



## SECURITY ISSUANCE AND STOCK PRICE EFFECTS WITH HETEROGENEOUS BELIEFS

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### ABSTRACT

*We analyze the factors that affect security issuance and its impacts on the volatility of stock returns before and after the issuance under heterogeneous beliefs and short sale constraints using the issuing sample of convertible bonds, corporate bonds and stocks in China's security market during 2007 to 2012. The empirical tests identify that abnormal turnover can portray heterogeneous beliefs much better than dispersion in analysts' earnings forecasts. Firms' pecking order of external financing is convertible bonds, stocks and corporate bonds for the bigger firm size and higher market to book ratio. However, for those firms with higher leverage, issue amount and market volume, their optimal options are stocks, convertible bonds and then corporate bonds. The empirical results also reveal that convertible bonds issuance has a negative impact on price-earnings, but this effect diminishes in the long run. Besides, the influence of stock issuance on its return is negative only on the seasoned equity offering day. However, there is no significant effect on the yield rate in a short-term if corporate bonds are issued. Heterogeneous beliefs have a significant impact on the stock return, while negative for convertible bonds and positive for stocks and corporate bonds.*

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**Keywords:** Heterogeneous beliefs, Security issuance, Pecking order theory, Stock price effects, Regression model, China's security market.

## Contribution/ Originality

This study is one of very few studies which have investigated empirically on firm's pecking order of external financing under heterogeneous beliefs, including the effects on stock returns when taking convertible bonds, corporate bonds and stocks in China's security market into account.

## 1. INTRODUCTION

Various types of securities provide sources of financing for firms, e.g. stocks (Initial public offering (IPO), seasoned equity offering (SEO), etc.), bonds (short-term bonds, long-term bonds, etc.), convertible bonds and some financial derivatives, etc.. Take China's security market in 2013 as an example, the net issue amount of corporate bonds (for simplicity, bonds) is about 1,800 billion RMB, decrease by 453 billion RMB. The equity offering of non-financial firms is 221.9 billion RMB, decrease by 28.9 billion RMB, while on the contrary, the issuance of convertible bonds is 87.6 billion RMB, closer to the highest level of 92.4 billion RMB in 2010. As a nature of the financial market, heterogeneous beliefs among investors may cause asset prices deviating from its fundamental value, i.e. stocks overvalued or undervalued, managers then take advantage of market timing or catering, hence it will affect firms' financial policies and capital structure. In this circumstance, how firms choose the optimal securities to realize value maximization, and what will be the effects on share price have become hot topics in recent years.

Hong and Stein (2007) summarize three mechanisms that form heterogeneous beliefs, graduation information flow, limited attention and heterogeneous priors. Present research in this area contains two main streams, asset pricing and corporate finance with heterogeneous beliefs. Miller (1977) pioneers that when there are heterogeneous beliefs and short sale constraints, pessimistic investors will be expelled from the market and stock price mainly reflects the valuation of optimistic investors. Following researchers build series of models to verify this logic. For instance, Scheinkman and Xiong (2003) develop the relationship among heterogeneous beliefs, speculation and bubbles. They point out that over-confidence is the cause of heterogeneous beliefs, the latter together with short sale constraints characterize the stock prices' resale options, which affect investors' valuation of asset price. Their rational expectation model discovers the stock price bubble mystery from the perspective of heterogeneous beliefs. Fama and French (2007) analyze the impact of heterogeneous preferences on asset pricing and identify that heterogeneous beliefs' effect is temporary. Akins *et al.* (2012) suggest that the competition among informed investors has an important effect on how the information environment affects the cost of capital.

Stein (1996) proposes the market timing hypothesis based on assumption of irrational investors and imperfect market, and concludes that investors' irrationality may not affect firm's invest plan but do affect the timing of stock issuance. Baker and Wurgler (2002) analyze the capital structure and market timing according to the phenomenon of issuing stocks at high prices and repurchasing them at low prices, the empirical results support the market timing hypothesis rather than the trade off theory and pecking order theory. Chemmanur *et al.* (2010) empirically analyze the effect of heterogeneous beliefs among outside investors on the capital structure and security issuance

choices made by a firm using a sample of debt and seasoned equity issues from 1980-2004 and different proxies of investor optimism and the dispersion in investor beliefs. However, their work does not consider the situation of issuing convertible bonds. Based on the research of [Chemmanur et al. \(2010\)](#), [Bayar et al. \(2011\)](#) model a pecking order of firm's external financing decision in an environment of heterogeneous beliefs and short sales constraints, which is quite different from that generated by asymmetric information models. Furthermore, they present several unique testable predictions for the price impact of equity, debt, and convertible debt issues without empirical tests.

