Portfolio Selection Effectiveness Based on Absolute Parity Premium: Evidence from Convertible Bond Factor

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Abstract. In the past, financial analysis mostly relied on subjective judgment, but with the improvement of the tools brought about by the development of The Times, the use of quantitative tools has become more and more important in financial investment. As an easy to use and expanding computer language, Python is also widely used in quantitative finance. China's convertible bond market has entered a phase of rapid development since 2017. In this paper, in addition to the traditional research on convertible bond indicators, an innovative research factor of absolute parity premium is cited as a research factor of convertible bonds use Python to back-test and analyze the convertible bond market in the past three years. The results indicate that the absolute parity premium indicator has predictive power for the future return of convertible bonds, and investing in convertible bonds with lower absolute parity premiums can bring significant excess returns. The significance of this paper is to discover and prove the quantitative investment strategy of absolute parity premium bond selection, which provides a new way of thinking for convertible bond investment research.

Keywords: convertible bonds · parity premium CAPM model · Fama-French three-factor model

1 Introduction

Convertible corporate bonds, or convertible bonds, are corporate bonds issued by the issuer following statutory procedures and can be converted into shares by bondholders after meeting certain terms and conditions. In February 2017, the Securities Regulatory Commission amended the Implementation Rules for Non-public Issuance of Shares by Listed Companies to stipulate that the issuance of convertible bonds and preferred shares is not subject to the restriction that there must be an interval of 18 months between refinancing. Since then, the size of China's convertible bond market has grown rapidly. As of April 25, 2022, there were 385 convertible bonds in circulation in the A-share market, and China's convertible bond market is rapidly expanding (see Fig. 1).

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Python is a widely used computer language, with many advantages, such as easy operation, strong expansion, and a wide range of users. In quantitative finance, Python can undertake tedious computing functions, data processing functions, data visualization functions, and more, which can help analysts save a lot of time and make automated investments feasible.

The parity premium reflects the level of premium that investors pay for convertible bonds at the market price and the cost of holding the shares after converting them compared to buying the shares directly. Generally speaking, the lower the parity premium, the stronger the equity of the convertible bond and the cheaper the price; the higher the parity premium, the stronger the debt.

This paper argues that both too high and too low parity premiums affect the return of convertible bonds while investing in convertible bonds with parity premiums close to zero can yield excess returns. The explanation given in this paper is that when the parity premium is above zero, the underlying stock price is far from the conversion price of the convertible bond. This is generally due to the fall in the company's share price, while the high price of convertible bonds may also be due to excessive speculation by investors. This is because convertible bonds are generally issued on a smaller scale and have a more flexible trading system. Compared to the current T + 1 trading system for A-shares in China, convertible bonds have a T + 0 trading system, which allows them to be bought and sold several times a day and has a more relaxed limit of increase and decrease. Therefore, it is favored by aggressive investors. On May 19, the suspension of the verification of the Yongji convertible bonds listed on the first day rose 321%, and the first two days of the cumulative rate of change of hands reached 1602.61%. This shows that China's convertible bond market is more affected by excessive speculation, but under the pressure of value return, the purchase of convertible bonds subject to speculation is often not profitable. Therefore, holding a higher parity premium, convertible bonds will not have excess returns.

At the same time, holding convertible bonds with parity premiums below zero may not bring excess returns either. The level of parity premiums is mainly influenced by the future expectations of the underlying stock price, the liquidity of the convertible bond market, and other factors. Convertible bonds with a negative parity premium can be purchased during the conversion period for risk-free arbitrage operations. However, a large number of arbitrage transactions will soon push the parity premium rate back up, and the arbitrage opportunity will disappear. While, during the lock-up period of convertible bonds, i.e., when they cannot be converted, the lower premium may reflect the limited potential of the underlying stock, and it may be difficult to obtain good returns by holding such bonds.

In this regard, based on the empirical study, this paper proposes an investment strategy to select convertible bonds using an absolute parity premium factor, i.e., investing in a portfolio of convertible bonds with a parity premium close to zero will yield excess returns. Using all Chinese market convertible bonds from January 1, 2019, to May 16, 2022, as the underlying pool, the underlying is divided into ten groups (10% in each group) from small to large (using absolute parity premium as the grouping criterion) and analyzed separately to measure its prediction of future yield and return smoothness.

