construction processes in urban and infrastructure projects [2]. The UIDC plays an essential part in the China's urbanization strategy [3]. Accordingly, the Winder database shows the number of UIDCs exceeded 3000 in 2022.

UIDCs in China mainly obtain financing through the following three methods: bank loans, urban investment bonds (UIBs) [4,5], and nonstandard financing. In China, UIBs are closely related to the government, which is an arrangement sharing similarities with municipal bonds in the United States [6]. At present, there is a wealth of research on UIBs, which focuses on the risk [5], the flow and stock [7], the price [8], the issuing spread [9], and regulatory policy.

In contrast to UIBs, nonstandard financing consists of debt assets that are not traded in the banking and securities trading markets, which includes credit assets, trust loans, entrusted claims, promissory notes, and accounts receivable [10]. Nonstandard financing is not limited by quotas and is not strictly controlled by regulatory authorities. This makes it difficult for traditional regulatory frameworks to effectively identify risks in the funding chain [11]. Therefore, nonstandard financing defaults have occurred frequently in China [12]. By the end of 2021, urban investment nonstandard defaults occurred in 14 regions, including Guizhou Province, Sichuan Province, Jilin Province, and Anhui Province. Thirty-two prefecture-level cities (states) and eighty-eight financing platforms were involved, and the total frequency of default events was approximately 167.

Regarding nonstandard financing, a growing number of studies have highlighted the issues regarding the assessment of nonstandard financing [13]. Some studies focused narrowly on the impact of non-standard financing on interest rate spreads [4]. Some studies simply linked proxies for nonstandard financing directly to economic outcomes such as the volume of bank lending [14]. Other studies examined how non-standard measures affect banks' risk exposure [15]. However, there are few studies examining nonstandard defaults and their possible impact on UIBs as well as the transmission of default risk.

In fact, the prices of UIBs issued by UIDCs also have significant abnormal fluctuations around their default dates. For example, according to information from Enterprise Alert, the nonstandard default date of Guizhou Xinpu Economic Development Investment Co., Ltd. was 1 March 2020, and the UIBs "19 Xinpu 02", "19 Xinpu 03", and "19 Xinpu 05" issued by the company in the same period showed significant abnormal fluctuations; Zunyi Honghuagang City Construction Investment Operation Co., Ltd. experienced nonstandard default on 1 February 2020, and its issued UIBs "17 Honghuagang Parking Lot Bond 01", "PR Zunhong City", and "16 Zunhong UIB" also experienced abnormal price fluctuations during the same period. Accordingly, this paper examines the relationship between the price of UIBs and nonstandard defaults based on an event study approach. Then, this paper argues for the effectiveness of the UIB market; namely, the UIB market will react to insider information regarding nonstandard defaults of UIDCs. This is important for the early warning of UIB default risk and the improvement of the sustainable development of urban investment enterprise financing.

This paper is organized as follows: Section 2 presents the theoretical foundation and research hypotheses. Section 3 provides a detailed description of the data source. Section 4 presents the proposed research methodology, and its related quantitative analyses and results are presented in Section 5. Section 6 presents the implications of this research. Finally, the last section consolidates the research performed in the form of conclusions.

2. Literature Review

2.1. UIBs

Scholars customarily refer to UIBs as "quasi municipal bonds", and the volume of the literature discussing this issue is relatively large. In terms of issuing subjects and composition structure, it is the issuing subjects that are defined as local financing platform companies [16] with implicit support from the central government [17], while the specific content includes corporate bonds, medium-term notes, and short-term financing bonds issued to raise financing for local urban construction or public welfare projects. As a standardized financing instrument with uniform regulatory regulations and rating initiatives, the issuance process is highly transparent and subject to stringent issuance conditions, and researchers have conducted both qualitative and quantitative analyses employing relatively consistent standards and easily available data [18].

The development of UIBs as a refinancing tool has been very strong [19]. In response to the rapid growth of UIBs, experts and scholars have unanimously suggested that the main reason for this strength is that the issuance of UIBs is significantly influenced by the government and its financial situation. First, the scale of UIB issuance is positively correlated with the promotional degree of local officials [20]. In addition, if local government officials' positions change more steadily, the cost of issuing debt will be relatively lower and, therefore, expand the size of UIBs [21]. In addition, concession revenue from land-use rights' and fiscal pressure will change the impact of economic growth pressure on UIB issuance [22].

Regarding the trends in the development of UIBs, UIBs issued by local-government financing vehicles (LGFVs) carry implicit governmental guarantees and, therefore, enjoy lower return spreads. The recent policy change introduced by the Chinese central government to regulate local government debt-financing activities has significantly reduced the return spread between LGFVs and bond issues. This policy change introduced by the Chinese central government, which aims to regulate local government debt-financing

activities, has significantly weakened the implicit governmental guarantee of UIBs, reduced the return spread between bonds issued by UIDCs and POEs, and made China's UIB market more market-oriented [23].

The rapid growth of UIBs as a standardized financing instrument for UIDCs has been accompanied by the possibility of potential credit risk emergence or even spillover, while a large number of bonds are issued by financing platforms [24]. The risks of UIBs can be broadly classified as over-issuance-debt risk, uncertainty risk of repayment liability, liquidity risk, own low profitability risk, and credit-rating risk [25]. Thus, the discussion on the issue of UIBs' risks is widening, and both land-hoarding size and land price have been found to exhibit positive effects on the size and risk of UIBs [26]. In addition, anticorruption significantly increases the credit risk that urban bond issuers face [27]. The credit risk of UIBs is not only related to the operation and financial status of the urban investment platform but also depends on the implicit guarantee of local governments [28].

However, in general, the compound interest approach of UIBs improves bond ratings [29]. In other words, the reputation mechanism of UIB underwriters can effectively reduce the price difference of bond issuance, reduce the information asymmetry between investors and issuers, and effectively solve the problem of informational asymmetry [8]. Additionally, the issuance of UIBs can give full play to the potential financial advantages of financing platforms and have positive promotional effects on other financing businesses of UIDCs under the role of credit scales [30].

2.2. Nonstandard Financing

The concept of nonstandard debt assets was first clearly introduced in 2013, when the China Banking Regulatory Commission issued the "Notice of the China Banking Regulatory Commission on Issues Relating to the Regulation of Investment Operations of Commercial Bank Wealth Management Business", which defined it as "debt assets that are not traded in the interbank market and stock exchange market are called nonstandard debt assets".

With respect to previous studies, fewer papers have been published that are directly related to the "nonstandard financing" of UIDCs. In recent years, the regulatory policies of different governments regarding nonstandard financing have been gradually tightened. In Europe, and especially in Poland, the formal mechanisms for reducing local governmental nonstandard financing debt have been significantly strengthened [31]. Meanwhile, in China, the ban on nonstandard financing by the Chinese government is also well documented [32,33]. Starting with the proposition of the China Banking Regulatory Commission regarding "nonstandard regulation" in Document No. 8 in 2013, regulators have gradually reduced the size of the stock of nonstandard assets and reduced the inflow of nonstandard funds to the point of breaking up the regulation in April 2018. From the "New Regulation on Asset Management" in April 2018, which ended rigid payments, to the "New Regulation on Wealth Management" in September of the same year, which restricted commercial banks, and on to the "New Regulation on Trust Plans" in May 2020, which also proposed the investment scale of trust plans to the "New Trust Regulations", etc., the regulatory authorities have continued to issue policies to ban nonstandard asset pools, prohibit maturity mismatches, and strictly limit channel business.

