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# The announcement effect of convertible bonds before and after the pandemic in the chinese market

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research dissertation

# **The announcement effect of convertible bonds before and after the pandemic in the Chinese market**

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**Master 2–Research Program Advances in  
Finance and Accounting  
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## SUMMARY

This paper collects 483 samples of convertible bonds which fit certain conditions. Given that China's stock market is an undeveloped market, the hypothesis is made that the announcement effect has a positive effect on the price of the stock and uses the market-adjusted model to estimate the normal return of stocks. However, the empirical results are different from the hypothesis set in the paper and a part of previous research in China's market.

The empirical results for the time before the pandemic indicate that -0.462% abnormal return on stocks is significant at 1% level. The empirical results for post-pandemic show that the window period [-5,5] has become significantly positive for the announcement effect, which is 1.831% in the significant level of 1%

The article comprehensively analyzes the issuance mechanism and terms of convertible bonds in the Chinese market, as well as the announcement effect of convertible bonds on the time window [-20,20].

**KEYWORDS:** convertible bonds, event study, announcement effect, pandemic, China's market

## RÉSUMÉ

Cet article rassemble 483 échantillons d'obligations convertibles qui répondent à certaines conditions. Étant donné que le marché boursier chinois est un marché sous-développé, l'hypothèse est faite que l'effet d'annonce a un effet positif sur le prix des actions et utilise le modèle ajusté du marché pour estimer le rendement normal des actions. Cependant, les résultats empiriques sont différents des hypothèses établies dans le papier et d'une partie des recherches antérieures sur le marché chinois.

Les résultats empiriques pour la période précédant la pandémie indiquent qu'un rendement anormal de -0,462 % sur les actions est significatif au niveau de 1 %. Les résultats empiriques pour l'après-pandémie montrent que la période de fenêtre [-5,5] est devenue significativement positive pour l'effet d'annonce, qui est de 1,831 % dans le niveau significatif de 1 %.

L'article analyse en détail le mécanisme d'émission et les conditions des obligations convertibles sur le marché chinois, ainsi que l'effet d'annonce des obligations convertibles sur la fenêtre temporelle [-20,20].

**MOTS-CLÉS :** obligations convertibles, étude événementielle, effet d'annonce, pandémie, marché chinois

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I hereby especially thank my supervisor Radu Burlacu. He is very kind to everyone and always tries to solve the problems of students.

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## FOREWORD

The first convertible bond in China's history was the Baoan Convertible Bond, which was issued in 1992 and has a history of 30 years. Due to the imperfection of legal norms, the development of convertible bonds in China has almost stagnated after the first convertible bond in China. As the threshold of other financing methods has gradually increased in recent years, the issuance regulations of convertible bonds have also been further improved. Thus, the issuance of convertible bonds has ushered in explosive growth since 2017. However, because of the small number of convertible bonds issued in China's market in the early stage, the number of samples available for research is not large enough. In addition, the results of previous studies are inconsistent or even contradict each other. Therefore, an empirical study on the announcement effect of convertible bonds is necessary.

For the company, first, the issuance cost of convertible bonds is low. The coupon rate of convertible bonds is around 0.5%, while the coupon rate of general corporate bonds is 4-6%. Second, compared with the issuance of new shares, the dilution of convertible bonds to the original shares is more moderate, the conversion period is six months after issue. Third, the structure is flexible, and the company can design the terms of convertible bonds according to its own needs.

For investors, first, it contains the dual nature of bonds and equities, which can not only guarantee the bottom line but also have the opportunity to appreciate. Second, China's convertible bonds have comprehensive anti-dilution clauses. During the issue period of convertible bonds, if the company distributes dividends or pays dividends to dilute the stock price, the conversion price will be adjusted accordingly to protect investors' interests. Third, the premium rate of convertible bonds is relatively low before the convertible bonds are listed, which leads to a good investment value.

Under the above circumstances, this paper comprehensively analyzes the situation of convertible bonds in the Chinese market and conducts an empirical analysis of the announcement effect of convertible bonds. The article uses a relatively larger sample size to ensure the reliability of the results.



# INTRODUCTION

As a hybrid bond, convertible bonds combine the properties of bonds and stocks. Because investors can choose to convert into stocks or stay in bonds after issuance, this type of bond also has the characteristics of options.

A convertible bond is unique as a method of fund for enterprises. This method is not like a secondary offering to dilute shares instantly, nor like a bond that companies have to redeem. Thus, many companies prefer to use convertible bonds to raise funds. We can find many types of research in different markets, for example, in North America, Europe and Japan on the motivation and the wealth effect of issuing convertible bonds. This paper aims to study the announcement effects of convertible bonds in China's market. In recent years, researches on the effects of convertible bonds are insufficient with the volume of convertible bond surges. Meanwhile, the results of different researches are contradictory, for example, Tian ke et al. (2004) think that there is no effect caused by convertible bonds on stock price, but Fu leiming (2010) and Hu minjie (2012)'s researches show that announcement of convertible bonds has a significantly positive effect on stock price, some scholars find that there is a negative effect on the stock price on the announcement day (Tang Kande et al., 2004).

At the same time, investors' emotions change significantly when the pandemic arrived. The price of risky assets has fallen sharply with the increase in market volatility, which will also lead to insufficient liquidity. Since the industry accounts for 80% of China's convertible bond issuance, investors will have different views on the company's purpose of raising funds and its financial situation during the pandemic.

Thus, we propose two questions:

1. In China, what is the exact announcement effect on stock price?
2. Are there changes in investors' reactions to the issuance of convertible bonds after the pandemic?

## **Research ideas and context**

This paper studies convertible bonds in China's market. First, the basic notions of convertible bonds are given, such as duration, conversion period regulation and strike-price-adjusted provision. Those stipulations are unique in China's convertible bond market. The descriptions of different bond markets' situations are followed, for example, the American market, European market and Chinese market. The situations include the history of convertible bonds, the volumes, credit quality allocation of bonds and

the industrial distribution of bonds in different markets. Second, I built the theories' foundation of the announcement effect of convertible bonds. Three main theories are most relevant, they are optimal capital structure, asymmetric information theory and pecking order theory. Those three theories are a bridge connecting the basic situations of convertible bonds and academic areas. The last part of the literature review is the empirical results of different studies. I divided two parts of different results, one part is negative, and another part is positive. There are also statistical results from another market for comparison. Third, I select 483 samples from June 2014 to May 2022 under certain criteria and take December 2019 as a boundary of the pandemic to analyze the announcement effect. The window period sets as [-20,20] to obtain the whole picture of the announcement effect. The results contain AAR (Average abnormal return) in window [-5,5] and CAAR (Cumulate average abnormal return) in window [-20,20] with the robustness test by using the BHAR (buy-to-hold average return) model.

The statistic results are compared from datasets before and after the pandemic. The results show that before the pandemic, the announcement date had a significant negative impact on the stock price. However, after the pandemic, the announcement date had no significant impact on the stock price on the day of the announcement but had a significant positive impact on the stock price during the window period [-5,5].

### **The meaning and value of research**

The Chinese financial market is a rapidly developing market, especially in the convertible bond market, but the theoretical analysis of this market is relatively small, Let alone the empirical study. Thus, this paper collected the biggest sample volume to analyze the investors' reaction to the first time of announcement of a convertible bond, which includes 189 samples during the period after the pandemic and 294 samples during the period before the pandemic. The results of the empirical study verified the asymmetric information theory. The investors cannot estimate the true values of a company, their reaction to a certain event will change under the different market situations, here as a pandemic. For the pecking order theory, the lowest-cost financing method in China is not internal financing, but external sourcing, like convertible bonds. Thus, the companies in China will choose convertible bonds, this motivation will affect the announcement effect as well. For example, when the convertible bond is a method to encircle money, investors will "voter on foot", Thus, based on pecking order theory, we can understand why there was a negative reaction during the period before the pandemic.

For academic research, since many studies on the effect of convertible bond announcements in the Chinese market are contradictory, this study can further clarify the effect of convertible bond announcements. This research provides a comprehensive analysis of the listing announcements of

convertible bonds in China. Based on the combination of previous research and some specific provisions of the Chinese market, the research enriches the quantitative research on the announcement effect of convertible bonds. At the same time, this paper also explores the adaptation of different models for the research announcement effect.

For investors who are facing a new soar convertible bond market, this study can supply solid knowledge to avoid risk.

For listed companies, the choice of financing method is particularly important. This research can help listed companies better understand convertible bonds, a low-cost financing method.

### **What is new in the article**

The contributions of this paper are as follows: first, this paper verified the asymmetric information theory and pecking order theory in China's market as the statistical results are negative for the period before the pandemic, compared to many other research results are positive (Zhang Peng 2012, Wu ruixin 2021). Second, the period and the number of samples are long and the biggest, which includes the major development timeline of China's convertible market. At the same time, there is a few empirical tests of the announcement effect of convertible bonds in China's market after the pandemic. Third, a comparison of the situation before and after the pandemic is made.

**PART 1: BASIC INFORMATION ON CONVERTIBLE BONDS IN CHINA'S  
MARKET AND AN OVERVIEW OF THE WORLD'S MAJOR MARKETS**

## CHAPTER 1 – OVERVIEW OF CONVERTIBLE BONDS

Convertible bonds as a method of financing, it has both the characteristics of bonds and the options. Convertible bonds can be converted into shares within a certain period. First of all, for convertible bonds, if all convertible bonds are finally converted into stocks, it is equivalent to the company issuing a new batch of stocks. However, convertible bonds are slowly converted within a certain period, so there will be no direct dilution of equity.

Furthermore, it is not cost-effective to use equity financing when the company feels that the stock price is undervalued. The convertible bond is only slowly converted into shares six months after the issuance, so the enterprise has enough time to raise the stock price.

Another reason to issue convertible bonds is the agency problem. The interests of corporate shareholders are often inconsistent with the interests of corporate bondholders. For example, shareholders are more inclined to invest in high-risk projects and expect higher returns, but bondholders like safe investments. Convertible bonds can solve this problem because convertible bonds' prices can also rise with the rise in stock prices.

### I. BASIC ELEMENTS OF CONVERTIBLE BONDS

**Par value:** the par value of the convertible bond is the amount paid when the convertible bond matures as a bond. In China, the par value is 100.