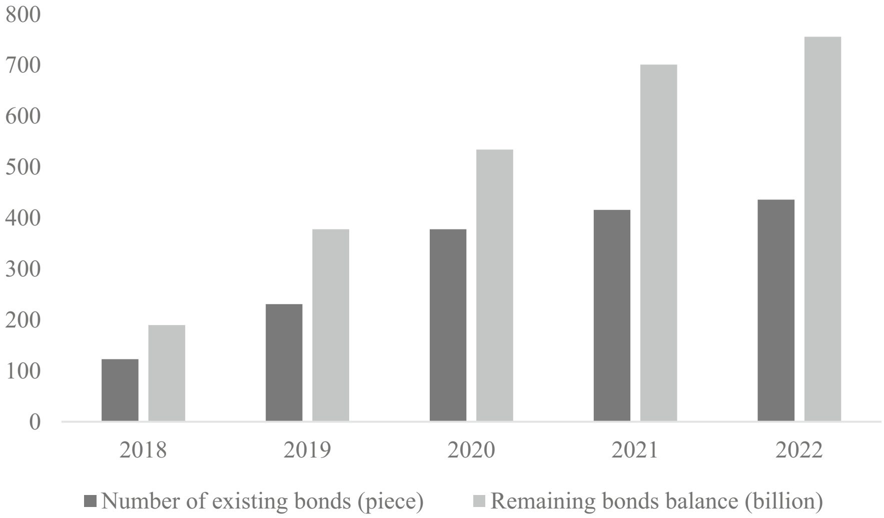

Fig. 1. The trend of convertible bonds after 2017 in China

The latter paper is organized as follows; Sect. 2 is a literature review, Sect. 3 is a research design, Sect. 4 is a univariate grouped empirical analysis, Sect. 5 is a robustness test using the CAPM model and the Fama-French three-factor model, and Sect. 6 summarizes the main conclusions of the paper.

2 Literature Review

The size of the convertible bond market has influenced foreign scholars to study convertible bond investment strategies much earlier than in China. Wenistein first studied convertible bond arbitrage [1], Edward and Sheen demonstrated the existence of arbitrage strategies using econometric methods [2], and Mark and Liliam studied the relationship between the liquidity risk and returned of convertible bonds and proposed and explained the existence of corresponding arbitrage strategies [3]. Ararwal empirically studied the operation of the long-term convertible bond market in the United States using stock price volatility risk, interest rate change risk, and bond credit risk [4].

There are fewer studies on convertible bond investment strategies in China, and the publication time has been concentrated in recent years. The reason is that the convertible bond market in China has only taken shape since 2017. Zhao Jing et al. introduced behavioral finance theory into the pricing of underlying convertible bonds and constructed a model of underlying convertible bond pricing under investor sentiment [5]. Song, Fangxiu, and Jiang, Yanwen found that there is an irrational conversion of convertible bonds in China through empirical analysis, and stock yield, stock price risk, convertible bond market liquidity, interest rate level, degree of information disclosure of listed companies, convertible bond coupon rate, and the ratio of pure bond value to the total value of convertible bonds will have an impact on investors' conversion decision [6]. Using an improved Tsiveriotis and Fernandes pricing model, Huang Binghua, and

Feng Yun found a significant underestimation of Chinese convertible bonds at the issue date during the period from 2010 to 2014 and constructed two types of convertible bond arbitrage strategies accordingly [7]. Yang Xuan, and Zeng Haimei analyzed the value of convertible bonds into pure bond value and option value and proposed five arbitrage strategies based on the price of convertible bonds and a detailed analysis of the strategy of playing new [8]. Lv Muhang, and Zhang Yihan separated the value of convertible bonds into bond value and option value and calculated them separately, designed speculative strategies to compare with Delta hedge arbitrage strategies, and found that Delta hedge arbitrage portfolio has higher return space and lower investment risk [9].