Even though the control policies are binding, the risk of nonstandard financing remains high. Many nonstandard financing instruments have a common feature in that they are not subject to public finance principles that introduce mechanisms. The high financing risks of nonstandard financing pose a threat to the financial stability of local governments and the solvency of the units [34]. Additionally, the institutional environment and the start-up phase of institutional void development in the nonstandard financing market exacerbate risks by providing inadequate protection for investors and borrowers. In addition, the risk of nonstandard financing is well hidden [10,35]. Banks with higher growth in nonstandard debt investments or wealth management products will invest more money in nonstandard debt instruments. This suggests a mutually reinforcing effect between nonstandard debt investments and wealth management products and that banks with higher risk are more

motivated to issue wealth management products to remove their positions from their balance sheets and hide their risks [36].

The frequent use of nonstandard financing instruments can also lead to more serious consequences. Firstly, nonstandard financing can cause an increase in local governmental debt. The use of nonstandard financial instruments by local government units not only leads to the incurrence of contractual costs that are much higher than the market costs but also creates the risk of invisible long-term debt [37]. Secondly, the consequences associated with the use of nonstandard financial instruments by local government units involve small penalties for violating public financial disciplines, which may force authorities to make decisions that result in the deterioration of their financial situation and overburdening. Thirdly, nonstandard financing has a negative impact on banks' independence. Based on the Cukierman method, it was found that the implementation of nonstandard financing in 2017 had a negative impact on the legal and actual independence of UK banks [38]. Finally, nonstandard financing instruments can also have adverse effects for private users. Local firms tend to use nonstandard financing instruments [39]. However, the disadvantage of this model is the limited amount of capital, which will have an impact on the productivity and operations of the firm [40,41].

2.3. The Event Studies

The event study method is one of the most important methods used for testing market validity and is also widely used to study the impact of a particular event on the market. The event study method, also known as cumulative excess average return analysis, takes the impact of time-series price data as the object of study, calculates the abnormal excess return during the artificially set window around the event's public date, and uses the paired T-test to determine the cumulative excess average return deviation from zero to obtain conclusions about the impact of the event information.

In the 1930s, the impacts of stock splits on the nominal price of stocks under different time data nodes were studied. This method of studying the impacts caused by specific events and their extent began to emerge in the field of finance [42]. Then, the theoretical system of the event study method was enriched, and the subject of study was further abstracted from the impact on the market value of a company to the impact of a specific type of event on a specific field, and more disciplines—such as accounting, sociology, and law—were involved [43,44]. At the beginning of the 21st century, the event study method was widely used in the field of securities market effectiveness testing, mergers, and the acquisitions of listed companies and accounting research [45]. Scholars have widely used the event study method to study the impact of a particular event on the macro market due to its deep mathematical and statistical foundation, clear logic, and simple calculations. For example, in the financial field, the event study method can also be used to study takeover markets and the impact of mergers on the shareholder returns of constituent firms [46]. There is an inextricable relationship between the properties of daily stock returns and the characteristics of these data and the event study method [47]. Further, the efficiency of several methods was tested and used to measure bond price performance from monthly and daily data pertaining to company stock prices, wherein the monthly data had some advantages over daily data [48]. In addition, the relationship between capital flight and political instability can be studied using the event study methodology widely used in the financial literature. The advantage of using this methodology is that the relationship can be examined more closely by isolating specific instances of political instability (defined as events) [49]. In the field of accounting, the event study methodology significantly contributes to strategic research and can be used to analyze the financial impact of single-country corporate announcements [50].

The event analysis method assumes that all investors remain rational, and in such a case, the securities market is perfectly efficient. Investors cannot obtain any excess returns from technical and fundamental analysis [51]. The purpose of this premise is to ensure that the effect of an event can be measured in terms of excess returns, and similarly, that the

cumulative excess average return can be used as the discriminant variable for the effect of an event occurring within a window of time, thus quantifying the effect into data form, and hence the need for the assumption that the market is efficient.

In summary, the following conclusions can be drawn from the review of UIBs and nonstandard financing: Firstly, UIBs are developing rapidly and have a unique “credit anchor” role. Secondly, although nonstandard financing is bound, it is still essentially a “default risk bomb”. As mentioned in the previous paper, there has been little research on “nonstandard financing” and nonstandard defaults of UIDCs in recent years, so this paper will fill the gap in this area. Based on previous research, this paper focuses on the impact of UIDCs’ nonstandard default events on the UIB market and then demonstrates the effectiveness of the UIB market.

In addition, in the review of the empirical theory and its methods, it can be observed that the event study method and market validity test are the more matured methods. Although event studies in the financial field have not yet involved the UIBs market, the previous studies are still a direct guide for the impact analysis of nonstandard default events and the validity testing of the UIBs market. Therefore, this paper will use the event studies method to further investigate the intrinsic relationship between UIBs and nonstandard financing in greater detail.

2.4. Hypotheses

According to our literature analysis, nonstandard financing is a hidden debt of UIDCs, and it carries a high level of risk [41–43]. Agarwal and Zhang argued that when firms experience payment pressure, nonstandard assets with higher payment frequency are more likely to default [52]. Public information on nonstandard defaults can create difficulties with respect to UIDCs’ ability to refinance, which can cause a degree of liquidity crunch that will eventually transmit this risk to the UIB market. Accordingly, the first hypothesis of this study is as follows.

H₁: *The nonstandard default events of UIDCs will have a significant impact on the UIB market.*

Furthermore, the event study approach is the one of the most effective methods for testing the validity of the market [45]. Event studies assume that all investors remain absolutely rational, in which case the securities market is perfectly efficient [51]. That is, investors cannot obtain any excess returns from the information reflected in the market. To facilitate the quantification of the impact of nonstandard defaults on the UIB market, this paper proposes the second hypothesis, as follows.

H₂: *The UIB market is a fully efficient market.*

3. Data Source

In this paper, the object of the empirical analysis constitutes the nonstandard default events of UICs and the main focus is the impact of these nonstandard default events on the UIB market. The data samples required for the empirical study include the data concerning the nonstandard default events of UIDCs and the market data on UIBs, among which the data concerning the nonstandard default events of UIDCs were released on the “Local Debt Link” platform by China Chengxin International Credit Rating Company Limited (hereafter referred to as CCRI), which serves as the main source of information. As the first national credit rating agency approved by the People’s Bank of China, the data sourced from the CCRI is relatively reliable; thus, 50 nonstandard default events of 32 UIDCs from 2018 to 2021 were collected.