**Coupon rate:** it has coupon rate-regulated when convertible bond as a bond. This rate depends on the market interest rate at the time of issuance, the creditworthiness of the convertible bond issuer and issuance terms. This rate is lower than non-convertible bonds under the same conditions, The company must pay interest semi-annually or once a year. If the bond is not converted into stock at the end, the company must also repay the principal and the final interest.

**Duration:** according to "China's Administrative Measures for the Issuance of Securities by Listed Companies", the duration of a convertible bond is at least 1 year and a maximum to 6 years. Normally, the longer the duration, the higher the sensitivity of the bond to interest rate changes. Similarly, the longer the duration, the higher the option value contained in the convertible bond.

**Conversion period:** conversion period is the period for the convertible bonds to convert to stocks. According to "China's Administrative Measures for the Issuance of Securities by Listed Companies", after six months of issuance, investors can choose to convert or not, but the certain period depends on the duration and the company's financial situation. The lock-up period is generally six months after

the issue and is designed to avoid equity dilution caused by the premature conversion of investors. Correspondences, the longer the conversion period the more option value of the convertible bond.

Conversion price: The conversion price refers to the price paid by the company for the convertible bond converted into stock, which can also be regarded as the exercise price of the option. The "Measures for the Administration of Securities Issuance of Listed Companies" stipulates that the conversion price shall not be lower than the average price of the stock price 20 days before the announcement of the prospectus and the average price of the stock price of the previous day. There are two terms associated with this concept: the conversion ratio and the conversion premium rate.

Conversion ratio = par value of unit convertible bond / conversion price

Conversion Premium Rate = Conversion Premium / Conversion Value

Strike-price-adjusted provision: It is a right of the issuer, that when the stock price is lower than the conversion price for several consecutive days, the company has the right to revise the conversion price downward to ensure the progress of the conversion. Otherwise, there is a fictitious conversion price that nobody will do the conversion.

"China's Administrative Measures for the Issuance of Securities by Listed Companies" regulates if the prospectus stipulates that the conversion price is revised downward, it shall also stipulate:

(1) The conversion price revision plan must be submitted to the company's general meeting of shareholders for voting and must be approved by the voting rights held by shareholders present at the meeting more than 2/3 agree.

(2) The revised share conversion price shall not be lower than the average price of twenty trading days before the date of the general meeting of shareholders and the average price of the previous trading day.

Ex-rights adjustment clause: when the company conducts additional issuance, allotment, and dividend distribution, the conversion price is adjusted according to a certain formula. The purpose of this is to protect the value of convertible bonds. Meanwhile, when the convertible bond is dividend protected, the share price and conversion price must be adjusted according to the same formula, but the impact is small when the cash dividend is small. (Kan chaofeng and Zheng zhenlong 2005)

Formulas are as follows:

Dividend:  $P = P_0 - D$

Capital reserve converted into share capital:  $P = P_0 / (1+N)$

Secondary Public Offering:  $P = (P_0 + AK) / (1+K)$

The initial conversion price is  $P_0$ , the dividend is  $D$ , the share capital is  $N$ , the new share or allotment is  $K$ , the price of secondary public offering is  $A$ , and the adjusted conversion price is  $P$ .

Convertible bond redemption clause: According to MM theory, the redemption clause is designed to protect the interest of shareholders, because when the price of convertible bonds raises to a certain number, the issuer has the right to redeem the convertible bonds in advance. Thus, this clause is essentially a call option for the company. At the same time, the clause regulates the price of redemption is at least equal to the par value of the share plus accrued interest.

Sale back clauses: corresponding to the redemption clause, the sale back clause can help investors to avoid great loss when the price of the share is far lower than the price of conversion. Meanwhile, the company will provide a premium, this premium depends on current interest and is higher than the coupon rate. The higher part is used as compensation for investors, and this clause is also for attracting more investors.

Guarantee clause: to attract more investors, the guarantor bears the same responsibility. The clause reduces the risk of default and also reduces the interest rate. "China's Administrative Measures for the Issuance of Securities by Listed Companies" stipulated that when the issuer's net assets reach more than 1.5 billion yuan, no guarantee is needed. Otherwise, the issuance of convertible bonds must be fully guaranteed.

## **CHAPTER 2 – OVERVIEW OF CONVERTIBLE BOND MARKET IN EUROPE AND AMERICA**

### **I. CONVERTIBLE BOND ISSUANCE HISTORY**

Early-stage: In 1843, New York Erie in the US issues the world's first convertible bond. The German company Dortmunder Verein issued the first convertible bond in Germany. At this time, the main bodies of convertible bonds were those industrial companies that were expanding rapidly, such as telegraph, steel, train, and so on.

After the First World War, the form of convertible bonds changed from par conversion to current price conversion. Around 1960, the redemption clause appeared in convertible bonds. The redemption clause is mainly to make the rights of the issuer and the investor equal and to help the company avoid financial risks.

Development stage: In 1975, Japan's Toshiba Corporation issued the world's first convertible bond with a redemption clause. The redemption clause stipulates that when the company's stock price is too low, investors have the right to request the company to redeem the bond, and the redemption rate is higher than the coupon rate as compensation to investors. However, in this way, the risk is almost borne by the company, so convertible bonds with redemption clauses accounted for a small proportion at that time.

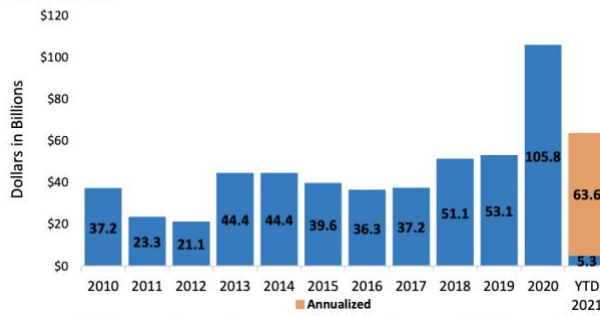
Prosperity stage: In 1985, Merrill Lynch invents zero-coupon convertibles that are both redeemable and puttable. At this time, the convertible bond market continued to expand.

### **II. OVERVIEW OF AMERICA CONVERTIBLE BOND MARKET**

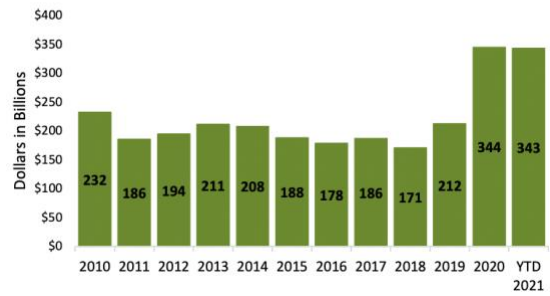
The U.S. market is the largest convertible bond market in the world. Because the U.S. corporate bond market is relatively developed, convertible bonds are only used as a supplementary means of corporate financing, which has also led to the comparatively lower credit ratings of convertible bonds issued in the U.S. convertible bond market.



## U.S. Convertible Market ISSUANCE

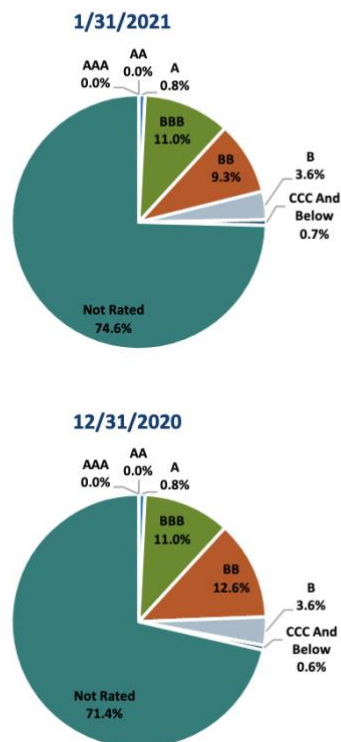


## ASSETS



Source: Calamos U.S. Convertible Market Snapshot

## CREDIT QUALITY ALLOCATION OF BONDS<sup>1</sup>



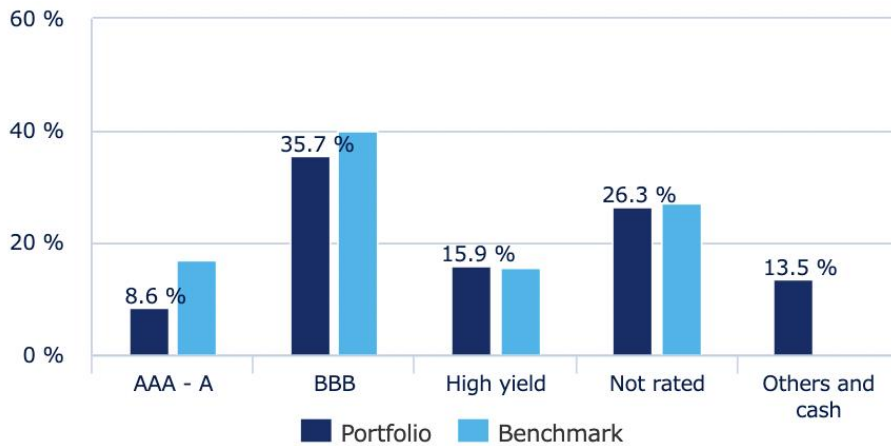
Source: Calamos U.S. Convertible Market Snapshot

**Figure 1: U. S. convertible market description**

### III. OVERVIEW OF THE EUROPEAN CONVERTIBLE BOND MARKET

The European bond market is also one of the major markets in the world. Due to the development of environmentalism, most convertible bonds will carry ESG ratings for bonds. Convertible bonds in Europe are generally rated higher than in the United States. Here are the statistics:

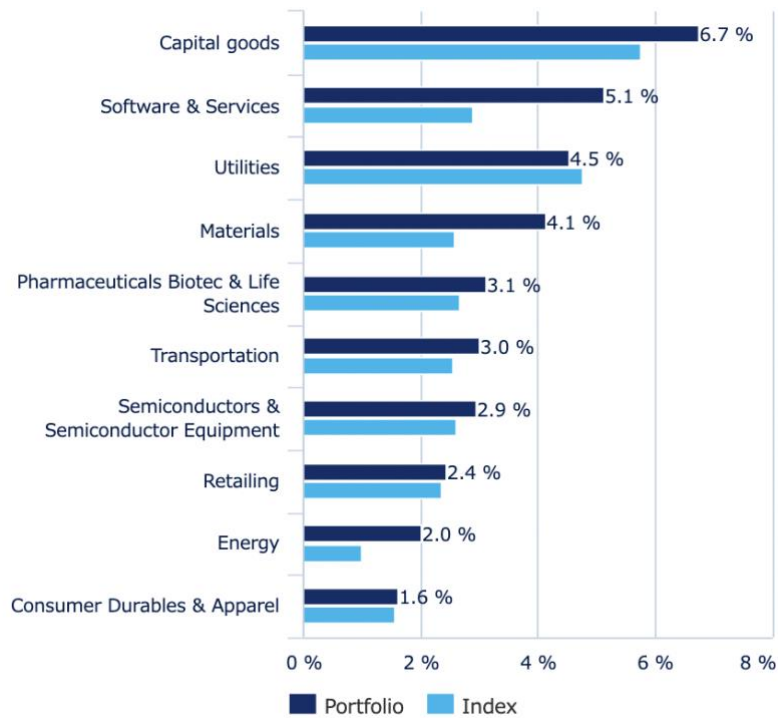
**Figure 2: Credit rating in the European market**



Source: AMUNDI

Today, most of the newly issued convertible bonds in the European market are concentrated in two sectors related to the pandemic, one is the gradually recovering tourism industry, and the other is the technology industry, especially related to online offices.