Some scholars discuss the situation which assumes managers being irrational. For instance, [Heaton \(2002\)](#) proposes that managers' overconfidence may lead to higher possibility of investing in projects with negative net present value and preference to issuing bonds. [Fairchild \(2005\)](#) identifies that overconfident managers prefer in debt financing and the degree of over confidence has positive relation with financial distress.

Some researches analyze the firm's financial policies based on the assumption that the outside investors and insiders have heterogeneous beliefs. For instance, [Bigus \(2003\)](#) provides a new approach to the theory of capital structure by emphasizing the issue that investors and entrepreneurs may have heterogeneous beliefs on firm's future returns, and examines a situation in which there is a perk consumption and heterogeneous beliefs on project's risk and mean. He also finds that optimal contracts tend to be highly nonlinear with heterogeneous beliefs. [Dittmar and Thakor \(2007\)](#) develop and test a new theory of security issuance which is consistent with the puzzling stylized fact that firms issue equity when their stock prices are high, and predict that managers use equity to finance projects when they believe that investors' views about project payoffs are likely to be aligned with theirs, thus maximizing the likelihood of agreement with investors, otherwise they use debt. They also find strong empirical support for the theory and document its incremental explanatory power over other security issuance theories such as market timing and time-varying adverse selection. [Lee \(2009\)](#) measure a firm's information asymmetry by its accounting information quality, and show that poor accounting information quality is associated with higher flotation costs in terms of larger underwriting fees, larger negative SEO announcement effects, and a higher probability of SEO withdrawals using a large sample of SEO. The results are robust to joint determination of offer size and flotation cost components and to adjustments for sample selection bias. [Yang \(2013\)](#) builds a dynamic trade-off model of corporate financing with differences in belief between the insider manager and outside investors, and finds that the optimal leverage depends on differences of opinion and can differ significantly from that in standard trade-off models.

As for the relation between security issuance and stock prices, in the [Graham and Harvey \(2001\)](#) anonymous survey of CFOs of public corporations, two thirds state that "the amount by which our stock is undervalued or overvalued was an important or very important consideration" in issuing equity. Several lines of evidence find that stock prices are viewed as more important than nine out of ten factors considered in the decision to issue common equity, and the most important of five factors in the decision to issue convertible debt. [Baker et al. \(2003\)](#) consider an undervalued

firm, and identify that the higher degree of under-valuation, the less the issuance of equity capital. [Gilchrist et al. \(2005\)](#) set up a framework of security issuance for managers based on long-term vision and market timing. [Greenwood et al. \(2010\)](#) analyze the effect of debt market efficiency on maturity structure, and while it falls within the market timing spirit it has the appealing feature that it does not require that firms have a debt market forecasting ability. Specifically, they argue that there are shocks to supply of bonds at different points in the yield curve, for example, changes in the maturity structure of government debt, that introduce corresponding mispricing along the yield curve. Given limited arbitrage on the investor side, firms that are indifferent to their debt maturity (in this otherwise Modigliani-Miller world) can supply debt at the mispriced term, limited only by their size. [Erel et al. \(2010\)](#) also confirm the significant relation between stock prices and public offering.

There are many other reasons why equity issuance and market valuations should be positively correlated, of course. More specific evidence for equity market timing comes from the pattern that new issues earn low subsequent returns. [Baker and Wurgler \(2000\)](#) discuss whether equity issuance, relative to total equity and debt issuance, predicts aggregate market returns between 1927 and 1999. They find that when the equity share was in its top historical quartile, the average value-weighted market return over the next year was negative 6%, or 15% below the average market return. [Baker et al. \(2003\)](#) examine the effect of debt market conditions on the maturity of debt issues and, perhaps more interestingly, connect the maturity of new issues to subsequent bond market returns. [Burch et al. \(2004\)](#) analyze the subsequent performance of seasoned equity issuance via rights offers, which are targeted to a firm's ongoing shareholders, and firm commitment offers, which are targeted to new shareholders. In their 1933 to 1949 sample, a period in which rights offers were more common, they find underperformance concentrated entirely in the latter group. This emphasizes the opportunistic timing of equity sales to new investors. [Henderson et al. \(2006\)](#) find a similar relationship in several international markets over the period 1990 to 2001. In 12 out of the 13 markets they examine, average market returns are higher after a below-median equity share year than after an above-median equity share year.

All in all, most of the present researches only discuss the issuance choices between stock and bonds and their effects on stock prices, which security firms should choose to maximize shareholder wealth and corporate value when taking convertible bonds into consideration? Whether heterogeneous beliefs will affect security issuance or not? Whether the issue amount is another factor firms should consider before making financing decision? To what degree the security issuance will affect stock prices and how long will it last?

Following the intuition in these studies, we propose some hypothesis based on the present research results and analyze the factors that affect security issuance which contains stocks, bonds and convertible bonds using the issuing sample during 2007 to 2012, and their impacts on the volatility of stock returns before and after the issuance under heterogeneous beliefs and short sale constraints.