After determining the UIDCs that have experienced nonstandard default events and their corresponding default time points, the next step is to find the corresponding sample data issued by the UIBs. Based on the flush system, this paper collects a total of 125 UIBs for 32 UIDCs (see Appendix A). In addition, the daily data on the return to maturity

of the UIB market issued by China Bond Credit Rating Co. are selected as the market sample information.

Since UIDCs with nonstandard default situations may have multiple default points that occur at the same time and issue multiple UIBs at the same time, each UIB is divided in the new UIB sample collection according to the default time point. The process of constructing the UIB sample is shown in Figure 1. By combining 125 UIBs with 50 default time points, a total of 252 nonstandard default samples of UIBs were obtained after disassembling bonds with multiple default points.

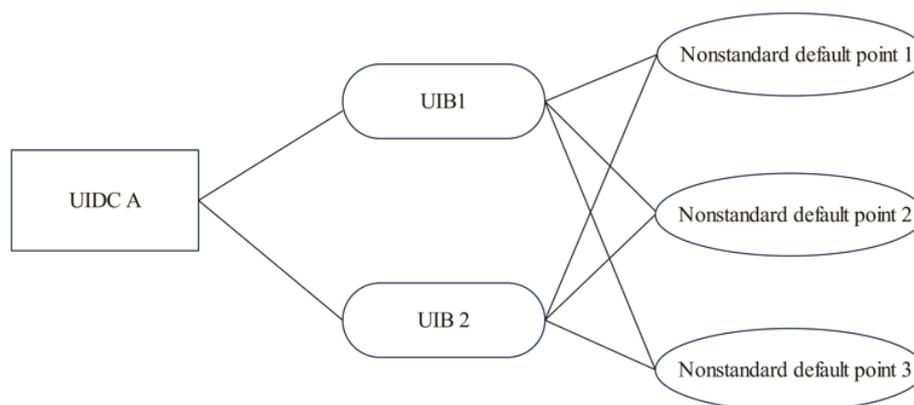


Figure 1. Schematic diagram of the sample construction process of UIBs.

Based on this, the initial samples need to be further screened according to certain screening conditions, with the specific screening flow shown in Figure 2.

In Figure 2, filter criteria 1, 4, and 5 are control conditions regarding informational integrity, and criteria 2 and 3 are control conditions concerning default behavior. The specific sample-screening process is shown below.

Filter criterion 1 entails excluding the sample of UIDCs that have not issued UIBs. This results in the intermediate sample 1, specifically, a sample of 186 nonstandard default events of UIBs, 25 UIDCs, and 41 default time points.

Filter criterion 2 states that the distance between the public date of nonstandard default events of the same UIDC should not be less than 4 months, and if the two default events are closer together, the one with more complete relative data will be retained. This results in the intermediate sample 2, specifically, a sample of 186 nonstandard default events of UIBs, 25 UIDCs, and 34 default time points.

Filter criterion 3 entails excluding samples where large events such as executive changes, major acquisitions, and mergers occurred during the window period. This results in the intermediate sample 3, specifically, a sample of 124 nonstandard default events of UIBs, 23 UIDCs, and 29 default time points.

Filter criterion 4 entails excluding samples with incomplete return-to-maturity data within the window period. This results in the intermediate sample 4, specifically, a sample of 87 nonstandard default events of UIBs, 20 UIDCs, and 29 default time points.

The filter criterion 5 entails excluding samples with unclear ratings and issue year data for UIBs. In this way, the final sample is formed, including 65 nonstandard default events of UIBs, 20 UIDCs, and 26 default time points, as shown in Appendix B.

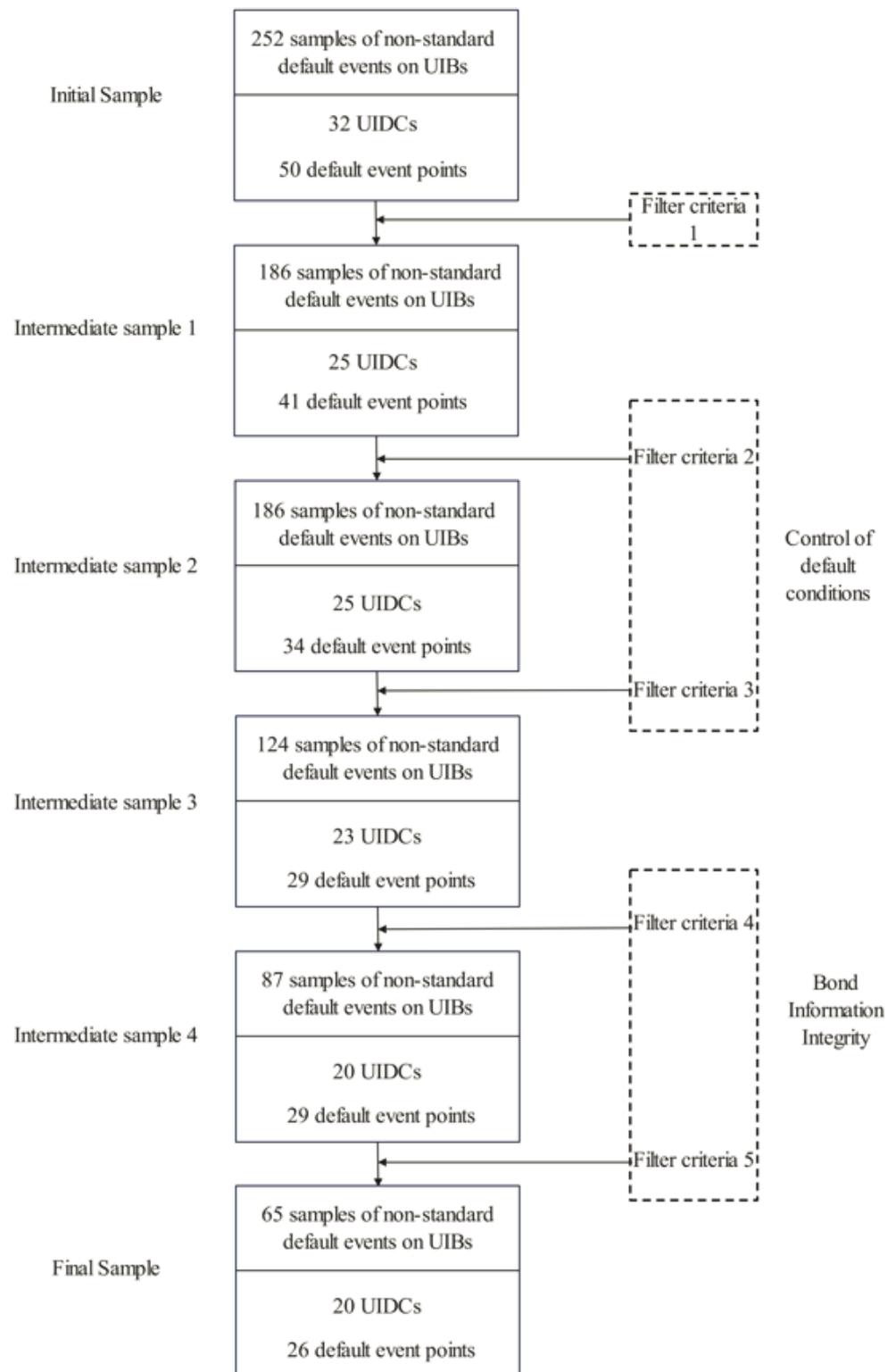


Figure 2. Flow chart of sample screening.