This paper proposes that investing in a portfolio of convertible bonds with a parity premium close to zero can yield stable excess returns. In the literature study on parity premium ratio, Men and Lv take convertible bond discount as the entry point. By analyzing the data of 63 convertible bonds that have been traded in the market for more than eight months between January 1, 2016, and November 30, 2018, they found that convertible bonds are commonly discounted in the Chinese market. There is an inverse relationship between the parity premium ratio and convertible bond price. Based on the findings, a negative premium rate conversion arbitrage strategy was proposed [10].

In summary, the existing domestic convertible bond investment strategy literature mostly focuses on convertible bond arbitrage and conversion stock timing, with few studies on the ability to predict a certain index yield. Whereas China's capital market started late, the practical operation of arbitrage faces many restrictions, and the bond financing mechanism can hardly meet the arbitrage demand. Therefore, this paper aims to verify the predictive ability of the parity premium rate on convertible bond yield and propose a practical convertible bond investment strategy in line with the current situation of the Chinese capital market.

3 Research Design

3.1 Data Source

All data calculated in this paper are from Wind. Considering the overall size of convertible bonds in China, the sample of convertible bonds selected in this paper are all convertible bonds listed in Shanghai and Shenzhen for a total of 816 trading days from January 1, 2019, to May 16, 2022, containing and using convertible bond prices, conversion prices, positive stock prices, and conversion price data to calculate the absolute parity premium for each convertible bond. The market value, book-to-market ratio, and price-to-earnings ratio indicators of the underlying shares corresponding to all convertible bonds are also extracted to provide data for the subsequent Fama-French analysis.

3.2 Absolute Parity Premium Indicator Construction

This paper employs an absolute parity premium indicator for convertible bond selection. In order to make the portfolios more comparable, this paper takes the absolute value of the parity premium and constructs an absolute parity premium indicator to measure the extent to which the convertible bond price deviates from the conversion parity. The parity premium is obtained by dividing the difference between the convertible bond price minus the convertible bond parity by the convertible bond parity.

$$Absolute\,parity\,premium\,rate = |(Convertible\,price - Convertible\,parity) \div Convertible\,parity| \quad (1)$$

$$Conversion\,parity = Conversion\,price \times 100 \div Underlying\ stock\ price \quad (2)$$

where the conversion parity is the conversion price divided by the underlying share price multiplied by 100, the conversion price is the closing price of the convertible bond on that day. The conversion price is the conversion price in the conversion regulation of the convertible bond on that day. The underlying share price is the closing price of the underlying share corresponding to the convertible bond on that day.

3.3 Inspection Method

This paper employs a univariate grouping test to test whether the absolute parity premium explains the variation in convertible bond yields in the cross-section. It uses Python to test the robustness of the indicator's ability to predict returns after controlling for portfolio sensitivity to systematic risk factors using the CAPM and the Fama-French three-factor models.

For the univariate grouping test, the convertible bonds are divided into ten groups every Monday according to the absolute parity premium at the end of the day. Suppose the cumulative return curve of the 10-tranche portfolio constructed according to the absolute parity premium shows a monotonic trend and a significant positive return for the long-short portfolio. In that case, the absolute parity premium indicator can be considered to have explanatory power for the change in convertible bond returns in the cross-section. Specifically, in week t, all convertible bonds are divided equally into 10 portfolios, each containing 10% of stocks, based on the absolute parity premium at the end of week t − 1. The portfolios are adjusted at the end of each week, with portfolio A1 consisting of the convertible bonds with the lowest absolute parity premium and portfolio A10 consisting of the convertible bonds with the highest absolute parity premium. The long-short portfolio is the result of buying 1 unit of portfolio A1 and selling 1 unit of portfolio A10. The long-short portfolio is the excess return achieved by buying 1 unit of portfolio A1 and selling 1 unit of portfolio A10.