This paper proceeds as follows. The hypothesis and sample data are described in Section 2, while Section 3 discusses the factors that affect security issuance. The influence of security issuance on stock prices is analyzed in Section 4. Section 5 presents our conclusions.

## 2. HYPOTHESES AND VARIABLES

Based on the above inference drawn from the literature, we propose some hypothesis and analyze the factors that affect security issuance and its impacts on the volatility of stock returns before and after the issuance under heterogeneous beliefs and short sale constraints using the issuing sample of convertible bonds, corporate bonds and stocks during 2007 to 2012 in China's security market.

### 2.1. Hypotheses

H1: Firms are more willing to issue stocks when outsiders' beliefs are highly dispersed.

H2: Firms are more willing to issue bonds when the issue amount is small.

H3: Firms are more willing to issue convertible bonds when the issue amount is large.

H4: Equity issuance has negative effect on stock returns.

H5: Bonds issuance has no significant impact on stock prices.

H6: Convertible bonds issuance has no significant impact on stock prices.

H7: The greater the dispersion in outsiders' beliefs, the greater the negative effect on stock price.

### 2.2. Sample Data

We choose the sample data of issued convertible bonds, bonds and stocks during 2007 to 2012 listed on China Shenzhen Stock Exchange and Shanghai Stock Exchange. After excluding the non-listed firms, financial corporates and any simultaneous offers of debt, equity, preferred stock, or warrants, there are 40 convertible bonds, 93 SEOs and 155 bonds left for the following empirical analysis. All issuers are collected in the CSMAR data base, and the other samples are from WIND data base.

### 2.3. Variables

#### (1) Heterogeneous beliefs

We use the dispersion among analysts and abnormal turnover as the proxy of heterogeneous beliefs among outside investors.

#### ① Dispersion among analysts (DISP)

We define dispersion (DISP) as the standard deviation of the current fiscal year annual earnings per share forecasts (the last forecasts available prior to the equity or debt issue) scaled by the absolute value of the mean earnings forecast. i.e.,

$$DISP = \sqrt{\frac{\sum_{n=1}^N (FRCST_n - \overline{FRCST})^2}{N-1}} / |\overline{FRCST}|$$

Thus the higher the dispersion among analysts forecasts, the higher the level of heterogeneity in investors' beliefs.

② Abnormal turnover (ABTURN)

We also use abnormal turnover (ABTURN) defined as the exchange adjusted turnover over the last 250 trading days prior to the day of the security issue as an additional proxy of heterogeneity in investors' beliefs.

$$ABTURN = \left[ \left( \frac{Vol_{i,t}}{Shs_{i,t}} \right) - \left( \frac{Vol_t}{Shs_t} \right) \right] - \frac{1}{T} \sum \left[ \left( \frac{Vol_{i,t}}{Shs_{i,t}} \right) - \left( \frac{Vol_t}{Shs_t} \right) \right]$$

The higher abnormal turnover of a stock is, the higher the level of heterogeneous beliefs among investors of the certain firm.

(2) Firm size (SIZE)

$$SIZE = \ln \left[ 100 \times (TA + MVE - BVE) \right]$$

Where *TA* denotes total assets, *MVE* denotes the market value of equity, and *BVE* denotes the book value of equity.

(3) Market-to-book ratio (MB)

$$MB = \frac{TA + MVE - BVE}{TA}$$

(4) Financial distress (ZSCORE)

$$ZSCORE = 1.2 \times \frac{WC}{TA} + 1.4 \times \frac{RE}{TA} + 3.3 \times \frac{EBIT}{TA} + 0.6 \times \frac{MVE}{DEBT} + \frac{SALES}{TA}$$

Where *WC* denotes working capital, *RE* denotes retained earnings, *EBIT* denotes earnings before interest and tax, *SALES* denotes sales revenue, and *DEBT* denotes the book value of debts.

(5) Leverage ratio (LEVG)

$$LEVG = \frac{DEBT}{TA + MVE - BVE}$$

(6) Issue amount (ISSA)

$$ISSA = \ln(\text{IssueAmount})$$

(7) Institutional holdings (LINST)

*LINST* denotes the log of the total shares owned by all institutional investors in a particular firm.

(8) Percentage of institutional holdings (PINST)

*PINST* denotes the proportion of total institutional shares held in a firm scaled by total outstanding shares.

Due to institutional constraints, most professional investors simply never sell short and hence cannot trade against over pricing of stocks they do not own. Furthermore, stock loan supply tends

to be sparse and short selling more expensive when institutional ownership is low. We thus control for the level of institutional holdings in the firm.

(9) Market volume (LMOVL)

LMOVL denotes economy wide market fluctuations using log of market volume.