**Industry distribution in the European market**



Source: AMUNDI

**Figure 3: Industry distribution in the European market**

## **CHAPTER 3 – OVERVIEW OF CHINA’S CONVERTIBLE BOND MARKET**

### **I. THE HISTORY AND OVERVIEW OF CHINA’S CONVERTIBLE BOND MARKET**

In 1991, Hainan New Energy issued China's first convertible bond. However, due to the imperfect implementation of early laws and regulations and people's lack of awareness of convertible bonds, the convertible bond was not successful in the end and had become a general cooperation bond. From 1991 to 1997, No convertible bonds were issued in China again.

Until March 1997, the Chinese government issued new regulations on convertible bonds, and then convertible bonds gradually got on the right track.

In 2006, the China Securities Regulatory Commission enacted the "Administrative Measures for the Issue of Securities by Boss Companies". In the ten years from 2006 to 2016, a total of 82 convertible bonds were issued, raising 274.2 billion yuan. Especially during the 2006-2007 bull market, convertible bonds rose with the stock price. The number of issues had also increased significantly.

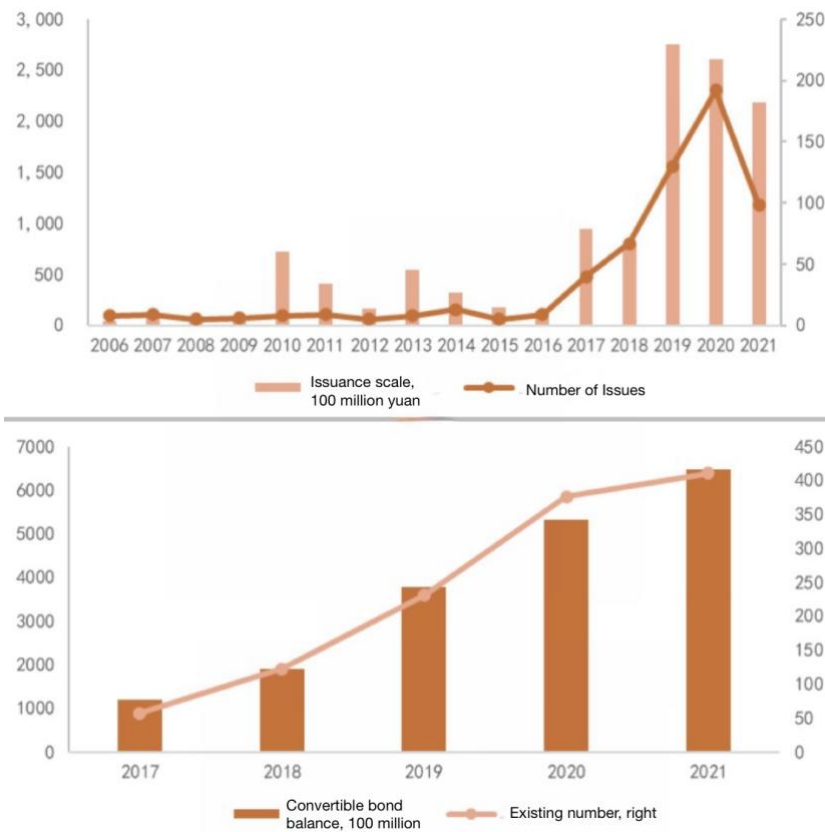
Until 2017, convertible bonds began to be sold online. There was almost no threshold for the online purchase of convertible bonds. Convertible bonds can be applied by simply an account and a phone. Therefore, the convertible bond market has ushered in explosive growth.

Chinese convertible bonds typically have a superior credit rating. At the same time, companies whose net assets are less than 1.5 billion yuan must also provide guarantees, so buying convertible bonds is very safe for investors. From the corporate side, in recent years, the additional financial methods of listed companies have been tightened, so companies choose convertible bonds as a convenient way to raise funds.

### **II. CONVERTIBLE BOND MARKET SIZE AND SECTORS IN CHINA**

China's convertible bond market is expanding in recent years, and the number of new convertible bonds issued every year exceeds 200 billion yuan. The scope of convertible bond issues in 2021 will decline, but the overall growth trend has not changed. Currently, convertible bonds in China amount to around 700 billion yuan. The newly added convertible bonds are mainly in banks, agriculture, forestry, animal husbandry, and fishery, and also in the electronics, chemical, power equipment, medicine, automobile, and other industries, diversification is extended in convertible bonds.

### Overview of China's market



Source: Xinlang finance.

Figure 4: Overview of China's market

PART 2  
-  
LITERATURE REVIEW

## CHAPTER 4 – THEORIES FOUNDATION OF ANNOUNCEMENT EFFECT

There are two main aspects of the theoretical part of issuing convertible bonds, one is the motivation for issuing convertible bonds, and the other one is the impact on the company's value after issuing convertible bonds. Here are some major theories.

### I. OPTIMAL CAPITAL STRUCTURE

Optimal capital means that the company can attain the lowest weighted average cost of capital over some time. There are wide and narrow meanings in capital structure. The general structure of capital refers to the composition and proportion of total capital, while the narrow structure of capital refers only to the composition of capital over the long term. Within this theory, the most famous and influential is the theory of MM (Modigliani and Miller, 1958). MM theory advocates that the capital structure of a company is not related to its market value, and no matter how the company's capital structure changes, it will not affect the company's market value. After a couple of years, the model was revised to include corporate income tax as a factor, known as the tax shield. Since a company's debt is tax-deductible, under MM's theory, the higher the level of a company's debt, the higher the company's market value. However, in reality, corporate debt levels are not as high as MM theory predicts. Thus Kraus & Litzenberger (1973) and Brennan & Schwartz (1988) put forward the theory of compromise to explain this phenomenon. The so-called trade-off theory is to weigh the benefits of the tax shield against the risk of bankruptcy. The trade-off theory is divided into two sections, the static trade-off theory and the dynamic trade-off theory.

#### The static trade-off theory

DeAngelo & Masulis (1980) supplemented the MM theory, arguing that the non-debt tax shield can also affect a firm's capital structure. If there are other tax shields, then the debt supply curve of enterprises is elastic, and there is an optimal debt level for each enterprise. This debt level is determined by the trade-off between the tax rate of personal debt and the relative price in the market. The optimal level of debt depends on whether the losses incurred by the newly issued bonds can be compensated. An extension of the Miller model, Bradley Jarrell & E. Han Kim (1984) raised several core issues: the trade-off between bankruptcy risk and tax shield, the difference in personal tax between stock and bond income, the loss of non-tax shield in non-default situations and the agency cost of debt. They concluded that:

1. The higher the debt ratio of a company, the lower its bankruptcy risk ratio.
2. The higher the company's debt ratio, the lower the level of its non-debt tax shield.

3. If the corporation is at a high risk of bankruptcy, the higher the debt ratio of the corporation, the less likely it is that the value of the corporation will change.

Shyam-Sunder & Myers (1999) compared the traditional capital structure and the pecking order model to prove the effectiveness of the pecking order model. The conclusion is that external financing is only used when internal financing is insufficient. Meanwhile, the empirical implication of the static trade-off theory is given, which is that the real debt ratio of the company will move to the optimal debt ratio. The static trade-off theory itself cannot measure the changes in the capital structure of enterprises over some time, but the capital structure of enterprises will change in each period. Thus, this becomes a shortcoming of static trade-off that gives the only leverage ratio but does not take into account the changes in mean reversion. Therefore, different scholars recently began to use multi-period models to measure the impact of tax shield and bankruptcy risk on corporate capital structure. Frank & Goyal (2009) pointed out the drawbacks of static trade-off theory, causing the reflection of this theory.

#### *A. The dynamic trade-off theory*

The dynamic trade-off theory appeared around 1980. Kane et al. (1984) established a model to analyze the trade-off between tax shield and bankruptcy risk of enterprises in different periods, but the model does not consider transaction costs, so enterprises can change to different capital compositions quickly. In the absence of transaction costs, companies will maintain high debt levels to obtain more tax shield benefits. Fischer, Heinkel & Zechner (1989) took the transaction cost into account based on Kane et al. (1984) and constructed a model of enterprise capital structure in continuous time. The main point of view is to take bankruptcy cost and tax shield as the variables of its recapitalization. The research is the earliest model of the dynamic capital structure of enterprises. The dynamic structure of capital depends on and changes dynamically with, its underlying costs, tax shields, risk-free rates, recapitalization costs, and other factors. When the capital composition deviates too much from its optimal capital structure, it will gradually move back to the optimal capital structure and fluctuate around the optimal capital structure. When the company is profitable and the debt ratio is reduced, the company will choose to recapitalize. Fischer, Heinkel & Zechner (1989) expressed this model as the (s,s) adjustment mode.