4. Research Methodology

In addition to being one of the important methods for performing market validity testing [45], the event study method is also widely used to study the impact of a particular event on the market [53]. In this paper, for 65 nonstandard default events of UIBs, the time

point of each event of UIDCs is recorded as d_0 ; then, the trading day before and the trading day after each nonstandard default event are defined as d_{-1} and d_1 , respectively.

Academics state that the duration of the estimation window tends to be approximately 100 days, while the duration of the event window is about 20 days or more [54]. The choice of the duration depends on the purpose of the research and results of several attempts. After attempting to use 150 days and 200 days as the estimation windows, the results of the calculated regression function used to estimate the normal return during the time window were almost the same. Consequently, in accordance with Kotari and Warner [55], this article chose to shorten the period, since the event analysis with a short duration of its estimation window is relatively mature and credible. Since the length of the estimation window usually varies from 100 to 200 trading days, this paper chooses 100 days as the estimation window length and 31 days as the event window length after several attempts, i.e., setting (d_{-115}, d_{-16}) as the estimation window period D_1 and (d_{-15}, d_{15}) as the event window period D_2 , and there is no overlap between the different window periods (Figure 3). Due to the empirical demand, no ex post window period is set, and the focus is on the immediate impact of nonstandard default events and the ex-ante UIB market reaction.

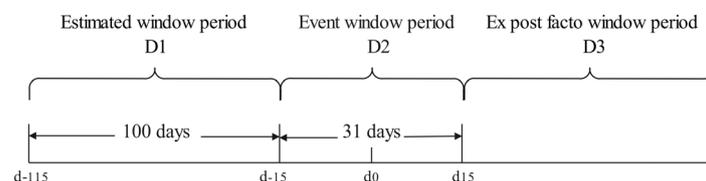


Figure 3. Schematic diagram of event occurrence points and event windows.

According to H_2 , the UIB market is a fully efficient market, and the returns during the estimated window of each nonstandard default event are not affected by the default event; therefore, the returns for that time period are normal returns. The calculation of normal returns can be obtained by two main methods: the econometric model and the statistical model [56,57]. The two main statistical models are the constant mean return model, which uses the average return as the normal return over the window, and the market model, which improves on this method and reduces the variance of abnormal returns to make it more practical [58]. The econometric models mainly include the capital-asset-pricing model and arbitrage-pricing theory, which were found to have the disadvantage of large model bias in subsequent empirical tests by scholars and, therefore, have not been used since the 1980s [59].

Therefore, this paper uses a market model from a statistical model, i.e., a risk-adjusted return model. The model is established by finding the relationship between the overall market return and the individual bond return, and the calculated regression function is used to estimate the normal return during the time window. According to the market model equation, there is a univariate linear relationship between individual bond returns of UIBs and market returns [60]; thus, the estimated window period for each nonstandard default event of a UIB can be based on D_1 , i.e., a one-dimensional regression function can be constructed based on the return to maturity and the market return to maturity from 115 trading days before the date of the default event (d_0) to 16 trading days before the default event's date, and the fitted function equation is as follows:

$$NR_{ij} = \hat{\alpha}_i + \hat{\beta}_i \hat{R}_{ij}, i \in [1, 65], j \in [-115, -15] \tag{1}$$

where NR_{ij} and \hat{R}_{ij} represent the normal expected return and the market return, respectively, at point d_j within event window D_1 for the nonstandard default event of i ; $\hat{\beta}_{ij}$ denotes the covariance between market returns and UIB returns at time point d_j ; and $\hat{\alpha}_{ij}$ denotes the constant term.

During the window of each nonstandard default event of a UIB D_2 , the difference between the actual return and the normal expected return is the abnormal return (AR) [61]. Specifically, the AR_{ij} of the i nonstandard default event of a UIB at time point d_j within event window D_2 can be expressed as follows:

$$AR_{ij} = R_{ij} - NR_{ij}, i \in [1, 65], j \in [-15, 15] \quad (2)$$

where R_{ij} represents the actual return at the window time point d_j for the nonstandard default event of i .

In addition, the cumulative abnormal return (CAR) [61] represents the total AR of the nonstandard default event of i in time d_j . It is estimated by the following formula.

$$CAR_{ij} = \sum_1^i AR_{ij}, i \in [1, 65], j \in [-15, 15] \quad (3)$$

The average abnormal return (AAR) [62] is the average of the abnormal returns of the 65 UIBs nonstandard default events at the same point in time d_j within the event window of D_2 , namely,

$$AAR_j = \frac{1}{N} \sum_{i=1}^N AR_{ij}, (j = 1, 2, \dots, M) \quad (4)$$

where $N = 65$, $M = 31$, and i denotes the bond serial number.

The cumulative average abnormal return (CAAR) [45] is the arithmetic mean of the AAR over the event window period D_2 . The arithmetic mean of the AAR_j corresponds to 31 different time points within the event window. The reason for calculating the cumulative summed average returns is to examine the continuous abnormal returns over the window period; therefore, they should be summed separately from the whole, and then the mean should be used to represent the overall situation of the return fluctuation in event window D_2 .

$$CAAR_j = \frac{1}{i} \sum_j^i AAR_j, (i = 1, 2, \dots, M) \quad (5)$$

5. Quantitative Analyses and Results

In this empirical analysis, we focus on whether the return volatility of 65 UIBs is abnormally affected by the nonstandard default event; specifically, this is performed by observing whether there is a significant difference between the actual daily return and the normal expected return fitted by the regression 100 days before the event window, using the 15 days before and after the event date as the study period.

The regression curves for the normal expected return of the 65 samples is shown in Appendix C.

5.1. Quantitative Analyses

Using Equation (2), the AR can be derived as the difference between the normal expected return and the actual return. Furthermore, the CAR, AAR, and CAAR for all samples at each point in the event window of D_2 can be calculated.

The results regarding the AR and CAR can be seen in Figure 4.

The results regarding the AAR and CAAR are shown in Figure 5.

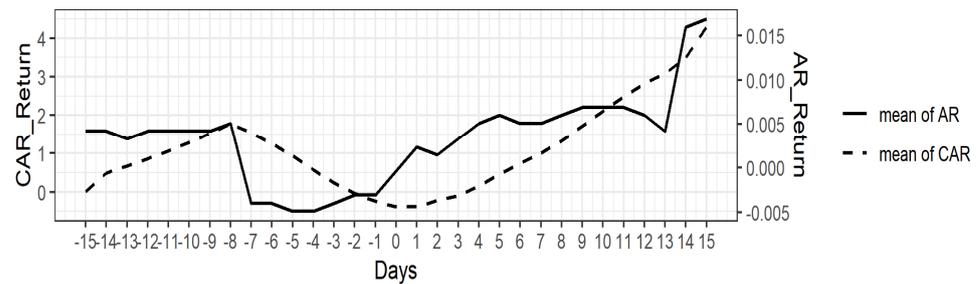


Figure 4. Results regarding the AR and CAR in window D_2 .