(10) Cumulative abnormal return (CAR)

The average CAR is calculated as  $CAR_{i,T} = \sum_{t=1}^T AR_{it}$ , where  $AR_{it}$  is the abnormal return calculated as  $AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$  using the market model estimated over 250 trading days prior to the issue date, i.e. over the window (-280, -31).

### 3. SECURITY ISSUANCE UNDER HETEROGENEOUS BELIEFS

#### 3.1. The Descriptive Statistics

The descriptive statistical analysis of variables under different security choices are shown in Table 1, Table 2 and Table 3 respectively.

**Table-1.** The descriptive statistics of variables when issuing convertible bonds

Convertible Bonds	Obs.	Mean	S.D.	Medium	Differences in means with (t-test)		Wilcoxon Ranksum test with (z-statistics)	
					Stocks	Bonds	Stocks	Bonds
DISP	40	0.1006	0.1121	0.0623	-0.4389	-0.1452	0.8610	-0.3630
ABTURN	40	0.0039	0.0246	0.0019	6.3030	0.1046	5.0140	-1.1560
SIZE	40	27.553	1.2357	27.5769	0.8987	-3.2531	1.0350	-2.8900
MB	40	2.4476	1.4598	2.0505	0.3963	5.1372	0.8600	1.8150
ZSCORE	40	3.8343	2.3969	3.4356	-0.4444	3.8634	0.2150	1.8820
LEVG	40	0.2854	0.1856	0.2718	-0.3290	-2.0307	-0.9010	0.3900
ISSA	40	2.4475	1.0655	2.1913	0.1044	-0.4096	-0.3900	-1.0820
LINST	40	18.7267	1.9781	18.5907	1.5137	-2.8827	1.4520	-2.7150
PINST	40	0.3796	0.2624	0.3483	0.1402	-2.8918	-0.0810	-1.8150
LMOVL	40	8.0324	0.2596	7.9402	2.2257	-2.7008	-5.5110	-3.5620

**Table-2.** The descriptive statistics of variables when issuing stocks

Stocks	Obs.	Mean	S.D.	Medium	Differences in means with (t-test)		Wilcoxon Ranksum test with (z-statistics)	
					Convertible Bonds	Bonds	Convertible Bonds	Bonds
DISP	93	0.1117	0.1432	0.0848	-0.4389	0.0473	0.8610	0.8200
ABTURN	93	-0.0249	0.0240	-0.0207	6.3030	-10.9348	5.0140	-7.3090
SIZE	93	27.3417	1.2467	27.2123	0.8987	-5.6665	1.0350	-4.8570
MB	93	2.3330	1.5564	1.9559	0.3963	5.1687	0.8600	2.9290
ZSCORE	93	4.1061	3.5294	2.9412	-0.4444	4.6095	0.2150	2.1440
LEVG	93	0.2971	0.1881	0.2501	-0.3290	-2.3048	-0.9010	0.3010
ISSA	93	2.4257	1.1193	2.3046	0.1044	-0.6926	-0.3900	-1.0290
LINST	93	18.1764	1.8986	18.2148	1.5137	-5.9205	1.4520	-5.4810
PINST	93	0.3733	0.2255	0.3682	0.1402	-4.2860	-0.0810	-3.5380
LMOVL	93	6.8516	3.3436	8.9305	2.2257	-5.3239	-5.5110	-1.7190

**Table-3.** The descriptive statistics of variables when issuing bonds

Bonds	Obs.	Mean	S.D.	Medium	Differences in means with (t-test)		Wilcoxon Ranksum test with (z-statistics)	
					Convertible Bonds	Stocks	Convertible Bonds	Stocks
DISP	155	0.1097	0.3944	0.0502	-0.1452	0.0473	-0.3630	0.8200
ABTURN	155	0.0035	0.0168	0.0025	0.1046	-10.9348	-1.1560	-7.3090
SIZE	155	28.3815	1.4826	28.3061	-3.2531	-5.6665	-2.8900	-4.8570
MB	155	1.5504	0.8198	1.3405	5.1372	5.1687	1.8150	2.9290
ZSCORE	155	2.5785	1.6599	2.1298	3.8634	4.6095	1.8820	2.1440
LEVG	155	0.3558	0.1978	0.3428	-2.0307	-2.3048	0.3900	0.3010
ISSA	155	2.5148	0.8885	2.3025	-0.4096	-0.6926	-1.0820	-1.0290
LINST	155	19.9473	2.4806	19.9740	-2.8827	-5.9205	-2.7150	-5.4810
PINST	155	0.5066	0.2437	0.5595	-2.8918	-4.2860	-1.8150	-3.5380
LMOVL	155	8.3279	0.6781	7.9402	-2.7008	-5.3239	-3.5620	-1.7190

It can be seen from Table 1, Table 2 and Table 3 that the differences in means between convertible bonds and bonds, stocks and bonds are significant, while the differences in means between convertible bonds and stocks are not so obvious. Maybe convertible bonds have more similar characteristics to stocks in China's security market. It is worth noting that the dispersion among analysts and issue amount are not significant to the three security options. The Logistic regression method will be used to further analyze the impact of relative factors on security issuance in the following paper.