Hennessy & Whited (2005) constructed a model of corporate financing, investment and allocation. The level of investment, the use of cash flow and the composition of the capital structure are all endogenous variables in the model. These variables depend on various taxes and potential costs to the business, such as the distribution of dividends, the cost of financial distress and personal income tax, etc. Titman & Tsyplakov (2007) developed a continuous-time model that can dynamically adjust the

capital structure and the proportion of corporate investment. The market value of an enterprise depends on the income of the enterprise, and the income depends on the current market price and the investment choice of the enterprise. Finally, the investment choice of the enterprise depends on the cash flow, product price and capital structure. Thus, whether it is the enterprise's market Value, investment choices or the capital structure of a business are all endogenous variables. The results of the model show that:

1. The conflict of interest between creditors and shareholders and the cost of bankruptcy has a great impact on the long-term debt ratio of the company, so it will appear conservatively in the early stage of the company's choice of capital structure.

2. The conflict of interest between creditors and shareholders and the risk of bankruptcy has different effects on the capital structure of the enterprise. The former slows down the return of the enterprise to the target capital structure, while the latter accelerates the return trend.

3. When enterprise managers take the interests of the enterprise as the fundamental rather than the interests of shareholders, the adjustable speed of the enterprise to the optimal capital structure is faster, and the elasticity of the rate of a return caused by the adjustment of the capital structure of the enterprise is lower.

## II. ASYMMETRIC INFORMATION THEORY

Obviously, in daily transactions, Information asymmetry exists between the two sides of the transaction. Generally speaking, sellers have more information than buyers. Sellers can obtain more information and are likely to take advantage of this information asymmetry, resulting in an amount in a transaction that is much higher than the actual value of the item. The most famous example is The Market for Lemons (Akerlof, 1970), when people are unsure of what a used car is worth, sellers use information asymmetry to drive up prices. At the same time, consumers cannot determine the value, they bargain the price as low as possible, which causes the problem of adverse selection. The result of this is that the quality of used cars in the market is getting worse and worse.

Ross. (1977) proposed capital signaling theory. Due to the information asymmetry between enterprises and external investment, the management of enterprises is familiar with information such as profit distribution, cash flow and future development of enterprises. Operators use the level of debt of the business as a signal to investors. Companies with high bankruptcy risk and have low debt ratios, and high-quality companies use high debt levels to indicate that their risk of bankruptcy is low. Low-quality companies are generally unable to imitate this.



Miller & Rock (1985) proposed the cash flow signaling hypothesis. They extended the standard models of investment and finance and showed that there is an information-consistent signaling equilibrium under stock trading and asymmetric information. Using contractual terms to circumvent profitable opportunities from information asymmetry is feasible, but also incurs deadweight costs. Thus, this article has not yet determined which path to rely on for consistency.

Kim (1990) puts forward the signaling theory of convertible bonds. Because companies with better development prospects generally use creditors' rights for financing, this phenomenon creates more shareholder returns. Therefore, when convertible bonds are issued, it is a good signal for investors that convertible bonds are biased towards bonds. However, when convertible bonds are biased towards stocks, this is a bad signal for investors. Stein (1992) thinks that the adverse selection problem caused by information asymmetry makes equity financing unattractive to enterprises, and enterprises will choose to issue convertible bonds as an alternative. Convertible bonds are not stocks but may become stocks in the future, so less negative information is sent. Still, convertible bonds can harm stock prices.

### III. PECKING ORDER THEORY

Myers & Majluf (1984) proposed the pecking order theory, this theory is based on the theory of information asymmetry and the assumption that managers act in the interests of the old shareholders. Investors do not know the true value of the companies that issues share and can only rely on discounted cash flow to estimate the company's value, which leads to an underestimation of the company's value. Therefore, the company will give priority to internal financing. Suppose the announcement time is divided into three stages,  $t-1$ ,  $t_0$  and  $t+1$ . Due to the asymmetry of information, the information received by everyone is equal at  $t+1$ , but the insiders receive more information at  $t_0$ . Their statistical results indicate that the issuance of convertible bonds hurts company valuation. This theory better reflects the choice of the company's financing methods and lays the foundation of the pecking theory. Using this theory to estimate the U.S. market is accurate. However, in the Chinese market, equity financing is the cheapest method, so internal financing does not account for a large proportion of Chinese companies. Instead, equity financing takes precedence over internal financing.

Han, Mou, Xie & Chen zh'an (2007) verified the pecking theory in the Chinese market, and also conducted an empirical study on the announcement effect of convertible bonds in China. They concluded that the wealth effect of convertible bonds is negatively related to company size, capital structure and convertible bond issuance size, but is positively related to leverage level and liquidity structure of equity. They attribute these correlations to a dual-class share structure specific to Chinese companies.

## CHAPTER 5 – LITERATURE REVIEW ON THE ANNOUNCEMENT EFFECT OF CONVERTIBLE BONDS IN CHINA

Firstly, since China began to carry out the share structure reform in 1998, that is, the non-tradable shares pay a certain consideration for the tradable shares to realize the full circle of the shares, which has a great impact on the stock market. Secondly, the development of China's convertible bond market is relatively slow, which also led to a small sample of early convertible bond studies. As a result, Chinese scholars had insufficient examples on this subject and even came to diametrically opposite conclusions from the same sample (Liu Chengyan, 2005; Liu Eping, 2005).

### I. POSITIVE ANNOUNCEMENT EFFECT

Wang Huiyu et al. (2004) found that the CAR on the day of the announcement of convertible bonds was 0.26%, and the CAR was the largest at 15 days, reaching 0.97%. The study uses 20 convertible bonds from 1992 to the end of 2003 as a sample. Liu Chengyan et al. (2005) found that there was a significant positive effect (0.64%), on the day after the announcement of convertible bonds, but the sample size of the study was relatively small from April 2001 to the end of 2003.

Hu Minjie et al. (2013) studied the impact of investor sentiment and convertible bond announcements on company stock prices. The study showed that before the ex-rights date, convertible bond announcements had a significant positive effect on stock prices, and the higher the price-earnings ratio, the greater the positive effect. This also shows that the announcement of the convertible bond issuance is a positive signal for investors. The sample of this study is the change of the stock price in the announcement time and ex-rights time of 67 companies from 2000 to 2010. Song Xiu fang & Fan hanyu (2014) studied and analyzed 101 samples of China's A-shares from 2005 to 2013, and concluded that the announcement effect is significantly positive for fully-circulated stock samples. He took this as evidence to show that China's share structure reform is very effective.

Liu huanhuan et.al (2016) conducted a sub-industry study on the announcement effect of 37 convertible bonds issued by listed companies from 2011 to 2015. The results show that the announcement effect on the manufacturing and energy industries is more significant. Zhang Likun and Xiao wan (2016) used the convertible bond data from the split share reform in 2013 as a sample to analyze the announcement effect. The results show that the announcement date was significantly positive, with a 1.67% excess return.

## II. NEGATIVE ANNOUNCEMENT EFFECT

Liu Eping (2005) used the event analysis method to analyze the 88 samples from April 2001 to December 2003 to test whether the announcement of convertible bonds by listed companies has a wealth effect. Research shows that the public company's convertible bond issuance announcement has a significant negative effect, but it is significantly lower than the negative wealth effect generated by secondary public offering. Mou hui et.al (2006) analyzed all convertible bonds before 2004 and found that the issuance of convertible bonds had a significant negative effect (-0.7%) on stock prices. Based on this, they judged that the financing sequence of Chinese enterprises is different from the pecking theory, enterprises use external financing first.

Yuan Xianping and Ke Dagang (2008) showed that when the board of directors plans to issue convertible bonds, there is a negative stock price effect. This negative stock price effect can be explained by the proportion of tradable shares and the size of the company. The negative effect is more obvious when the proportion of tradable shares is large, indicating that shareholders of tradable shares have a negative attitude towards the issuance of convertible bonds. Huang dingfa (2010) selected 28 convertible bond issuance announcements from August to October 2007 and 14 companies issued corporate bonds as a comparison and found that compared with corporate bonds. Although convertible bonds have negative wealth effects, they are much smaller than the issuance of corporate bonds, -1.82% and -5.45% respectively in the time interval of (-6, 4). Zhou binchen (2020) studied 74 samples of convertible bond announcement effect and found that there was a significant effect of -0.477% at the 10% level on the pre-announcement date of convertible bonds.

## III. FACTORS INFLUENCING THE ANNOUNCEMENT EFFECT IN CHINA

Several major factors affect the announcement effect of convertible bonds in China: the size of the company, the proportion of outstanding shares, the size of the convertible bonds, the period of changes in the Chinese market environment and the company's future expectations. Wang Huiyu et al. (2004) studied the convertible bonds issued by 20 companies from 1992 to 2003 through the method of cross-sectional regression. The research shows that the company CAR has a significant positive correlation with the size of the company and the size of the convertible bonds. Liu Chengyan et al. (2005) found that the announcement effect of convertible bonds is positively related to financial leverage, but significantly negatively related to the size of the company. Liu Eping (2005) used the stepwise regression method and found that CAR was significantly negatively correlated with equity dilution and the company's debt level. Mohui(2006) studied the convertible bonds before 2004 and found that the announcement effect of convertible bonds was significantly negatively correlated with the market value of ordinary stocks and the size of convertible bonds, but the AAR during the

announcement period was significantly positively correlated with the debt level of the company. Song fangxiu et al. (2014) concluded by studying the announcement of the plan. If the convertible bond is finally issued successfully, the announcement effect will be positive, and it will be negative if the convertible bond is unsuccessfully issued. At the same time, the company's asset size and the dilution of equity have a significant negative correlation with the announcement effect.

In general, the conclusions of different studies on the announcement effect of the convertible bond market in China are contradictory. There are several reasons:

First, the development of convertible bonds in China is relatively late, and there are very few successful cases in the early stage, so the sample size is insufficient. Thus, the conclusions obtained are naturally not all accurate.

The second is the application of the model. Most of the research on the announcement effect of convertible bonds by Chinese scholars directly imitates the research methods of the US or European markets, but the models for other markets cannot be accurately described when they are directly applied to the Chinese market. For example, the estimation of market risk by the CAPM model is not exactly suitable for the Chinese market.

Third, the Chinese market has undergone the split share structure reform. The impact of this reform on the announcement effect is huge. Most of the research has a very long-time span, including a bull market and a bear market. The impact of the announcement effect under different market conditions is also different.