Based on the statistical tests, the CAPM model and the Fama-French three-factor model are also used to consider the impact of market risk on convertible bond returns. Ten portfolios return time series are regressed on the CAPM model and the Fama-French three-factor model (using two methods, arithmetic mean construction market portfolio and bond balance weighted construction market portfolio, to obtain the abnormal returns of each portfolio relative to e market. Also, t-tests are conducted to determine whether their risk-adjusted ability to predict returns is statistically significant.

$$r_{it} = a_i + r_f + \beta_{im}\left(R_{mt} - R_{ft}\right) + \varepsilon_{it} \quad (3)$$

$$r_{it} = a_i + \beta_1\left(R_{mt} - R_{ft}\right) + \beta_2\,SMB_t + \beta_3\,HML_t + \varepsilon_{it} \quad (4)$$

Table 1. Boundary values among combinations

Year	Total number of bonds	A1-A2	A2-A3	A3-A4	A4-A5	A5-A6	A6-A7	A7-A8	A8-A9	A9-A10
2019	111	3.297	6.4604	9.8597	16.0886	21.9965	28.3412	38.5428	54.1754	75.9566
2020	197	1.5169	6.0704	8.0888	12.9621	16.3082	19.8323	24.6738	32.9247	47.5859
2021	326	2.6213	7.012	10.897	15.3113	19.3542	24.3503	28.2008	35.3481	51.8919
2022	377	7.4689	13.1968	17.1224	20.6473	25.3027	29.1795	36.2418	46.1055	65.7409

Model (3) is the CAPM model and model (4) is Fama and French three-factor model, with the explanatory variable being the risk-free interest rate adjusted return of the risk-free rate of portfolio i at date t, where the 5-year Treasury yield is chosen to be the yield of the market portfolio on day t. The market portfolio in this paper is the yield of all the convertible bonds in Shanghai and Shenzhen in the current period calculated by equal weighting and bond balance weighting methods choose the book-to-market factor as the size factor. The size factor is the difference between the returns of small-cap stocks and large-cap stocks, and small-cap stocks are distinguished from large-cap stocks by the average market capitalization; the book-to-market factor is the difference between stocks with a high book-to-market ratio (the highest 30% of the market) and stocks with low book-to-market ratio (the lowest 30% of the market).

4 Empirical Results

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Based on the absolute parity premium indicator constructed in the previous section, this section examines the predictive power of the absolute parity premium on convertible bond yields, for which a univariate grouping approach is applied in this section.

The sample of this paper is 816 days of convertible bond trading data from January 2019 to May 2022. The absolute parity premium index of convertible bonds is divided into 10 groups from small to large for testing. The frequency of position adjustment is once a week. The convertible bonds within each portfolio are weighted by two methods of equal weighting and bond balance to obtain the return of each group separately. The cut-off values for each asset portfolio at the beginning of the year are shown in the following table (Shown in Table 1).

4.1 Equal-Weighted Analysis

All convertible bonds are divided into ten groups with parity premiums from small to large, and each 10% is an interval. Set the frequency of position transfer to weekly, and

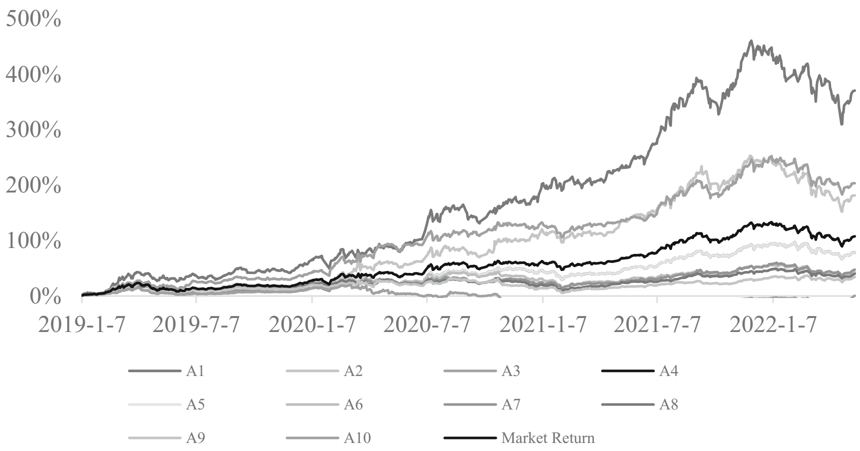

Fig. 2. Arithmetic mean grouping back-test results

Table 2. Arithmetic mean grouped back-test charts

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Annualized Return	65.95%	40.95%	43.68%	23.99%	22.12%	15.34%	14.23%	9.81%	8.86%	4.67%
Annualized Volatility	25.92%	23.31%	19.68%	16.60%	14.19%	13.46%	12.29%	11.34%	11.57%	15.64%
Sharpe Ratio	2.4671	1.6706	2.1186	1.3247	1.4179	0.9911	0.9947	0.6891	0.5925	0.1709

calculate the yield fluctuation after one week based on the closing price every Monday, and such for the arithmetic mean to calculate the return and market return to calculate the excess return. The equal-weighted return results in the back-test from January 2019 to May 2022.