### 3.2. Logistic Regression

The model of Logistic regression is  $P_i = F(y_i) = \frac{1}{1 + e^{-y_i}}$ , where

$$y_i = \alpha_1 DISP_{i,t-1} + \alpha_2 ABTURN_{i,t-1} + \alpha_3 SIZE_{i,t-1} + \alpha_4 MB_{i,t-1} + \alpha_5 ZSCORE_{i,t-1} + \alpha_6 LEVG_{i,t-1} + \alpha_7 ISSA_{i,t} + \alpha_8 LINST_{i,t-1} + \alpha_9 PINST_{i,t-1} + \alpha_{10} LMOVL_{t-1}$$

By taking the issuance of bonds as the basis for comparison, the comprehensive Logistic regression results are shown in Table 4.

From the regression results in Table 4, it can be identified that abnormal turnover, firm size, market-to-book ratio, leverage, issue amount and market volume are related to security issuance to some extent. Abnormal turnover is a better description of investors' heterogeneous beliefs instead of the dispersion among analysts. Besides, compared with the issuance of convertible bonds, the relative risk ratios between stocks and bonds are more obvious. The influence of heterogeneous beliefs on the choice between stocks and bonds is significant, which is in consistent with the above statistical analysis. Together with the negative z-value, it can be identified that the higher the heterogeneous beliefs among investors, the higher the possibility of issuing equity, which support the hypothesis H1.

According to the relative risk ratios of other significant variables, under heterogeneous beliefs, the bigger the firm size and the higher the market to book ratio, the higher the possibility of issuing



convertible bonds, then stocks, at last bonds. The higher the leverage ratio, the bigger the issue amount and the better the market condition, the higher the possibility of issuing stocks, then convertible bonds, at last bonds. This approves hypothesis H2 and H3.

It seems that in China's security market, bond is usually the last choice. Besides, in view of the similarity of convertible bonds and stocks firms prefer to equity issue, which help explain the equity financing puzzle to some extent. Since the log of the total shares owned by all institutional investors and the proportion of total institutional shares held in a firm are not statistically significant, the influence of short sale constraints cannot be judged at this moment.

**Table-4.** The Logistic regression results of convertible bonds, stocks and bonds

Variables	Reg.1		Reg.2		Reg.3	
	Convertible Bonds	Stocks	Convertible Bonds	Stocks	Convertible Bonds	Stocks
DISP	0.9132 (-0.10)	0.9084 (-0.12)			0.9732 (-0.03)	0.3690 (-0.78)
ABTURN			1.7675 (0.06)	0.0000 (-5.65)	1.6754 (0.06)	0.0000 (-5.69)
SIZE	0.1710 (-3.98)	0.1394 (-5.86)	0.1772 (-4.21)	0.2275 (-3.97)	0.1726 (-4.23)	0.2241 (-4.00)
MB	9.5784 (5.35)	8.8527 (5.40)	9.8532 (5.06)	8.3022 (4.73)	10.1658 (5.06)	8.6368 (4.74)
ZSCORE	1.0216 (0.18)	1.0971 (0.89)	0.9788 (-0.18)	1.0436 (0.37)	0.9753 (-0.21)	1.0444 (0.38)
LEVG	381.0465 (3.22)	588.7800 (3.95)	335.7969 (3.16)	532.8306 (3.46)	360.8474 (3.14)	700.7300 (3.50)
ISSA	4.9727 (4.10)	7.6276 (5.69)	5.6441 (4.14)	5.6625 (4.33)	5.7919 (4.17)	5.8251 (4.37)
LINST	1.2480 (0.80)	0.8798 (-1.20)	1.0313 (0.16)	0.9298 (-0.60)	1.0284 (0.15)	0.9274 (-0.61)
PINST	0.0995 (-1.51)	0.6082 (-0.44)	0.2869 (-0.91)	0.7441 (-0.23)	0.3007 (-0.87)	0.8387 (-0.14)
LMOVL	0.7785 (-1.83)	0.6191 (-4.18)	0.8229 (-1.51)	0.6055 (-3.45)	0.8243 (-1.14)	0.6040 (-3.48)
LR chi2(2)	175.39		238.76		239.57	
Prob > chi2	0.00		0.00		0.00	
Pseudo R2	0.3138		0.4271		0.4286	
Log likelihood	-191.8011		-160.1146		-159.7101	

Note: ( ) denotes the z-value of the relative risk ratios.