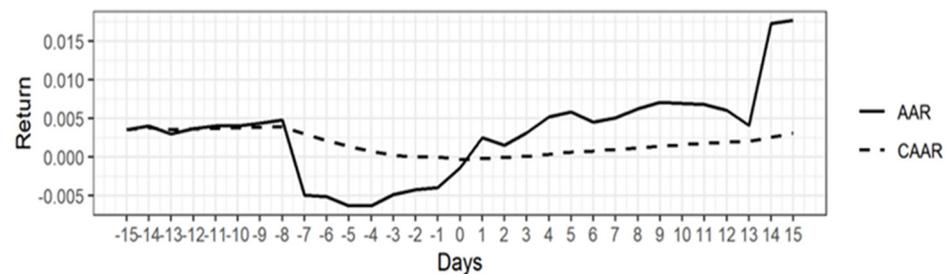


Figure 5. Results regarding the AAR and CAAR in window D_2 .

5.2. Results Regarding the Risk Transmission of Nonstandard Default Events

In this section, this paper focuses on whether the return volatility of the 65 samples in window D_2 was affected by the non-standard default event. Specifically, this paper uses a T-test to observe whether the actual returns of the sample during window D_2 are significantly different from the normal expected returns [63].

The T-test for the difference between the mean of CAR and zero gives the significance of the effect of the occurrence of events at different times within window D_2 . The T-test results of CAR are shown in Table 1.

Then, the T-test step for calculating the difference between the mean of the CAAR and zero denotes the significance of the effect of the occurrence of events. The T-test results regarding the CAAR are shown in Table 2.

Since most of the p -values in Table 1 are less than 0.01, this suggests that the occurrence of a nonstandard default event causes abnormal volatility of UIB returns in window D_2 . In turn, this suggests that the nonstandard default events of UIDCs have an impact on the UIB market, i.e., Hypothesis 1 holds.

According to Figure 5 and Table 2, the AAR was negative from the first -7 days and continued to be negative until day 0, which was the first day that it began to appear positive; if a default event day occurred within a week before the UIB return in which abnormal fluctuations had begun to appear, the UIB prices for city nonstandard default events are more sensitive, and a significant negative correlational effect is observed. On the day after the event day, the market recovers quickly, and the AAR turns positive again. Similarly, the CAAR rate after considering the time accumulation factor also showed abnormal fluctuations, but the negative correlation fluctuated on the second day, which is slightly later than the significant abnormal fluctuation of the average daily return rate, and only lasts until the second day. The rebound range of the CAAR on the third day is larger, quickly recovering to a significant positive effect. This is another way of indicating that nonstandard default events have caused certain degrees of negative impacts on the UIB market.

Table 1. T-test of CAR.

Time Point	Mean	SD	t-Value	p-Value
−15	0.004	0.11	0.241	0.81
−14	0.481	0.232	15.41	0.000 **
−13	0.677	0.234	21.485	0.000 **
−12	0.855	0.228	27.751	0.000 **
−11	1.066	0.226	35	0.000 **
−10	1.283	0.222	42.866	0.000 **
−9	1.521	0.222	50.807	0.000 **
−8	1.777	0.22	59.882	0.000 **
−7	1.538	0.16	71.255	0.000 **
−6	1.246	0.156	59.232	0.000 **
−5	0.94	0.162	43.001	0.000 **
−4	0.574	0.154	27.676	0.000 **
−3	0.244	0.136	13.342	0.000 **
−2	−0.032	0.126	−1.914	0.061
−1	−0.231	0.127	−13.455	0.000 **
0	−0.386	0.089	−32.276	0.000 **
1	−0.381	0.067	−42.089	0.000 **
2	−0.222	0.081	−20.3	0.000 **
3	−0.088	0.087	−7.511	0.000 **
4	0.153	0.096	11.893	0.000 **
5	0.457	0.098	34.524	0.000 **
6	0.739	0.092	59.529	0.000 **
7	1	0.093	79.773	0.000 **
8	1.318	0.102	96.285	0.000 **
9	1.711	0.114	111.581	0.000 **
10	2.107	0.113	138.746	0.000 **
11	2.484	0.112	164.387	0.000 **
12	2.833	0.108	195.342	0.000 **
13	3.085	0.109	210.152	0.000 **
14	3.485	0.324	79.878	0.000 **
15	4.304	0.261	122.186	0.000 **

Note: ** is significant at the 0.01 level.

Table 2. T-test of CAAR.

Mean	SD	t	Cohen's d	p-Value
0.002	0.001	6.939	1.267	0.000 **

Note: ** is significant at the 0.01 level.

In reference to previous research, China's non-standardized dual-financing mechanism has led to banks or non-bank financial companies and the entire financial industry witnessing rapid growth in debt accumulation [33]. The rapid increase in the leverage ratio of state-owned enterprises and the decline in the leverage ratio of non-state-owned enterprises have exacerbated the credit risk problem in China [64]. This suggests that

nonstandard defaults have had a negative impact on the UIB market, which is similar to the findings of this paper.

5.3. Results Regarding the Effectiveness of the UIB Market

This section focuses on whether the unusual price volatility in UIBs occurred prior to the non-standard default event. According to market validity theory, the prices of UIBs only adjust abruptly in time after a nonstandard default event, so the validity of the UIB market is tested by determining whether the price of the UIB shifted prior to a nonstandard default event.

The validity test of the UIB market is a T-test of the CAAR in the five days before the default event. The result has been shown in Table 3.

Table 3. T-test of the effectiveness of the UIB market.

Mean	SD	t	Cohen's d	p-Value
0.002	0.002	5.522	1.381	0.000 **

Note: ** is significant at the 0.01 level.

According to the data in Table 3, in the $(-5, 0)$ event window, bond prices still changed abnormally. Thus, the UIB market is not fully efficient, and the price outlier fluctuations may advance or lag, i.e., the original hypothesis H_2 , which states that the UIB market is a fully efficient market, is not considered valid. In general, when an abnormal fluctuation occurs before the event and an adjustment to a normal fluctuation occurs after the event [43], this indicates that the information response of this market is ahead of time, the price has made an informative adjustment before the event, and the UIB market is not effective as a whole.

In previous studies, some scholars have concluded that the UIB market has implicit governmental guarantees, so the yield spread is small, and the degree of marketization is not high [23]. In addition, there is informational asymmetry in the quasi-municipal bond market, which affects market effectiveness [8]. This paper concludes that the UIB market is not a completely efficient market, which is similar to the conclusions of the previous studies.

In summary, the hypothesis of H_1 is accepted, and the hypothesis of H_2 is rejected. The result can be seen in Table 4.

Table 4. Summary of the hypotheses.