The results in Fig. 2 show that the A1 portfolio has significantly higher returns than the other portfolios and market returns during the back-test period, while the A10 portfolio has lower returns than the other portfolios, with significant differences in overall returns (As shown in Fig. 2).

Table 2 shows that in the historical back-test, the returns of each portfolio show a steady upward trend as the absolute parity premium decreases, and the lowest parity premium group A1 can reach an annualized return of 65.95%, while the highest parity premium group A10 has an annualized return of 4.67%. The Sharpe Ratio reflects the degree of excess return per unit of risk. The back-test results show that the Sharpe Ratio of Group A1 is 2.467. The Sharpe Ratio of Group A10 is 0.171, which indicates that the lower absolute parity premium can effectively outperform the market return per unit of risk. The unit return needs to take less risk, while the unit return of the portfolio with a higher absolute parity premium needs to take the higher risk (please see Table 2).

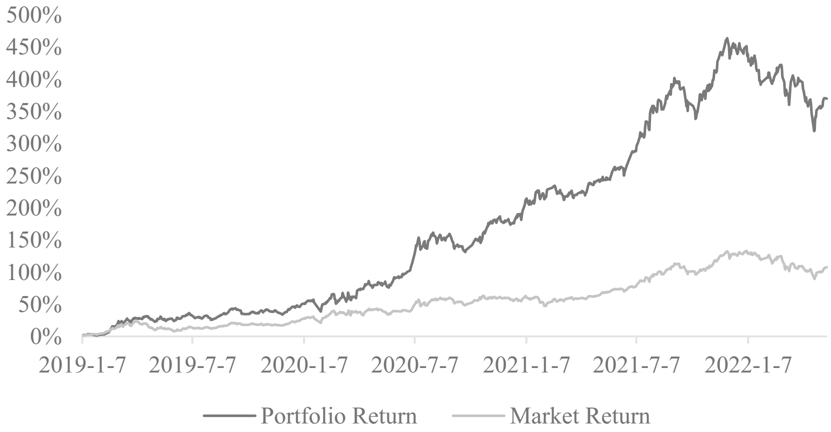

Fig. 3. Arithmetic mean long-short portfolio return results

Thus, by observing the group, A1 returns. Group A10 returns to construct a long-short portfolio, i.e., A1-A10, and comparing the daily returns of the constructed equal-weighted long-short portfolio with the market returns, it is found that the long-short portfolio fluctuates in the same direction as the market returns before April 2020. The cumulative returns of the long-short portfolio are similar to the market returns. In contrast, after April 2020, the cumulative returns of the long-short portfolio significantly exceed the average market return, reaching a cumulative return of 283.57% at the end of the back-test period. This reflects that holding a long/short portfolio constructed based on the absolute parity premium indicator provides a consistent and reliable excess return on investment (As shown in Fig. 3).

The annualized return of the long-short portfolio, which is a portfolio of assets consisting of buying 1 unit of portfolio A1 while selling 1 unit of portfolio A10. The results show that the annualized return of the short-selling portfolio reached 57.82%, a return that far outperformed the market return, while the annualized volatility of the long-short portfolio was 26.41%, and the Sharpe ratio was 1.8.

4.2 Weighted Analysis

Using the same data processing method as above, a weighted analysis was performed using bond balances as weights to calculate excess returns using market yields. The balance-weighted return results were obtained by back-testing the data from January 2019 to May 2022.