### 3.3. The Impact of Heterogeneous Beliefs on Issue Amount

In order to analyze the impact of heterogeneous beliefs on security choice, we develop two models to discuss the factors that affect the issue amount by taking advantage of the dispersion among analysts and abnormal turnover separately.

$$ISSA_{i,t} = \beta_0 + \beta_1 DISP_{i,t-1} + \beta_2 SIZE_{i,t-1} + \beta_3 MB_{i,t-1} + \beta_4 LEVG_{i,t-1} + \beta_5 LMOVL_{t-1}$$

$$ISSA_{i,t} = \beta_0 + \beta_1 ABTURN_{i,t-1} + \beta_2 SIZE_{i,t-1} + \beta_3 MB_{i,t-1} + \beta_4 LEVG_{i,t-1} + \beta_5 LMOVL_{t-1}$$

It can be seen from the regression results in Table 5 that the factors that affect issue amount of three security options are the firm size and market to book ratio, while factors that have no significant impact are the dispersion among analysts, abnormal turnover and leverage ratio. It means that heterogeneous beliefs' effect on issue amount is not significant, market volume only affect the issuance amount of convertible bonds. Besides, the model's R-square is almost the same for issue of convertible bonds and stocks, which is about 70%, and better than the fitness of issue of bonds, which is just about 50%.

**Table-5.** The regression results on issue amount of convertible bonds, stocks and bonds

Variables	Convertible Bonds		Stocks		Bonds	
DISP	-0.9982 (-1.36)		0.0249 (0.06)		0.0982 (1.43)	
ABTURN		3.6637 (0.91)		-3.2281 (-1.04)		0.7395 (0.33)
SIZE	0.6141 (7.44)	0.6321 (8.20)	0.7359 (14.08)	0.7613 (13.85)	0.4432 (10.07)	0.4325 (9.85)
MB	-0.3271 (-5.35)	-0.3305 (-5.11)	-0.1280 (-2.94)	-0.1200 (-2.66)	-0.1537 (-1.76)	-0.1552 (-1.77)
LEVG	-1.3855 (-1.44)	-1.5054 (-1.57)	-0.0371 (-0.08)	-0.0195 (-0.04)	-0.0309 (-0.08)	-0.0328 (-0.08)
LMOVL	-1.1983 (-2.02)	-1.2220 (-1.99)	0.0041 (0.23)	0.0042 (0.24)	0.0089 (0.12)	0.0211 (0.29)
Cons	-3.5521 (-0.52)	-3.9302 (-0.60)	-17.4163 (-12.38)	-18.2152 (-11.68)	-9.6151 (-7.00)	-9.6849 (-6.96)
R <sup>2</sup>	0.6790	0.6756	0.6862	0.6900	0.5388	0.5372

Note: ( ) denotes the t-test of the coefficient.

#### 4 THE PRICE IMPACT OF SECURITY ISSUANCE

In this section, the differences in means (t-test) and Wilcoxon Ranksum test (z-statistics) of CAR series with different term of three security issuance are firstly analyzed. Then, to verify the influence of security issuance on stock prices and its duration, the relations between CAR and relative factors are discussed by exploring multivariable regression method.

##### 4.1. Statistical Tests of CAR Series

The differences in means (t-test) and Wilcoxon Ranksum test (z-statistics) of CAR series with different term of three security issuance are shown in Table 6.

**Table-6.** Summary statistics of price impact

CAR	Difference from zero (t-test)			Convertible Bonds Vs. Stocks		Convertible Bonds Vs. Bonds		Stocks Vs. Bonds	
	Convertible Bonds	Stocks	Bonds	t-test	z-statistics	t-test	z-statistics	t-test	z-statistics
CAR[0]	-5.1809	-4.7186	0.1860	-7.7003	-4.059	-6.0995	-3.495	-0.7081	-0.480
CAR[0 1]	-3.1897	0.8061	-0.8311	-4.1546	-3.132	-3.3335	-1.694	1.1301	1.653
CAR[0 3]	-2.7139	-0.1651	-1.8253	-2.5744	-1.828	-2.0831	-1.008	1.0433	0.649
CAR[0 5]	-3.5198	0.1257	-1.9371	-3.0884	-2.177	-2.7210	-0.618	1.2651	1.200
CAR[0 10]	-1.8717	-0.1173	-2.8369	-1.4390	-1.519	-0.9216	0.242	1.3351	1.621
CAR[-1 1]	-2.7805	-1.4562	-0.6311	-1.6938	-1.828	-2.6703	-1.411	-0.8388	-0.880
CAR[-3 3]	-0.1156	0.1069	-0.8758	-0.1461	0.430	0.2758	0.780	0.5518	0.175
CAR[-5 5]	0.0136	2.5099	-0.7277	-1.2178	-1.048	0.3136	0.309	2.5640	2.258
CAR[-10 10]	0.8667	2.4793	-1.4913	-0.6130	-1.022	1.6416	0.659	3.0386	3.100

It can be identified from Table 6 that CAR is negative after the issuance of convertible bonds. However, the longer the window of CAR, the lower the significant level, which means the issuance of convertible bonds has negative effect on stock returns and it becomes weaker in the long run. This is consistent with the Logistic regression result that the higher the market to book ratio, the higher the possibility of issuing convertible bonds. More specifically, when the share price is high, the market to book ratio is also high, and firms' prefer to convertible issue, and then share price decrease, and hence the negative effect on rate of return.