## **CHAPTER 6 – LITERATURE REVIEW ON THE ANNOUNCEMENT EFFECT IN OTHER MARKETS**

In general, in the United States, Europe and Japan, where the financial markets are more developed. The issuance logic of convertible bonds is the same as that of a secondary public offering, which will lead to dilution of equity. Therefore, the announcement effect on these markets is mostly negative. However, in some specific developed financial markets, the announcement effect is generally positive, such as Japan and Netherlands.

### **I. EUROPEAN MARKET**

Abhyankar and Dunning (1999) studied 129 samples in the English market: The announcement of convertible bonds for different financing purposes has different effects. The announcement of convertible bonds for debt repayment and acquisition, such convertible bond has a negative wealth effect. The convertible bonds for capital expenditure purposes, all show positive wealth effects. Roon and Veld (1998) studied the announcement effect of Dutch convertible bond issuance and found that Dutch convertible bonds had a positive wealth effect, although the results of regression analysis were not significant. They attribute this result to the propaganda of the Dutch company. Ammann M et al. (2006) conducted a study of convertible bond announcements in the German and Swiss markets, using data from 1996 to 2003. The results of the study show that in both the German and Swiss markets, the announcement of convertible bonds has a significant negative wealth effect, and this effect is more pronounced under adverse market conditions.

### **II. AMERICAN MARKET**

Marquardt and Wiedman (2005) used a sample of 207 convertible bond issuances from 2000 to 2002 and found that issuance date has a significant negative wealth effect and is related to diluted earnings per share. Dann and Mikkelson (1984) studied the impact of announcements of secondary public offerings on stock prices. The study found that there was a significant negative impact on stock prices around the announcement date. Managers tended to issue common stock or convertible bonds when stock prices were higher. It also illustrates that issuance is independent of relative size and ratings.

Arshanapalli et al. (2004) provided new evidence for the issuance of convertible bonds in the United States. The research shows that there are significant negative effects around the announcement date and the issuance date. Investors can use these negative effects to speculate. They also found that abnormal returns are a function of a company's market capitalization, price-to-book ratio, issuance size, and overall market conditions. Eric Duca et al. (2012) studied the convertible bond

announcements in the US market from 1984 to 1999 and found that the average abnormal return was -1.69%, while the average abnormal return from 2000 to 2008 reached -4.95%. They can attribute this change to the change in the type of investors, from long investors to hedge fund investments. Hedge funds shorted stocks and also affected the issuance expectations of convertible bonds.

## PART 3

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### RESEARCH PROBLEM AND METHODOLOGY

## CHAPTER 7 – RESEARCH PROBLEM

Theoretical significance: with the rapid development of China's convertible bond market in recent years, more and more companies have issued convertible bonds as a method of financing. However, because of the relatively slow-developing of China's convertible bond market in the early stage, there were a few theoretical analyses of convertible bonds. At the same time, companies and the market urgently need a deeper understanding of the convertible bond theory to avoid risk. Therefore, this paper analyses the theoretical background and empirical research on the announcement effect of convertible bonds and contributes to the theoretical and empirical research on China's market.

In China, both investors and companies have a relatively sciolous understanding of convertible bonds. Companies regard convertible bonds as a new method to encircle money. Investors, most retail investors in China, see convertible bonds as a new form of speculation. Since China's convertible bonds have guaranteed terms, there is almost no loss for those who directly apply for convertible bonds. Although retail investors have risked exposures to stocks corresponding to convertible bonds, most investors do not know how to avoid the corresponding risks. Therefore, it is necessary to explain the announcement effect of convertible bonds.

Meanwhile, I compare the announcement effect of convertible bonds during the pandemic and the announcement effect of convertible bonds before the pandemic to illustrate the impact of the pandemic on it.

### I. RESEARCH PROBLEM

There are two main research issues in this paper.

1. Is there an impact on the corresponding stock price when the convertible bond issuance is announced. If there is an impact, which is negative or positive.

2. What is the impact on convertible bond announcement effects before and after the pandemic.



## CHAPTER 8 – METHODOLOGY

First method is the literature research method. Looking for the research and theoretical basis of the announcement effect of convertible bonds in China and other countries, comparing the different market conditions in China and other countries, taking China's convertible bonds as the main body and drawing a relatively localized comparison conclusion are used. Then I synthesized all literature, formulated hypotheses and set appropriate models.

In the empirical research part, this article uses an event study structure to analyze the announcement effect. The datasets come from the CSMAR database and the Oriental Fortune database to determine the date of the first announcement, the daily rate of return of individual stocks and the data about the convertible bond issuing company. At the same time, this paper comprehensively analyzes the general situation of convertible bonds and the abnormal rate of return on the announcement date.

### I. RESEARCH HYPOTHESIS

Considering that previous research results on various markets around the world and previous research conclusions on the Chinese market, convertible bond announcements in developed markets generally have a negative effect on stock prices, while developing markets have a positive effect on stock prices. However, there are exceptions. For example, the announcement effect of convertible bonds in the Netherlands or Japan is generally positive, but they are all developed markets.

Based on the theoretical basis of the literature review, the following assumptions are made:

Hypothesis 0: the announcement effect of convertible bonds is significantly positive in China's secondary market.

### II. EMPIRICAL MODEL

Ball and Brown (1968) created the event study. An event study is to study the impact of an event on the stock price by setting the window period. Since in the stock market, the effectiveness of news will quickly reflect on the stock price, an event study is usually used to determine the effectiveness of the market. Here I use an event study to verify the announcement effect of convertible bonds.

The followings are the specific steps:

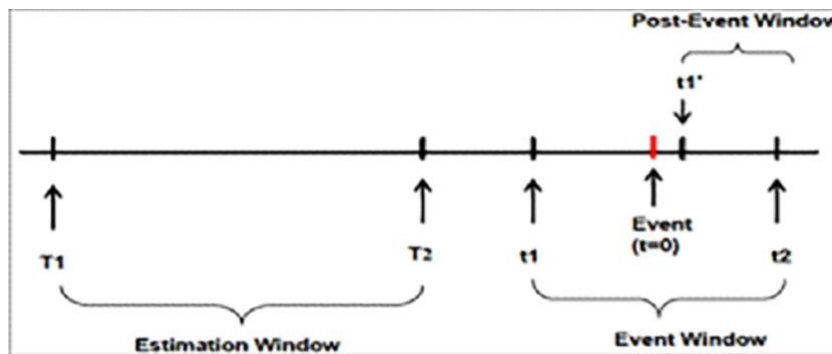
1. Determining the event, here is naturally the impact of the announcement of convertible bonds on the stock price.

2. Determining the date of the event, here is the first day of the public learning about the issuance of convertible bonds is chosen, regardless of whether this date is a pre-announcement or a formal announcement.

3. Select the sample range and determine the time window.

This paper draws on the window selection of Wu Ruixin (2021) and takes 240 days before the event to 30 days before the event as the normal return range for stocks [-240, -30]. The convertible bond announcement date is the base date, and five-day windows are created for comparison. One day before the announcement to the next day, a total of two days [1,1] is used as a time window, two days before the announcement and two days after the announcement, a total of four days [2, 2], five days before the announcement to five days after the announcement [5, 5], ten days before the announcement to ten days after the announcement [10, 10], twenty days before the announcement to twenty days after the announcement [20, 20].

Illustration of the event window



Source: <https://lianxh.cn/news/3820f71099fd9.html>

**Figure 5: illustration of the event window**

4. Establishing a normal rate of return and abnormal rate of return model estimates abnormal returns. Generally speaking, the rate of return model has the following types:

(1) CAPM model

$$R_{it} - r_f = \beta(R_{mt} - R_f) + \varepsilon_{it}$$

(2) Market model

$$R_{it} = a_i + \beta_i R_{mt} + \varepsilon_{it}$$

$$E(\varepsilon_{it}) = 0 \quad \text{Var}(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

### (3) market-adjusted returns model

For the share's (i) abnormal return ( $AR_{it}$ )

$$AR_{it} = R_{it} - R_{mt} = \frac{P_{it} - P_{i(t-1)}}{P_{i(t-1)}} - \frac{P_{mt} - P_{m(t-1)}}{P_{m(t-1)}}$$

In the equations,  $R_{it}$  is the real return of stock i on trading day t,  $R_{mt}$  is the market return on trading day t. Since stocks come from two different markets, I use a composite index, the CSI 300 Index of high-quality stocks representing the Shanghai Stock Exchange and the Shenzhen Stock Exchange.  $P_{it}$  is the closing price of stock i at the end of period t,  $P_{mt}$  is the closing price corresponding same period of stock.

At this point, we can get the average annual ( $AAR_t$ ) return of all samples in trading day t:

$$AAR_t = \frac{1}{N} \sum_{i=1}^N AR_{it}$$

Thus, the cumulative abnormal return ( $CAR_{it}$ ) of share I in trading day t is:

$$CAR_{it[t_1, t_2]} = \sum_{t=t_1}^{t=t_2} AR_{it}$$

We can have N shares' cumulative average annual return in time  $[t_1, t_2]$ :

$$CAAR_{[t_1, t_2]} = \frac{1}{N} \sum_{i=1}^N \sum_{t=t_1}^{t=t_2} AAR_{it}$$

At this time, the t-test statistics of  $AAR_t$  and  $CAAR_t$  are:

$$t_{AAR_t} = \frac{AAR_t}{S^2(AAR_t)/\sqrt{n}}$$

$$t_{CAAR_t} = \frac{CAAR_t}{S^2(CAAR_t)/\sqrt{n}}$$

Given that China's market is an underdeveloped market and the market's effectiveness is insufficient. This paper adopts the method of Fu Leiming (2011) and uses the Market-Adjusted Returns Model as the benchmark model for regression. The main feature of this model is to use the market rate of return as the company's daily return expected rate of return.

### III. DATA DESCRIPTION

This article takes convertible bonds from April 2014 to May 2022 as the research object. Since the outbreak of the pandemic in China was in January 2020, this time is used as a node to distinguish convertible bonds announced before the pandemic and convertible bonds announced after the pandemic. The abnormal returns of the previous and subsequent convertible bond announcements were analyzed separately. The total number of samples from January 2020 to May 2022 is 189, and the total number of samples from June 2014 to November 2019 is 294.

The inclusion criteria for the samples are:

1. Non-financial industries and ST stocks<sup>1</sup>. Since the asset-liability structure of the financial industry is very different from that of ordinary companies, convertible bonds in the financial industry, such as banks and securities companies, are excluded.

2. There are no major events before or after the initial announcement day. Stocks with major events within one week of the first announcement date are also excluded.