Figure 4 shows that in the historical back-test, the weighted results using bond balances as weights generally show a steady upward trend, with an annualized return of 37.67% for the A1 group and 9.41% for the A10 group. The Sharpe Ratio back-test results indicate that the returns of the A1 group are higher than those of the A10 group for the same level of risk. However, comparing the arithmetic mean results with the weighted mean results, we find that the arithmetic means grouping is significantly more discriminatory in terms of returns than the weighted mean group. The arithmetic means

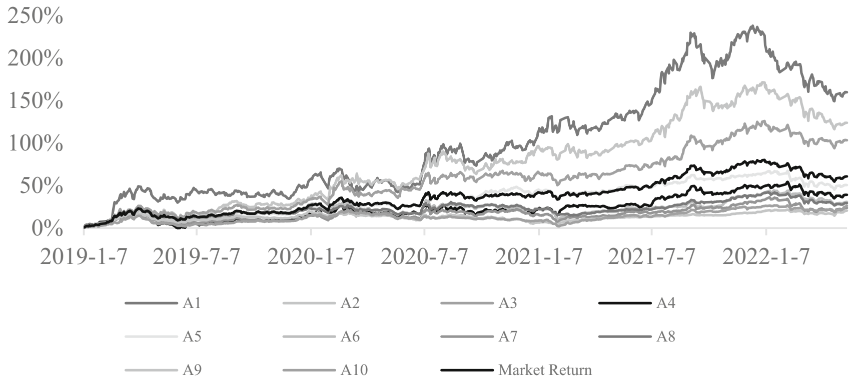

Fig. 4. Weighted mean group back-test results

Table 3. Weighted mean group back-test results

	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
Annualized Return	37.67%	29.50%	28.53%	11.55%	13.74%	12.31%	7.95%	6.89%	5.82%	9.41%
Annualized Volatility	25.42%	20.69%	16.90%	14.29%	12.35%	11.25%	10.72%	9.20%	6.75%	7.28%
Sharpe Ratio	1.4033	1.3288	1.5695	0.6686	0.9509	0.9158	0.5555	0.5317	0.5668	1.0179

the group has a significantly higher return than the weighted mean group for the same buy A1 portfolio (please see Fig. 4 and Table 3).

Figure 5 compares the daily returns of the constructed long-short portfolio with the market returns and finds that the long-short portfolio returns reach a maximum of over 200%, significantly outperforming the market returns. The graph shows that the cumulative return of the long/short portfolio significantly outperformed the market return for the majority of the time during the back-test period, meaning that holding a long/short portfolio constructed based on the absolute parity premium indicator provides a consistent and reliable excess return on investment.

The annualized returns of the long-short portfolio under balanced bond weighting. The results show that the annualized return of the long-short portfolio reaches 28.48%, the annualized volatility is 24.37%, and the Sharpe ratio is 1.15, which indicates that the long-short portfolio constructed using balance weighting still achieves higher excess returns. However, its return is lower than the long-short portfolio in the equal-weighted case, and it gets less return per unit of risk taken. This may be because there is a small-cap effect in the convertible bond market similar to the stock market, where the remaining small convertible bonds need less capital to be influenced and achieve a significant price increase.

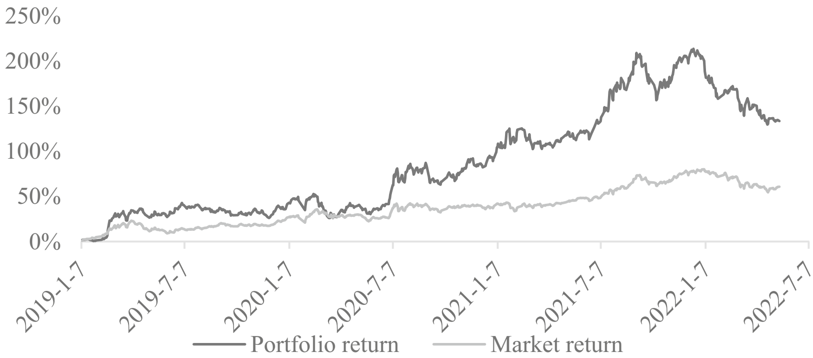

Fig. 5. Long/short portfolio yield profile (bond balance weighted)

5 Robustness Testing

5.1 CAPM Model Analysis

This paper first adjusts the returns using the CAPM model, and the regression sample uses portfolio daily return data.