NO.	Hypothesis	Result
H_1	The nonstandard default events of UIDCs will have a significant impact on the UIB market.	Accepted
H_2	The UIB market is a fully efficient market.	Rejected

6. Implications

This section discusses the theoretical and practical implications derived from the empirical results regarding nonstandard default risk. The theoretical implication of the research lies in its uncovered impact of the risk transmission mechanism of nonstandard default events on the UIB market, whose explication has filled the research gap in the field of nonstandard financing. For example, by collating the research on the credit risk of UIDCs, it can be found that most previous scholars have focused on the default risk of UIBs, and few have explored the default risk of nonstandard financing. Therefore, this paper extends the current literature by clarifying the impact of nonstandard default events of UIDCs on the UIB market through the event study method. This study not only complements the research on the credit risk of UIDCs but also enriches the theory of corporate finance.

Moreover, this research provides two practical implications of the impact of the non-standard default events of UIDCs on the UIB market. First, the findings are useful for

helping investors protect themselves against the risk of default by UIDCs. The related studies discovered that the risk of nonstandard financing can be transmitted to the UIB market, but it is more difficult to renew nonstandard assets at maturity due to China's financial regulatory policies as per the refinancing risk of UIDCs [31,32]. Therefore, investors should focus on UIDCs with a high degree of nonstandard financing and be cautious in purchasing a company's UIBs according to their risk appetite.

The second insight is the need for the governments to strengthen risk control with respect to nonstandard financing practices. With the dissolution of rigid payments for UIBs, a higher risk of non-standard defaults will increase the risk of defaulting on UIBs. Even worse, it will also further reduce government credit. This is because there is an implicit governmental guarantee in the UIB market [23]. Therefore, the government needs to classify the risk level of nonstandard assets with reference to the proprietary business of UIDCs in order to effectively monitor potential risk points of the UIDCs. In addition, a contingency plan management mechanism for nonstandard financing defaults should be established to ensure risk disposal measures can be taken in a timely manner when risks occur.

7. Conclusions

Compared with bond defaults, nonstandard default events have less of an impact on the reputations and refinancing of UIDCs. Consequently, UIDCs are less inclined to repay nonstandard financing products than they are to repay bond-financing products. However, under the general trend of reducing leverage and strictly controlling new hidden debts of local governments, the risk of nonstandard defaults of UIDCs continues to be released, which, in turn, will increase the credit risk of UIDCs. Therefore, it is necessary to explore the mechanism through which the nonstandard default events of UIDCs impact the price of UIBs, and then analyze the early warning effect of nonstandard default events on UIB defaults.

This paper has uncovered the impact of nonstandard default events of UIDCs on the UIB market, illustrating the response of UIB prices to nonstandard default events with advanced and lagging time differences through the event study method. It has revealed the UIB market is not a completely efficient market. At the same time, this research has revealed that the public disclosure of the default information of non-standard products may lead to the obstruction of the refinancing of debt-issuing enterprises, which may lead to liquidity problems and transmission to the bond market. Therefore, the risk of non-standard products can be used as early warning information for bond defaults. This study has addressed the gap regarding the risk of nonstandard asset management for UIDCs. It also further clarifies the transmission mechanism of nonstandard defaults on UIB defaults on a technical level, which is beneficial for preventing investors from facing default risk from UIDCs and allowing for sustainable UIDC financing development in other fields.

This paper still has some limitations. In exploring the correlation between the nonstandard financing market and the UIB market, this paper excludes some major event factors to ensure the uniqueness of its employed variables (e.g., executive changes, major acquisitions and mergers, etc.), and no consideration is given to other factors that affect the prices of UIBs; thus, there is a need for further in-depth research on the scope of the risk factors in the UIB market.

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Appendix A. Summary of 50 Nonstandard Default Events of 32 UIDCs

No.	Name of UIDC	Name of UIB	Date of Default
1	Xiangtan Jiuhua Economic Construction Investment Co.	17 Xiangtan Jiuhua MTN002, 17 Jiuhua 01, 16 Jiuhua Shuangchuang Bond, 19 Xiangtan Jiuhua MTN001, 19 Xiang Jiuhua, 17 Xiangtan Jiuhua PPN002, PR Shuangchuang Bond, 17 Xiangtan Jiuhua MTN001	1 January 2021 1 September 2020 20 June 2019
2	Zunyi City, Xuzhou District, Urban Construction Investment Management (Group) Co.	17 Zunyi Bo Investment Bond 02, 17 Bo Investment Bond 01, PR Bo Investment Bond 02, 17 Zunyi Bo Investment Bond 01	1 January 2021 1 October 2020 1 September 2020
3	Anshun City Urban Construction Investment Co.	18 Anshun 01, PR Anduan Bond, 18 Anshun 02, 17 Anshun Special Bond, 21 Anshun 01, 19 Anshun 02	1 December 2020
4	Puding County Puxin Urban Construction Investment Co.	No information on UIB	1 December 2020
5	Zunyi Peace Investment and Construction Co.	20Zunhe02, 20Zunhe01	1 October 2020 1 January 2020
6	Jilin Province Transportation Investment Group Co.	No information on UIB	28 September 2020
7	Anshun City Transportation Construction Investment Co.	PR Anjiaotou, 17 Anshun Jiaotou Bond	3 September 2020 2 August 2019
8	Guizhou Liupanshui Climbing Development Investment Trading Co.	PR Pantou Bond, 17 Pantou Special Bon, 21 Pantou Bond	1 August 2020 1 March 2020 1 November 2019
9	Ruzhou Xinyuan Investment Co.	16 Ruzhou Xinyuan Bond, PR Ruzhou Investment	1 July 2020
10	Anshun City State-owned Assets Management Co.	16 Anshun State Capital Bond, PR Anshun Bond	1 July 2020
11	Guizhou Zhongshan Development and Investment Co.	PR Zhong Shan Kai, 19 Zhong Stop 01, 17 Zhong Stop Bond 01, 19 Zhong Stop Bond 01	1 May 2020
12	Hunan Zhaoshan Economic Construction Investment Co.	17 Zhaotou 02, 18 Zhaoshan Economy PPN001, 17 Zhaotou 01, 19 Zhaoshan Economy PPN001, 17 Zhaoshan Economy PPN001	1 April 2020
13	Qiannan State Capital Operation Co.	17 Qiannan Bond 01, 17 Qiannan Bond 02, PR Qiannan 01, PR Qiannan 02	1 April 2020