The price impact on the day of the equity issue is significantly negative, the longer the window of CAR prior and subsequent to the issue, the more significant the positive effect, which means the issuance of stocks has negative effect on stock returns only on the day of the equity issue. This identifies the preference of equity issue in China's security market. The long term CAR is significantly negative after the issuance of bonds, which means the impact of issuing bonds on CAR is not obvious in the short run. Besides, the value of CAR[0 10] pass the 95% confidence level t-test which may due to the sample error or means the effect is significant in the long run.

Furthermore, the differences of the effect on CAR between convertible bonds and stocks, convertible bonds and bonds are significant, while not so with stocks and bonds. It verifies Hypothesis 4 and 5 to some extent, while denies Hypothesis 6.

#### 4.2. Multivariate Analysis of Price Impact

In order to further empirically analyze heterogeneous beliefs' impact on stock price and the factors affect CAR under different security choices, we develop the following regression model of CAR on the day of issuance and some variables:

$$CAR_{i,t} = \alpha_{i,t} + \alpha_1 DISP_{i,t-1} + \alpha_2 ABTURN_{i,t-1} + \alpha_3 SIZE_{i,t-1} + \alpha_4 MB_{i,t-1} + \alpha_5 ZSCORE_{i,t-1} + \alpha_6 LEVG_{i,t-1} + \alpha_7 ISSA_{i,t} + \alpha_8 LINST_{i,t-1} + \alpha_9 PINST_{i,t-1} + \alpha_{10} LMOVL_{t-1} + \varepsilon_{i,t}$$

The regression results of the issuance of convertible bonds, stocks and bonds are shown in Table 7, Table 8 and Table 9 respectively.

It can be seen from Table 7 that heterogeneous beliefs and the total shares owned by all institutional investors have significant effect on CAR on the day of convertible bonds issuance.

More specifically, the higher the degree of heterogeneous beliefs, the more significant negative effect on CAR when issuing convertible bonds.

As can be seen from the results in Table 8, heterogeneous beliefs have significant effect on CAR on the day of stock issuance, i.e. the higher the degree of heterogeneous beliefs, the more significant effect on CAR when issuing stocks. However, the influence is positive, which denies Hypothesis 7.

The regression results shown in Table 9 identify that heterogeneous beliefs and market-to-book ratio have significant effect on CAR on the day of bonds issuance. More specifically, the higher the degree of heterogeneous beliefs, the more significant positive effect on CAR when issuing bonds, which also denies Hypothesis 7.

The above comprehensive analysis identify that compared with the dispersion among analysts, abnormal turnover is a better proxy of heterogeneous beliefs which have significant effect on stock prices. However, the differences are that the issuance of convertible bonds' impact is negative, while the issuance of stocks and bonds' impact are positive, which is consistent with the statistical tests result.

**Table-7.** Multivariate analysis of price impact of convertible bonds

CAR[0]	Coefficient	S.D.	t-test	P> t	95% confidence interval	
DISP	4.4954	3.9336	1.14	0.262	-3.5497	12.5407
ABTURN	-40.2008	19.8350	-2.03	0.052	-80.7681	0.3663
SIZE	1.0203	0.7042	-1.45	0.158	-2.4607	0.4200
MB	0.3139	0.3371	0.93	0.360	-0.3757	1.0035
ZSCORE	0.1122	0.1504	0.75	0.462	-0.1954	0.4199
LEVG	3.5737	2.6763	1.34	0.192	-1.9000	9.0476
ISSA	-0.2644	0.6202	-0.43	0.673	-1.5330	1.0041
LINST	1.1909	0.4005	2.97	0.006	0.3716	2.0101
PINST	-3.4124	2.0534	-1.66	0.107	-7.6121	0.7872
LMOVL	2.9117	1.5679	1.86	0.073	-0.2951	6.1186
CONS	-20.1096	13.9909	-1.44	0.161	-48.7244	8.5050
R-squared = 0.3252						