In the equal-weighted asset, portfolio return analysis, the alpha of portfolios 1–10 has a monotonically decreasing trend, and the average daily excess return of the long-short portfolio during the back-test period is 0.001848 and significantly positive (t-value of 3.25), indicating a significant excess return for the strategy without the adjustment of the pricing model. The alpha (α), or idiosyncratic volatility abnormal return, obtained after CAPM model regression shows that the daily excess return of the portfolio with the lowest absolute parity premium is 0.0841%. The daily excess return of the portfolio with the highest absolute parity premium is -0.0272%, and the excess return of the long-short portfolio is significantly positive with an adjusted daily return of 0.1113% (t-value of 2.33) in the equal-weighted case.

According to Table 4, in the return analysis of the portfolios constructed with the bond balance weighting method, the excess returns of the portfolios also show a monotonic decreasing trend, with an unadjusted excess return of 0.0921% (t-value 1.85) and an insignificant excess return of 0.0413% for the long-short portfolio adjusted by the CAPM model (t-value 1.13).

5.2 Fama-French Three-Factor Model Analysis

After that, this paper also constructs a relevant three-factor index using the Fama-French three-factor model to adjust the returns using the underlying stocks of the issued tranches as the stock pool to make it applicable in the analysis.

The alpha (α), or idiosyncratic volatility abnormal return, obtained after the FF three-factor model regression shows that the daily excess return of the portfolio with the lowest absolute parity premium is 0.1067%. The daily excess return of the portfolio with the highest absolute parity premium is -0.0518% for the equal-weighted case, and the adjusted excess return of the long-short portfolio is significantly positive at 0.1586%

Table 4. CAPM earnings adjustment

	Group	1	2	3	4	5	6	7	8	9	10	1–10
Equal weighting combination	Excess Earnings (%)	0. 1918	0. 1262	0. 1339	0.0748	0. 0690	0. 0460	0. 0420	0.0262	0.0227	0. 0070	0. 1850
		(-3.33)	(-2.44)	(-3.07)	(-2.03)	(-2.18)	(-1.53)	(-1.54)	(-1.04)	(-0.88)	(-0.2)	(-3.25)
	CAPM α (%)	0. 0841	0. 0275	0.0516	0. 0067	0. 013	-0.0065	-0.003	-0.013	-0.016	-0.027	0.111
		(-3.04)	(-1.23)	(-2.85)	(-0.45)	(-0.96)	(-0.51)	(-0.23)	(-0.94)	(-1.10)	(-0.94)	(-2.33)
Bond Balance Weighted	Excess Earnings (%)	0. 1168	0. 0923	0.0893	0. 0325	0. 040	0.0352	0.0193	0.0154	0.0114	0.0247	0.092
		(-2.07)	(-2.01)	(-2.38)	(-1.02)	(-1.47)	(-1.41)	(-0.81)	(-0.75)	(-0.76)	(-1.53)	(-1.85)
	CAPM α (%)	0.059	0.0469	0.0519	0.0014	0.014	0.0129	-0.002	-0.001	0.0043	0.0177	0.041
		(-1.82)	(-1.8)	(-2.77)	(-0.21)	(-1.26)	(-1.18)	(-0.20)	(-0.11)	(-0.5)	(-1.68)	(-1.13)

Table 5. Fama-French three-factor model return adjustment (daily return)

	Group	1	2	3	4	5	6	7	8	9	10	1–10
Equal weighting combination	Excess Earnings (%)	0.1918	0.1262	0.1339	0.0748	0.0688	0.0459	0.042	0.0262	0.0227	0.07	0.1848
		(-3.33)	(-2.44)	(-3.07)	(-2.03)	(-2.18)	(-1.53)	(-1.54)	(-1.04)	(-0.88)	(-0.2)	(-3.25)
	FF α (%)	0.1067	0.0332	0.0534	0.0126	0.0165	-0.0069	-0.0038	-0.0134	-0.0282	-0.0518	0.1586
		(-4.64)	(-1.64)	(-3)	(-0.86)	(-1.25)	(-0.57)	(-0.30)	(-1.05)	(-2.24)	(-2.03)	(-4.15)
Bond Balance Weighted	Excess Earnings (%)	0. 1168	0.0923	0.0893	0. 0325	0.0403	0.0352	0. 0193	0. 0154	0. 0114	0. 0247	0. 0921
		(-2.07)	(-2.01)	(-2.38)	(-1.02)	(-1.47)	(-1.41)	(-0.81)	(-0.75)	(-0.76)	(-1.53)	(-1.85)
	FF α (%)	0. 0614	0. 0361	0.0472	-0.003	0.0136	0.0117	-0. 005	-0. 002	0. 0028	0. 0055	0. 0559
		(-2.25)	(-1.59)	(-2.72)	(-0.21)	(-1.2)	(-1.09)	(-0.55)	(-0.24)	(-0.36)	(-0.6)	(-1.86)