No.	Name of UIDC	Name of UIB	Date of Default
14	Zunyi City Investment (Group) Co.	19 Zun Investment Bond 01, 19 Zun Investment Bond 02, 21 Zun Investment Bond 03, 19 Zun Investment Bond 03, 20 Zun Investment Bond 04, 21 Zun Investment Bond 04, 20 Zun Investment Bond 02, 20 Zun Investment Bond 01, 2 Zun Investment Bond 101	1 April 2020
15	Guizhou Donghu New City Construction Investment Co.	18 Donghu Pipeline Corridor Bond, 15 Qian Donghu Construction and Investment Bond, 18 Donghu Bond, 15 Qian Donghu Construction and Investment Bond, 21 Donghu Bond	1 March 2020
16	Guizhou Xinpu Economic Development Investment Co.	19 Xinpu 01, 20 Xinpu 02, 19 Xinpu 03, 19 Xinpu 05, 19 Xinpu 02, 20 Xinpu 01	1 March 2020 1 February 2020
17	Zunyi Road and Bridge Construction (Group) Co.	22 Zunqiao 02, 19 Zunqiao 01, 21 Zunqiao 08, 21 Zunqiao 05, 21 Zunyidaoqiao PPN001, 21 Zunqiao 02, 21 Zunqiao 04, 21 Zunqiao 13, 15 Zunyidaoqiao Investment, 20 Zunqiao 04, 21 Zunqiao 09, 21 Zunqiao 03, 21 Zunqiao 07, 21 Zunqiao 03, 19 Zunqiao 02, 20 Zunqiao 02, 19 Zunqiao 03, 21 Zunqiao 11, 20 Zunqiao 01, 21 Zunqiao 12, PR Zundaoqiao, 22 Zunqiao 01, 21 Zunqiao 01, 21 Zunqiao 10, 20 Zunqiao 03, 19 Zunqiao 01, 21 Zunqiao D4, 21 Zunqiao 06	16 January 2020 10 January 2020 1 January 2020
18	Zunyi Huichuan District Urban Construction Investment Management Co.	19 Huichuan 02, 18 Huichuan 01	2 January 2020 1 January 2020 1 September 2019
19	Zunyi Honghuagang City Construction Investment Management Co.	17 Honghuagang Parking Lot Bond 01, PR Zunhong City, 17 Honghuagang, 16 Zunhong Urban Investment Bond	1 February 2020 29 July 2019
20	Zhongshan District, Liupanshui City, Industry and Information Technology Bureau	No information on UIB	1 March 2020 1 November 2019
21	Zunyi Honghuagang state-owned assets investment and management limited liability company	19 Zunhong 02, 17 Zunhong Bond, 19 Zunhong 01	1 February 2020

No.	Name of UIDC	Name of UIB	Date of Default
22	Hancheng City Investment (Group) Co.	20 Hancheng 01, 16 Hancheng Urban Investment Bond, 20 Hancheng 04, 20 Hancheng 03, 19 Hancheng 01, PR Hancheng Investment, 19 Hancheng 02, 20 Hancheng 02	10 December 2019 30 November 2018
23	Zunyi Economic and Technological Development Zone Investment and Construction Co.	20 Zunjing 01, 21 Zunjing 01, 17 Zunjing Development Project Bond, 19 Zunjing 02, 19 Zunjing 03, PR Zunjing Development, 20 Zunjing 02, 19 Zunjing 01, PR Zunjing Bond, 16 Zunjing Development Bond	1 December 2019 1 September 2019
24	Guizhou Daxing High-tech Development and Investment Co.	No information on UIB	1 November 2019
25	Liupanshui Zhongshan District Urban Construction Investment Co.	21 Jongsan 01	1 March 2020 1 November 2019
26	Alashan League infrastructure construction investment and operation	No information on UIB	12 February 2019
27	Guizhou Kaili Kaiyuan Urban Investment Development Co.	17Kaiyuan Special Bond 02, 17Kaiyuan Special Bond 01, PRKaiyuan 02, PRKaiyuan 01	10 February 2019
28	Huhehaote Economic and Technological Development Zone Investment and Development	No information on UIB	1 September 2018
29	Qian southeast development investment (group) limited liability company	No information on UIB	10 July 2018
30	Inner Mongolia horqin city construction investment group	No information on UIB	8 June 2018
31	Tongliao City Investment Group Co.	17 Tongliao Urban Investment PPN001	8 June 2018
32	Tianjin Municipal Construction Group Co.	No information on UIB	27 April 2018

Data source: Enterprise Alerting Link.

Appendix B. Summary of 26 Nonstandard Default Events of 20 UIDCs

NO.	Name of UIDC	Name of UIB	Date of Default
1	Xiangtan Jiuhua Economic Construction Investment Co.	17 Xiangtan Jiuhua MTN002, 16 Jiuhua Shuangchuang Bond, 19 Xiangtan Jiuhua MTN001, 17 Xiangtan Jiuhua MTN001	1 January 2021 20 June 2019
2	Zunyi City, Xuzhou District, Urban Construction Investment Management (Group) Co.	17Zunyi Bo Invsetment Bond 02,PR Bo Investment 02, 17 Zunyi Bo Investment 01	1 January 2021
3	Anshun City Urban Construction Investment Co.	PR Antoine Investment Bond, 17 Anshun Special Bond	1 December 2020
4	Zunyi Peace Investment and Construction Co.	20Zunhe01	1 October 2020 1 January 2020
5	Anshun City Transportation Construction Investment Co.	PR Anjiaotou, 17 Anshun Jiaotou Bond	3 September 2020 2 August 2019
6	Guizhou Liupanshui Climbing Development Investment Trading Co.	PR Pantou Bond, 17 Pantou Special Bond	1 August 2020 1 November 2019
7	Ruzhou Xinyuan Investment Co.	16 Ruzhou Xinyuan Bond, PR Ruzhou Investment	1 July 2020
8	Anshun City State-owned Assets Management Co.	16 Anshun State Capital Bond, PR Anshun Bond	1 July 2020
9	Guizhou Zhongshan Development and Investment Co.	PR Zhong Shan Kai, 19 Zhong Stop 01, 17 Zhong Stop Debt 01, 19 Zhong Stop Debt 01	1 May 2020
10	Hunan Zhaoshan Economic Construction Investment Co.	17Zhao Investment 02, 17Zhao Investment 01	1 April 2020
11	Qiannan State Capital Operation Co.	17 Qiannan Bond 01, 17 Qiannan Bond 02, PR Qiannan 01, PR Qiannan 02	1 April 2020
12	Zunyi City Investment (Group) Co.	19 Zun Investment 01, 19 Zun Investment 02, 19 Zun Investment 03	1 April 2020
13	Guizhou Donghu New City Construction Investment Co.	18 Donghu Pipeline Corridor Bond, 15 Qian Donghu Construction Investment Bond	1 March 2020
14	Guizhou Xinpu Economic Development Investment Co.	19 xinpu 01, 19 xinpu 03, 19 xinpu 05, 19 xinpu 02	1 March 2020
15	Zunyi Road and Bridge Construction (Group) Co.	15 Zunyidaoqiao Bond, PR Zundaoqiao, 19 Daoqiao 01	1 February 2020
16	Zunyi Honghuagang City Construction Investment Management Co.	17 Honghuagang Parking Lot Bond 01, 16 Zunhong Urban Investment Bond	1 February 2020 29 July 2019
17	Zunyi Honghuagang state-owned assets investment and management limited liability company	17 Zunhong Bond	1 February 2020