3. The window of this paper is selected from [-1,1], [-2,2], [-3,3], [-5,5], [-10,10], [-20,20]. The estimated period of the sample is [-240, -30]. If the announcement date is not the same day as the trading day, the first trading day after the announcement date is selected as the reflection of the announcement effect.

The sample obtained after screening the sample is 189 companies in the post-period of the pandemic. For the period before the pandemic, the sample obtained after screening is 309. The datasets of listed companies come from the CSMAR database.

#### *A. Statistics description of the sample*

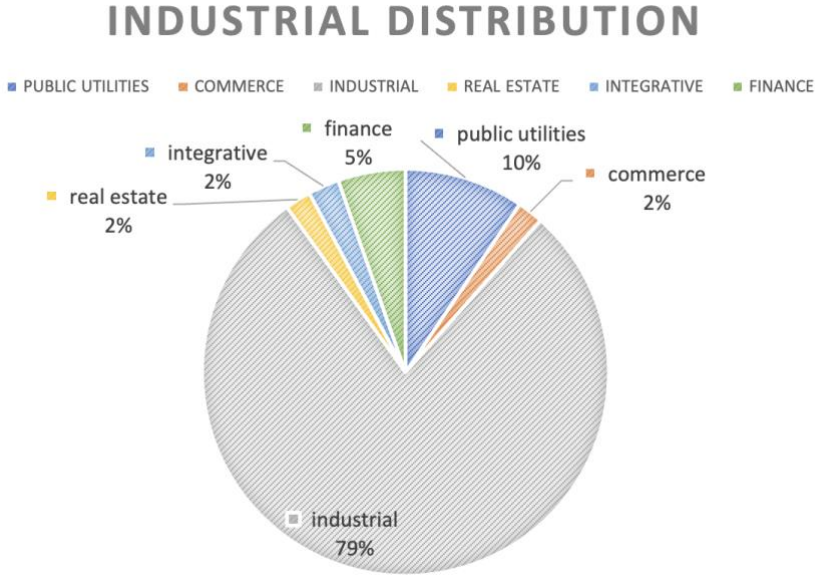
After the pandemic, from January 2020 to May 2022, a total of 249 convertible bonds were issued, of which industry accounted for 79% of convertible bond financing, public utilities<sup>2</sup> accounted for 10%, financial industry accounted for 5%, and the remaining the following accounts for only 6%. It can be seen that for convertible bonds, mainly industry accounts for the vast majority. The main issuers of China's convertible bonds have always been industries. As the conditions for the issuance of

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<sup>1</sup> stocks at risk of delisting

<sup>2</sup> Public utilities are those responsible for maintaining public service infrastructure. Public utilities are under a natural monopoly, possibly under the control of the government, and if privately owned, they are supervised by administrative regulations. Generally speaking, public utilities include electricity, water supply, waste treatment, sewage treatment, gas supply, transportation, communication, etc.

convertible bonds have gradually released, this financing method has also made great contributions to China's industrial development.



Source: Arranged by dataset from CSMAR

**Figure 6: Industry distribution in China's market**

**Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
Issue amount (billion Yuan)	250	10.356	36.035	0.305	500
Term(year)	245	5.98	0.142	5	6
Interest Rate (%)	245	0.336	0.099	0.1	0.6
Conversion Premium (%) <sup>3</sup>	230	114.317	65.736	1	228

**Table 1: Description statistics for sample before screening**

<sup>3</sup> This is the conversion premium rate on May 23, 2022

As can be seen from the table, the standard deviation of China's convertible bond issuance scale is relatively large, reaching 3.6035 billion yuan, of which the smallest is only 30.5 million yuan, and the largest is 50 billion yuan. Such large-scale convertible bonds are generally issued by the finance industry. The maturity term of convertible bonds generally reaches the top level of 6 years, because the maturity of convertible bonds in China is stipulated as 1-6 years, which is quite different from the unlimited maturity term in Europe and the United States. However, companies generally choose 6 years as the maturity term, meaning that the existing time limit can no longer meet the requirements of enterprises. For coupon rates, there are two main reasons for the relatively low coupon rate of convertible bonds. First, investors value the option value contained in convertible bonds, so they do not emphasize on the coupon rate of convertible bonds. Second, convertible bond issuers in the Chinese market have relatively high creditworthiness and generally have guarantee clauses, so the risk premium is low. The conversion premium rate of convertible bonds in the Chinese market is relatively high, with an average of 114.317%. Since the Chinese market participants are mainly individual investors and have a strong speculative atmosphere, the conversion premium rate after issuance is at a high level.

## CHAPTER 9 – STATISTIC RESULTS

This paper divides statistical results into two parts: before and after the pandemic.

### I. STATISTIC RESULTS OF SAMPLES AFTER A PANDEMIC

AAR and CAAR results will be presented

#### A. AAR statistic results

It can be seen from the table that there is a positive effect of 0.086% on the announcement day, but the statistical result is not significant. On the following dates, the impact of the convertible bond announcement on the stock price was positive and reached the maximum on the fourth day, which is 0.284%, but the results were not significant as well, indicating that the first announcement of the issue of convertible bonds had no significant impact on the stock price. Since this data is after the pandemic, this result reflects that under the pandemic, investors do not consider the issuance of convertible bonds as a negative sign, but only a good investment approach. Because the conversion period of convertible bonds to shares is long and the impact on the stock price is gradual, the results are not significant. However, there are 0.375% and 0.381% positive effects on the price of a stock on the day - 4 and day -3, significantly 5% and 10% respectively. In sum, the statistical results show that the announcement date of convertible bonds issued after the pandemic has no significant impact, but the results are still positive.

Given that Manufacturing companies account for the majority in China's convertible bond market, and because of its strict pandemic measures and as the first country to break out, China recovered quickly after suffering a short-term impact, it had formed a time lag with other countries. When most countries were hit by the pandemic, China was just recovering from the initial pandemic. Since the manufacturing industries in many other countries were largely shut down due to the impact of the pandemic, China's manufacturing output expanded massively after the pandemic and reached US\$75.42 billion in November 2020. This is the highest record in China's foreign trade statistics in the past 40 years. Therefore, the issue of convertible bonds with the manufacturing industry at this time is more for expansion. It is natural to receive positive feedback from the market.

AAR results for sample after pandemic

Trading day	AAR	T_value	P_value	AAR_significance
-5	0.0007891	0.783118	0.4344443	
-4	0.0037488	2.038566	0.0427526	**
-3	0.0038061	1.74803	0.0819273	*
-2	0.0013164	0.3325281	0.7398238	
-1	-0.0002069	-0.6829841	0.4953733	
0	0.0008636	0.6934463	0.4887994	
1	0.0020626	0.6886142	0.4918297	
2	0.0007146	-0.4088608	0.6830604	
3	0.0001377	-0.4840018	0.6288913	
4	0.0028362	1.485262	0.1389812	
5	0.0022505	1.454989	0.1471726	

Note: \*\*\*, \*\*, \* represent significant levels at 1%, 5% and 10%, respectively

**Table 2: AAR results for sample after the pandemic**

*B. CAAR results*

Using the formula to further calculate the CAAR of the window period, the time interval of [-5;5] is the most significant, and the CAAR value is 0.832%, indicating that the cumulative impact on the stock price during this announcement period is positive. The hypothesis set above is verified, which means the announcement of convertible bonds has a positive and significant impact on the stock price. When we further subdivide the data in the [0;5] window, the effect is not significant. The [-5;0] window has a positive effect of 0.887% and is significant at the 5% level. In the window [0.10], the value of CAAR is 0.27% under significant level 10%. In sum, the announcement effect during the posted period of the pandemic is positive on the stock price.

Here are the reasons: Firstly, due to the pandemic, the market's view of the company is generally pessimistic. At the same time, issuance conditions of convertible bonds are relatively high. The investors consider the issuance of convertible bonds as a signal of the company's future development. Secondly, the issuance of convertible bonds in China is often accompanied by a downward revision of the conversion price. Therefore, no matter how the stock price falls, the company will eventually revise the conversion price to guarantee conversion. At the same time, the enterprise can revise the conversion price to minimize the risk of bankruptcy. This has strengthened investors' confidence in the company's issuance of convertible bonds. Another reason is that there is still a large number of non-



tradable stocks in the Chinese market, and changes in stock prices will not have a direct impact on non-tradable stocks, which is also a major reason for the positive announcement effect of convertible bonds. In addition, the company that is about to issue a convertible bond will pick the day when stock prices have better performance.

This result also verifies the problem of information asymmetry in the market. Investors do not invest based on the real value of the company but can only infer from a certain event.