**Table-8.** Multivariate analysis of price impact of equity issues

CAR[0]	Coefficient	S.D.	t-test	P> t	95% confidence interval	
DISP	-0.1217	0.1057	-1.15	0.253	-0.3320	0.0885
ABTURN	2.4669	0.8005	3.08	0.003	0.8744	4.0594
SIZE	-0.0174	0.0277	-0.63	0.531	-0.0726	0.0377
MB	-0.0293	0.0286	-1.02	0.310	-0.0864	0.0277
ZSCORE	-0.0004	0.0087	-0.06	0.955	-0.0178	0.0168
LEVG	0.1269	0.1548	0.82	0.415	-0.1811	0.4350
ISSA	-0.0008	0.0242	-0.03	0.973	-0.0490	0.0474
LINST	0.0050	0.0196	0.26	0.797	-0.0339	0.0440
PINST	-0.1826	0.1193	-1.53	0.130	-0.4199	0.0547
LMOVL	-0.0038	0.0056	-0.68	0.501	-0.0150	0.0074
CONS	0.5016	0.6121	0.82	0.415	-0.7160	1.7193
R-squared = 0.2287						

**Table-9.** Multivariate analysis of price impact of bonds issues

CAR[0]	Coefficient	S.D.	t-test	P> t	95% confidence interval	
DISP	0.0676	0.2103	0.32	0.748	-0.3482	0.4835
ABTURN	24.1944	9.4648	2.56	0.012	5.4854	42.9034
SIZE	-0.0415	0.1265	-0.33	0.743	-0.2917	0.2085
MB	0.3766	0.1786	2.11	0.037	0.0234	0.7298
ZSCORE	-0.1942	0.1175	-1.65	0.101	-0.4266	0.0381
LEVG	-0.0534	0.7107	-0.08	0.940	-1.4584	1.3515
ISSA	-0.0267	0.1900	-0.14	0.888	-0.4025	0.3489
LINST	0.0269	0.0414	0.65	0.516	-0.0549	0.1088
PINST	-0.1854	0.7557	-0.25	0.807	-1.6793	1.3085
LMOVL	0.1672	0.1791	0.93	0.352	-0.1868	0.5214
CONS	-0.6960	3.7726	-0.18	0.854	-8.1535	6.7613
R-squared = 0.1143						

## 5. CONCLUSION

The paper analyzes the factors that affect security choices under heterogeneous beliefs and short sale constraints using the issuing sample of convertible bonds, corporate bonds and stocks during 2007 to 2012. The results show that abnormal turnover is a better description of investors' heterogeneous beliefs compared with the dispersion among analysts. Besides, compared with the issuance of convertible bonds, the relative risk ratios between stocks and bonds are more obvious. The influence of heterogeneous beliefs on the choice between stocks and bonds is not significant.

According to the relative risk ratios of other significant variables, under heterogeneous beliefs, the bigger the firm size and the higher the market to book ratio, the higher the possibility of issuing convertible bonds, then stocks, at last bonds. The higher the leverage ratio, the bigger the issue amount and the better the market condition, the higher the possibility of issuing stocks, then convertible bonds, at last bonds, which identify the equity financing preference indirectly. Since the log of the total shares owned by all institutional investors and the proportion of total institutional shares held in a firm are not statistically significant, the influence of short sale constraints cannot be judged for the present.

The regression results show that the only factor that affect issue amount of three security options is the firm size, while factors that have no significant impact are the dispersion among analysts, abnormal turnover and leverage ratio. It means that heterogeneous beliefs' effect on issue amount is not significant, market-to-book ratio has influence on issuing convertible bonds and stocks, market volume only affect the issuance of convertible bonds. The models' R-squares are almost the same for issue of convertible bonds and stocks, and better than the fitness of bonds issue.

Besides, the comprehensive empirical analysis of the influence of security issuance on stock prices and its duration identify that CAR is negative after the issuance of convertible bonds. However, it becomes weaker in the long run. The price impact on the day of the equity issue is significantly negative, while the short term CAR is not significant after the issuance of bonds. This also identifies the preference of equity issue in China's security market, and verifies the market

timing of security issuance to some extent, and shows indirectly that convertible bonds in China's market have more similar characteristics with stocks since the stock price effect is significantly negative after the issuance of convertible bonds.

Heterogeneous beliefs have significant impact on stock prices. However, the issuance of convertible bonds' effect is negative, while the other two choices' influences are positive. It can be directly identified that the higher the degree of heterogeneous beliefs and stock prices, the more likely that firms' issuing convertible bonds and hence the negative stock price effect. Furthermore, after taking convertible bonds into consideration, this identification is not consistent with previous research results of the negative price effect of issuing stocks and no significant price effect of issuing bonds. Since there is no comprehensive reference to other research results, it needs further empirical tests to confirm.

Our research is limited to investors' heterogeneous beliefs' effect on security issuance and stock price effects, it can be extended to the heterogeneous beliefs between investors and managers' impacts.

## 6. ACKNOWLEDGEMENTS

This research is supported by National Natural Science Foundation of China (No.71071010, 71371023) and China Scholarship Council.

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