(t-value of 4.15). The daily return of the long-short portfolio constructed by the bond balance weighting method adjusted by the FF three-factor model is 0.0559% (t-value of 1.86). The results are also significant (please see Table 5).

The yield-adjusted results reflect that the excess return of the long-short portfolio constructed using the absolute parity premium rate under the equal-weighting approach cannot be explained by market risk, and the abnormal return adjusted by the CAPM and FF models is still significantly positive. Therefore, the strategy of using an absolute parity premium rate to select convertible bonds can achieve stable and substantial excess returns.

6 Discussion

There are two innovations in this paper: The first is to propose an absolute parity premium rate index based on the parity premium to measure the deviation of convertible bond price from the conversion value. The second is that the research on parity premium rate has focused on convertible bond conversion arbitrage strategy. There is a lack of measurement and research on convertible bond holding income. This paper finds that the use of the absolute parity premium rate indicator can achieve significant excess returns.

The findings of this paper have significant theoretical and practical implications. First, at the theoretical level, the findings of this paper demonstrate that the use of an absolute parity premium indicator for convertible bond investment can yield excess returns that are significantly different from market portfolio returns. Since the parity premium is publicly available information, this finding also reflects that the convertible bond market in China has not reached a semi-strong efficient state and that an aggressive investment strategy for the convertible bond market can yield excess returns. Second, in practice, convertible bond investors can buy portfolios with low absolute parity premiums and sell portfolios with high absolute parity premiums to obtain excess returns in accordance with the findings of this paper. Considering that convertible bond conversion is a one-time operation, convertible bond investment using the strategy proposed in this paper will result in more sustainable, stable, and long-term investment returns.

Since the convertible bond market in China has only taken shape since 17 years ago, the data available for this paper are relatively small and the conclusions obtained are not comprehensive. Meanwhile, although the indicators and research methods selected in this paper have tried to cover various factors that may be affected, there may still be a certain degree of bias due to incomplete consideration, and subsequent studies should use diversified valuation indicators to conduct practical tests and evaluations to achieve the best return effect.

With the strong support from the state and the steady promotion of globalization, the convertible bond market has gradually expanded in recent years. However, domestic scholars have less research on convertible bonds, and the research on the quantitative investment strategy of convertible bonds is still in the beginning. However, the absolute evaluation premium proposed in this paper can predict the convertible bond return to a certain extent and provide a new idea for future convertible bond investment outside the conversion arbitrage, which has theoretical and practical value.

7 Conclusion

This paper adopts the CSI convertible bonds from January 1, 2019, to May 16, 2022, as the underlying pool. It uses the absolute parity premium as the stock selection criterion and divides the underlying into ten groups (10% in each group) from small to large. The paper analyzes the differences in the maximum annualized returns of different groups through the equal-weighted grouping test and bond balance-weighted grouping test to select the best long-short portfolio. It also performs robustness tests on portfolio returns using the CAPM model and the Fama-French three-factor model to measure the statistical significance of the factor's predictive power on future returns. The conclusions drawn in this paper are summarized as follows.

For one: The long-short portfolio grouped and constructed with the absolute evaluation premium rate as the grouping factor had good returns and outperformed the convertible bond market return profile.

For another: Under the equal weighting approach, the excess return of the long-short portfolio constructed using the absolute parity premium is still high despite the presence of market risk. The abnormal returns adjusted by the CAPM and FF models are still significantly positive; therefore, using the absolute parity premium to select convertible bonds can achieve stable and substantial excess returns.

In summary, the absolute evaluation premium rate is more accurate for convertible bond yields market prediction. It can effectively avoid market volatility risk and obtain higher yields, which has practical application value in quantitative research of the convertible bond market.

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