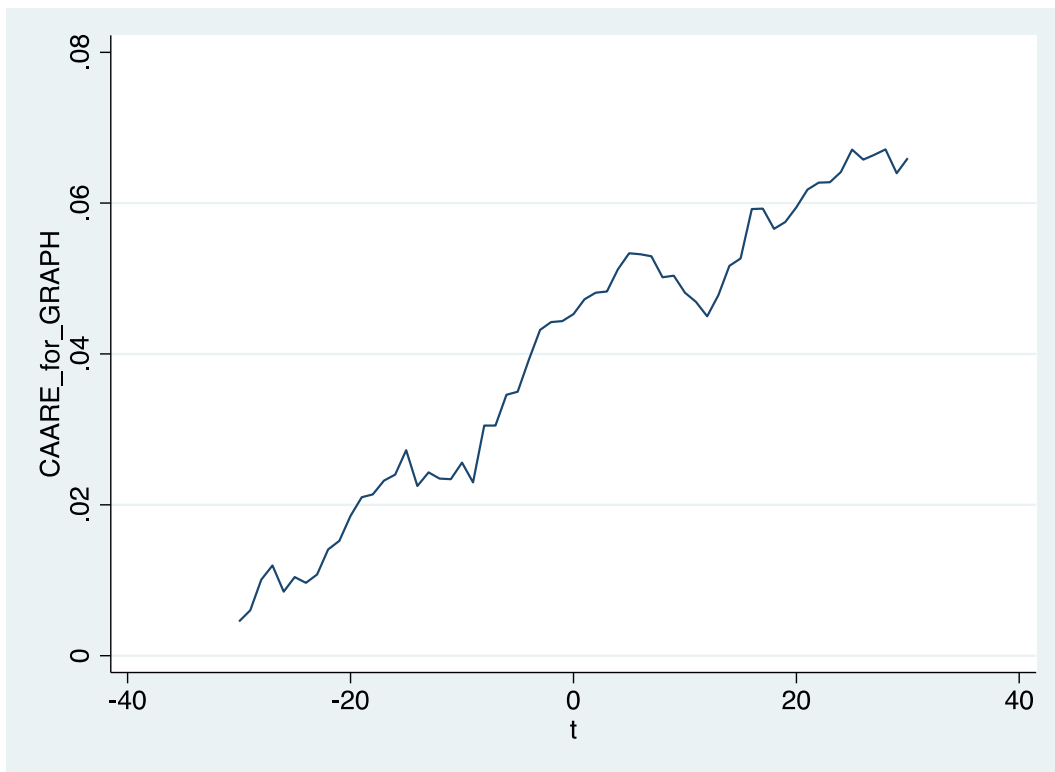
The results of different windows

Time Windows	CAAR	T_value(Boehmer)	P_value	CAAR_significance
[-10;10]	0.0233781	1.994944	0.047348	**
[-20;20]	0.0435414	2.241533	0.0260427	**
[-1;0]	0.0006679	-0.0823537	0.9344443	
[-2;0]	0.0019205	0.2005817	0.0912207	*
[-3;0]	0.0057937	1.444339	0.1501411	
[-5;0]	0.0102265	2.210764	0.0281365	**
[-10;0]	0.0222498	2.358928	0.01925	**
[-20;0]	0.0312432	2.365575	0.018917	**
[0;20]	0.0135187	0.7351243	0.4630879	
[0;10]	0.0027	-1.756633	0.0789805	*
[0;5]	0.0088651	1.285363	0.2000879	
[0;3]	0.0038134	0.5801381	0.5624464	
[0;2]	0.0035638	0.6995366	0.4849946	
[0;1]	0.002779	0.8685236	0.386104	
[-5;5]	0.0183186	2.750153	0.006479	***
[-4;4]	0.0150977	2.520843	0.0124542	**
[-3;3]	0.0086525	1.374922	0.1706277	
[-2;2]	0.0045297	0.2606286	0.7946356	
[-1;1]	0.0024924	0.1720496	0.863565	

Note: \*\*\*, \*\*, \* represent significant levels at 1%, 5% and 10%, respectively

**Table 3: The results of different windows for samples after the pandemic**

### The trend of CAAR



**Figure 7: The trend of CAAR for samples after the pandemic**

#### *C. Robustness Test*

This paper uses the holding-period rate of return model to test its robustness. BHAR (Buy and Hold Abnormal Return): this model will increase with the growth of the income period, even if there is no abnormal return after the event. The results and trends using the BHAR model are consistent with the results obtained using the market-adjusted model.

BHAR time windows results

Time windows	BHAR	BHAR_significance
[-10;10]	0.0273018	**
[-20;20]	0.0553313	***
[-1;0]	0.0017322	
[-2;0]	0.0033546	
[-3;0]	0.0073135	*
[-5;0]	0.0119458	**
[-10;0]	0.0259564	***
[-20;0]	0.038494	***
[0;20]	0.0184772	
[0;10]	0.0036979	
[0;5]	0.0113286	**
[0;3]	0.0056567	
[0;2]	0.0046216	
[0;1]	0.00378	
[-5;5]	0.0218112	***
[-4;4]	0.0186356	**
[-3;3]	0.0119987	
[-2;2]	0.0069496	
[-1;1]	0.0045834	

Note: \*\*\*, \*\*, \* represent significant levels at 1%, 5% and 10%, respectively

**Table 4: BHAR time windows results**

The contrast between Market adjusted model and Buy and Hold Abnormal Return model

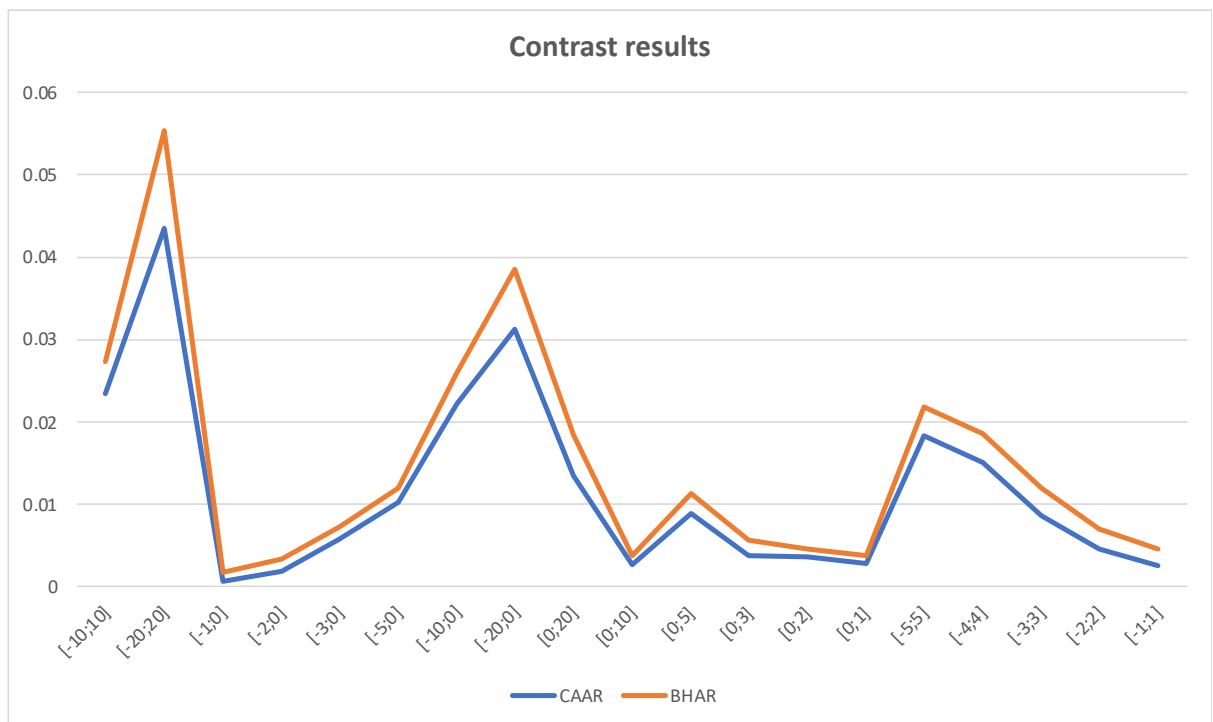


Figure 8: Contrast of CAAR and BHAR model

The trend of BHAR (Buy and Hold Abnormal Return) model

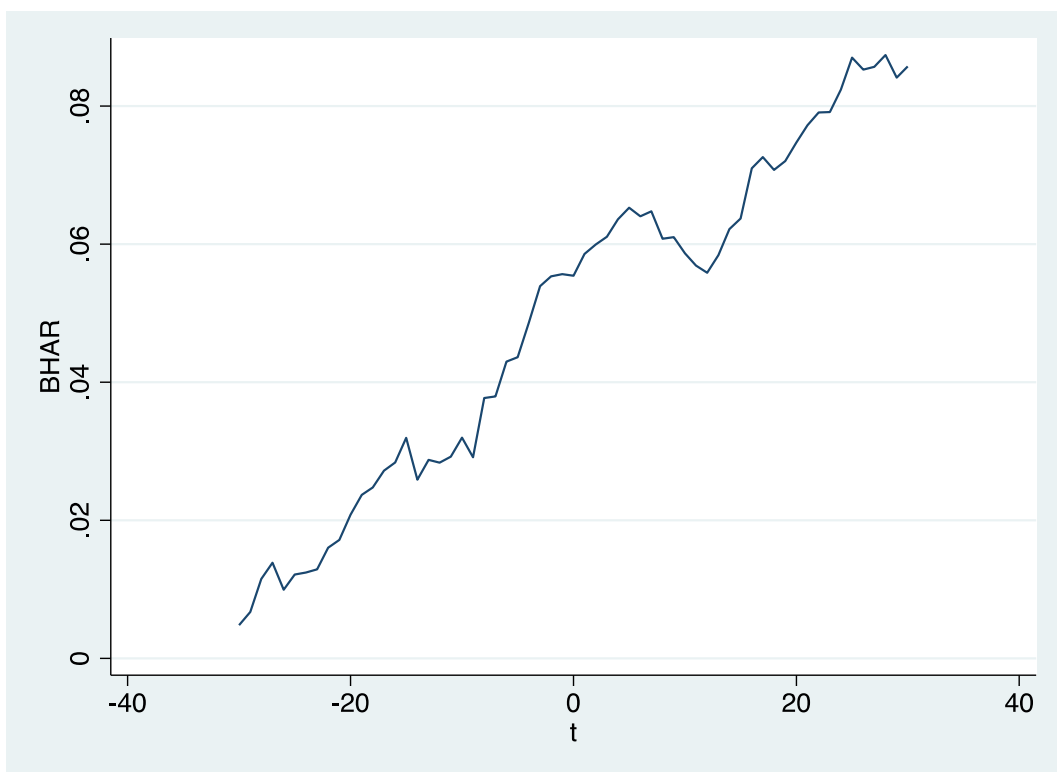


Figure 9: The trend of BHAR (Buy and Hold Abnormal Return) model.

By comparing the results of different models, the results obtained by using the market adjusted model are robust.

In general, the announcement of convertible bonds after the pandemic has an obvious positive stock price effect during the window period of [-5, 5]. Due to the imperfect development of China's stock market and convertible bond market, the market is not completely free. The issuance system of convertible bonds not only protects investors' right to know but also plays a role in screening companies. Therefore, the announcement of convertible bonds represents the company's qualifications and future development prospects, which caused the results in the window period to be positive.

## II. STATISTIC RESULTS OF THE SAMPLES BEFORE THE PANDEMIC

The statistical results of 294 samples before the pandemic show that the announcement of convertible bonds has a significant negative effect (-0.462%) at the 1% level before the pandemic (June 2014 to November 2019). AAR turns positive on day four, which is 0.323% in the significance of the 5% level. This result is completely contrary to our pre-hypothesis. This shows that investors are generally pessimistic about the issuance of convertible bonds if there is no continued impact of major events, such as the pandemic. At this time, investors pay more attention to the dilution of equity by the issuance of convertible bonds. According to the pecking order theory (Myers and Majluf 1984), corporate financing is generally from internal to external, so when a company chooses external financing, it shows the lack of internal resources in the company.