NO.	Name of UIDC	Name of UIB	Date of Default
18	Hancheng City Investment (Group) Co.	16 Hancheng Urban Investment Bond, PR Hancheng Investment	30 November 2018 10 December 2019
19	Zunyi Economic and Technological Development Zone Investment and Construction Co.	17ZunJingKai Project Bond, PRZunJingKai, 16ZunJingKai Bond	1 September 2019
20	Guizhou Kaili Kaiyuan Urban Investment Development Co.	17Kaiyuan Special Bond 02 17 Kaiyuan Special Bond 01 PR Kaiyuan 02 PR Kaiyuan01	10 February 2019

Appendix C. Fitted Slope and Intercept for All Bonds

No.	Slope	Intercept	p-Value	Fit a Regression Function
1	-0.55	-4.31	2.01×10^{-10} **	$y = -4.31 - 0.55x$
2	1.96	3.92	1.97×10^{-10} **	$y = 3.92 + 1.96x$
3	-0.03	-2.65	1.44×10^{-12} **	$y = -2.65 + 0.03x$
4	-0.02	-2.75	5.39×10^{-12} **	$y = -2.75 - 0.02x$
5	12.21	33.86	1.64×10^{-15} **	$y = 33.86 + 12.21x$
6	0.01	-2.60	1.33×10^{-23} **	$y = -2.60 + 0.01x$
7	-0.03	-3.08	1.67×10^{-37} **	$y = -3.08 - 0.03x$
8	0.00	-2.99	4.39×10^{-7} **	$y = -2.99 + 0.00$
9	-0.01	-3.02	1.76×10^{-10} **	$y = -3.02 - 0.01x$
10	1.25	1.13	1.73×10^{-1}	$y = 1.13 + 1.25x$
11	-0.46	-3.90	5.09×10^{-3} **	$y = -3.90 - 0.46x$
12	0.03	-2.44	8.93×10^{-25} **	$y = -2.44 + 0.03x$
13	0.18	-1.99	7.66×10^{-07} **	$y = -1.99 + 0.18x$
14	3.01	6.71	8.52×10^{-4} **	$y = 6.71 + 3.01x$
15	2.30	4.49	7.55×10^{-15} **	$y = 4.49 + 2.30x$
16	-0.01	-2.64	1.81×10^{-31} **	$y = -2.64 - 0.01x$
17	0.00	-2.60	2.64×10^{-2} **	$y = -2.60 + 0.00$
18	0.00	-2.61	1.69×10^{-5} **	$y = -2.61 + 0.00$
19	0.22	-1.61	1.50×10^{-41} **	$y = -1.61 + 0.22x$
20	-0.16	-3.01	1.78×10^{-1}	$y = -3.01 - 0.16x$
21	0.02	-2.57	4.00×10^{-14} **	$y = -2.57 + 0.02x$
22	-0.11	-2.94	3.88×10^{-1} **	$y = -2.94 - 0.11x$
23	0.01	-2.60	3.89×10^{-2} *	$y = -2.60 + 0.01x$
24	-0.07	-2.77	2.66×10^{-1}	$y = -2.77 - 0.07x$
25	0.19	-2.00	2.31×10^{-13} **	$y = -2.00 + 0.19x$
26	0.00	-3.13	9.73×10^{-5} **	$y = -3.13 + 0.00$
27	-0.56	-4.30	2.94×10^{-9} **	$y = -4.30 - 0.56x$
28	-0.01	-3.13	7.32×10^{-7} **	$y = -3.13 - 0.01x$
29	0.01	-2.72	5.10×10^{-25} **	$y = -2.72 + 0.01x$
30	-0.01	-2.56	3.40×10^{-50} **	$y = -2.56 - 0.01x$
31	0.01	-2.71	1.13×10^{-47} **	$y = -2.71 + 0.01x$
32	0.33	-1.66	3.90×10^{-7} **	$y = -1.66 + 0.33x$
33	0.01	-2.59	5.50×10^{-16} **	$y = -2.59 + 0.01x$
34	0.01	-2.58	3.14×10^{-9} **	$y = -2.58 + 0.01x$
35	-0.28	-3.22	1.99×10^{-6} **	$y = -3.22 - 0.28x$
36	-0.03	-2.72	1.77×10^{-47} **	$y = -2.72 - 0.03x$
37	-0.01	-2.70	7.73×10^{-33} **	$y = -2.70 - 0.01x$
38	0.00	-2.66	6.69×10^{-3} **	$y = -2.66 + 0.00$
39	-0.01	-2.65	1.90×10^{-43} **	$y = -2.65 - 0.01x$

No.	Slope	Intercept	p-Value	Fit a Regression Function
40	0.01	−2.57	1.18×10^{-16} **	$y = -2.57 + 0.01x$
41	0.01	−2.57	8.38×10^{-17} **	$y = -2.57 + 0.01x$
42	0.10	−2.34	3.31×10^{-12} **	$y = -2.34 + 0.10x$
43	1.46	1.99	7.28×10^{-9} **	$y = 1.99 + 1.46x$
44	0.00	−2.59	4.45×10^{-1}	$y = -2.59 + 0.00$
45	0.02	−2.52	3.06×10^{-31} **	$y = -2.52 + 0.02x$
46	0.02	−2.52	2.96×10^{-17} **	$y = -2.52 + 0.02x$
47	0.01	−2.58	1.14×10^{-1}	$y = -2.58 + 0.01x$
48	−0.01	−2.64	1.51×10^{-1}	$y = -2.64 - 0.01x$
49	0.14	−2.14	7.25×10^{-1}	$y = -2.14 + 0.14x$
50	−0.44	−3.96	2.78×10^{-6} **	$y = -3.96 - 0.44x$
51	0.01	−2.96	3.74×10^{-1}	$y = -2.96 + 0.01x$
52	−0.01	−3.02	2.01×10^{-2} *	$y = -3.02 - 0.01x$
53	2.54	5.16	2.26×10^{-2} *	$y = 5.16 + 2.54x$
54	0.35	−1.47	1.54×10^{-3} **	$y = -1.47 + 0.35x$
55	−1.82	−8.49	2.97×10^{-2} *	$y = -8.49 - 1.82x$
56	0.71	−1.05	4.84×10^{-3} **	$y = -1.05 + 0.71x$
57	3.88	9.55	6.57×10^{-4} **	$y = 9.55 + 3.88x$
58	−0.13	−3.14	1.36×10^{-1}	$y = -3.14 - 0.13x$
59	−0.79	−4.93	3.78×10^{-10} **	$y = -4.93 - 0.79x$
60	−0.01	−3.09	5.46×10^{-4} **	$y = -3.09 - 0.01x$
61	−0.01	−3.09	3.11×10^{-13} **	$y = -3.09 - 0.01x$
62	0.07	−2.39	7.23×10^{-4} **	$y = -2.39 + 0.07x$
63	−0.02	−2.67	5.04×10^{-34} **	$y = -2.67 - 0.02x$
64	0.02	−2.98	2.82×10^{-18} **	$y = -2.98 + 0.02x$
65	−0.30	−3.54	6.98×10^{-24} **	$y = -3.54 - 0.30x$

Note: * is significant at the 0.05 level, ** is significant at the 0.01 level.

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