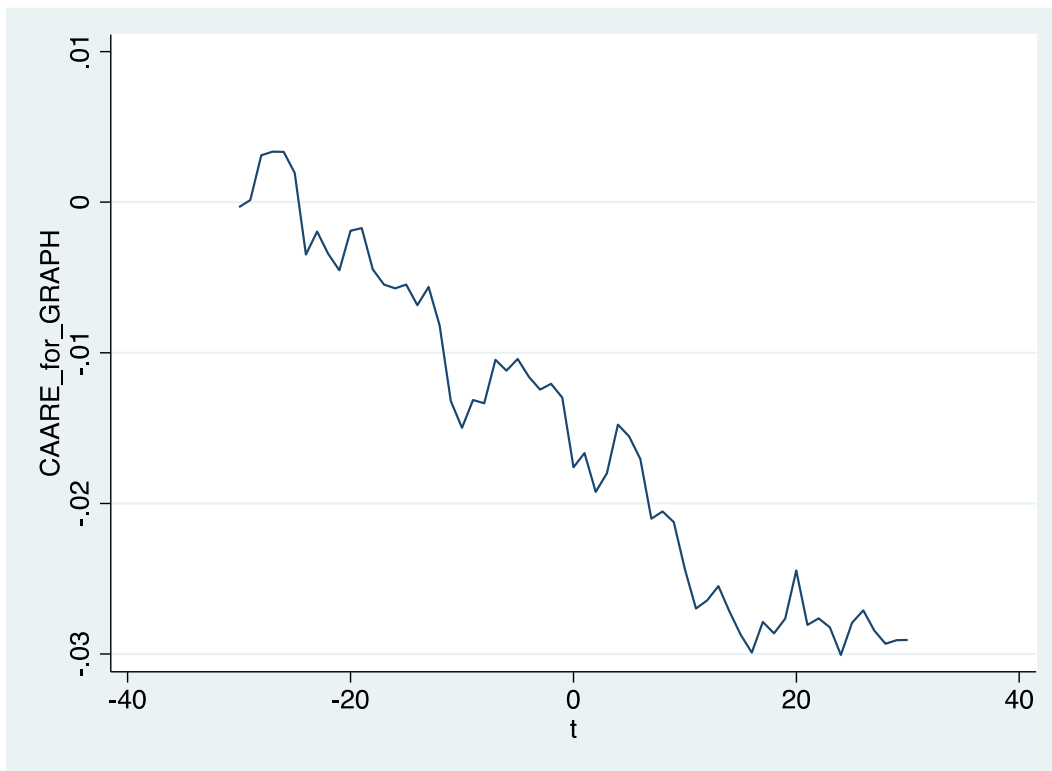
The trend of CAAR in the whole window period is declining after the pandemic. In general, the announcement of convertible bonds has a significant negative effect on the stock price during the window.

AAR results of the sample before the pandemic

Trading day	AAR	T_value	P_value	AAR_significance
-5	0.0005864	0.326086	0.7446855	
-4	-0.0011846	-0.6609321	0.5093837	
-3	-0.0008607	-0.4802169	0.6315754	
-2	0.0003854	0.2150617	0.8299289	
-1	-0.0009233	-0.5116757	0.6094182	
0	-0.0046234	-2.553318	0.0093831	***
1	0.0009288	0.5182474	0.6048339	
2	-0.0025927	-1.451507	0.1481381	
3	0.0012458	0.6974392	0.4863031	
4	0.0032307	1.808691	0.0419362	**
5	-0.0007888	-0.4416004	0.6592349	

Note: \*\*\*, \*\*, \* represent significant levels at 1%, 5% and 10%, respectively

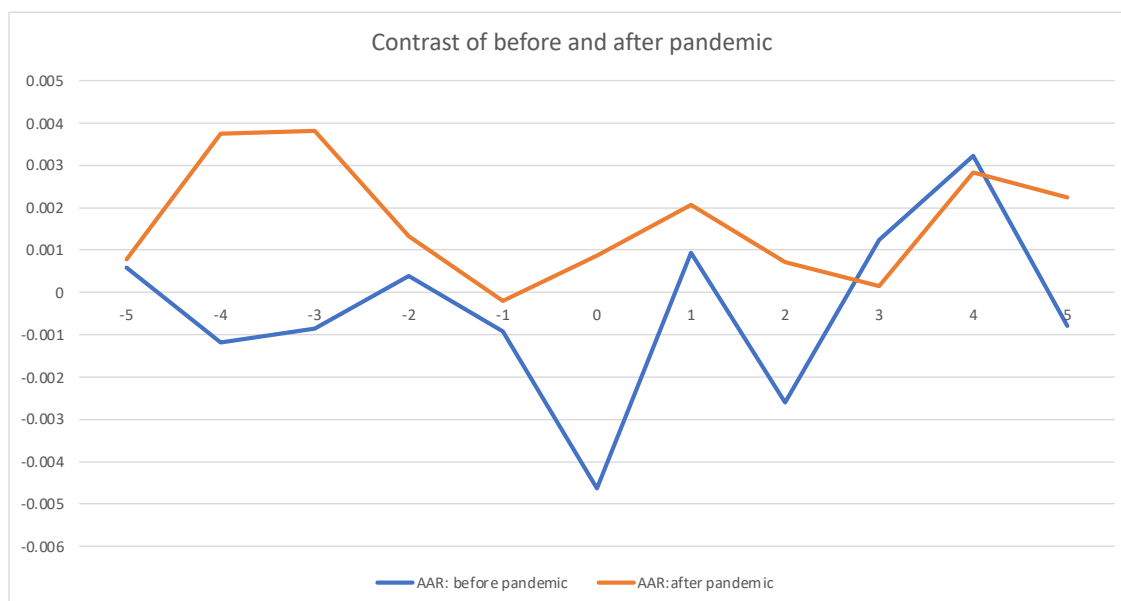
**Table 5:AAR results of the sample before pandemic**



The trend of CAAR [30,-30]

**Figure 10: The trend of CAAR [30, -30]**

By comparing the data before and after the pandemic, we can see that investors have a positive attitude towards the issuance of convertible bonds after the pandemic.



**Figure 11: the contrast of AAR results**

## CONCLUSION

The history of convertible bonds in China has only 30 years, and the market is developing rapidly in recent years. Because of the small number of early issuances, there are relatively few studies in this area. The research results on the announcement effect of convertible bonds are also inconsistent. This study compares the announcement effect of convertible bonds before and after the pandemic. The data in this article is divided into two parts, one is the announcement date of convertible bonds before the pandemic, from June 2014 to November 2019, with a total of 294 eligible samples. The other one is the post-pandemic data, from January 2020 to April 2022, a total of 189 eligible samples. The structure of this paper is mainly divided into three parts: introduction, literature review and event research. This research used the market adjusted model to estimate the normal return of the stock, and uses the BHAR model to examine its robustness of the model. This paper also lists the cumulative abnormal average returns for each window period in detail and conducts a T-test for each window.

The results of the statistics show that before the pandemic, the impact on the stock price on the announcement date of convertible bonds was significantly negative (-0.62% in 1% level). On the day of the announcement of convertible bonds after the pandemic, the impact on stock prices is positive, but the results are not significant. However, when the window extends to [5,5], the announcement effect of convertible bonds has a significant positive result (2.181% at 1% level). By comparing the attitudes of investors towards convertible bonds before and after the pandemic, it can be found that the company's choice to issue convertible bonds during the downturn has a positive attitude towards to announcement.

This result also verified the asymmetric information theory, pecking order theory and the optimal financial structure theory. For the asymmetric information theory, the investors cannot judge the true value of a company, they will only estimate the value of enterprises by market conditions and other investors' behaviors. For the optimal financial structure, the convertible bond can generate the tax shield for companies to create value, combined with the lowest cost external sourcing for the Chinese market. All of these effectors will have an impact on the announcement effect of convertible bonds in China's market.

There are some shortages in this study, first shortcoming is that there is no further analysis of the relevant factors affecting convertible bonds, such as the dilution of convertible bonds to the company's equity and the proportion of non-tradable shares. The second shortcoming is that this paper does not study the impact of the split share structure reform on the issuance announcement of convertible bonds. The third is the lack of analysis of the purposes of issuing a convertible bond. For example, a



company may raise funds to invest new project or repay debts before. The purpose will affect the announcement effect as well.

## **I. ADVICE ON CONVERTIBLE BOND FINANCING FOR LISTED COMPANIES AND INVESTORS**

### ***A. The choice of the timing of issuance***

The overall environment of the stock market has a great impact on the issuance of convertible bonds. For example, when the market is booming, investors will think that the issuance of convertible bonds will lead to equity dilution, and then have a negative attitude towards the issuance, resulting in a cumulative impact of the announcement period. During the pandemic, people will seek safer assets to avoid risks. Because of the strict regulations on the issuance of convertible bonds in the Chinese market, the issuance of convertible bonds at this time has become a symbol of the company's capital strength. The response to the announcement was more positive. Another factor is the company's debt level. For convertible bonds, due to the existence of the downward revision clause of the conversion price, the bankruptcy risk brought by issuing bonds is near zero, and there are the benefits of tax shields. Thus, the companies need to issue as much as possible convertible bonds when they have opportunities.

### ***B. Decision-making of investors***

Investors should further increase the allocation of stocks when the company announces the issuance of convertible bonds in order to obtain excess returns.

Firstly, investors need to make judgments on the economic situation: when the economic situation is on the rise, avoid the negative benefits brought by the announcement of convertible bonds. Secondly, investors must also examine the future development of the company. For companies with high growth potential, the issuance of convertible bonds can bring more investment returns. Finally, pay attention to the issuance terms of the convertible bonds, whether it includes the downward revision of the conversion price and the coupon rate of the convertible bonds. The downward revision of the conversion price can allow the company to avoid the risk of bankruptcy. At the same time, the lower coupon rate is also proof of the company's qualifications.

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## ABBREVIATIONS AND ACRONYMS USED

### ABBREVIATION:

1.AAR

2.CAR

3. CAAR

### ACRONYM:

1. The average annual return

2. cumulative abnormal return

3. Cumulative Average Abnormal Return

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