

# Correlation Analysis of Time Value of Cash Flow and Pricing in IPO Enterprises —— Based on Multi-period Cash Flow Model

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## Abstract

In recent years, growth and technology-based companies account for a relatively high proportion of A-share IPO enterprises, and the fluctuation of cash flow and rising capital expenditure make the issue pricing more uncertain. In this paper, based on the multi-period cash flow model, the correlation between the time value of cash flow and IPO pricing is discussed, taking the IPO enterprises of science and technology innovation board Growth Enterprise Market as samples from 2024 to 2025. Through sample selection, unified parameter setting, correlation analysis, unary linear regression and comparison of pricing deviation, this paper finds that the direct explanatory power of discount rate to IPO issue price is weak, and the explanatory effect of DCF model is limited in the whole sample, but it is obviously enhanced after excluding abnormal samples, while PE method is closer to the actual issue price as a whole. The research shows that the multi-period cash flow model has a conditional explanatory function in IPO pricing, and its applicability is constrained by the stability of cash flow and the market pricing mechanism.

## Keywords

initial public offering, time value of cash flow, DCF valuation, PE method

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## 1. Introduction

In 2023, China's capital market realized the registration system for the main board, science and technology innovation board, Growth Enterprise Market and North Stock Exchange. The market pricing of IPO gradually shifted from administrative guidance to market-oriented inquiry mechanism, and the pricing and rationality of IPO gradually became the core issue of capital market reform. However, some IPO companies appear pricing deviation after listing, which leads to scientific thinking about IPO pricing logic.

The time value of cash flow is the core cornerstone of modern financial asset pricing theory. As a classic method of enterprise valuation, multi-period cash flow model (DCF) is an important theoretical basis for IPO pricing, which is to discount the future cash flow of an enterprise to the present according to the time value of money. In the actual IPO pricing process, multiple factors, such as the issuance mechanism, market expectation, comparison of the same industry and investor sentiment, will affect the final issue price, and the setting of the discount rate itself has strong parameter sensitivity and subjectivity [1].

The existing academic research on IPO pricing and cash flow valuation has achieved rich results. In recent years, domestic academic research shows that Song Shunlin thinks that the institutional background of IPO pricing in China is different from that in the United States, so there are many differences between IPO pricing and the United States, and there are many theories such as information asymmetry theory [2]. Recent studies have shown that the IPO issue price is not a direct mapping of the intrinsic value of the enterprise, but a market-oriented result formed under the joint action of bookkeeping, investor concern and underwriter incentive [3-5]. At the same time, IPO pricing deviation and quotation correction will also be affected by liquidity, social media attention and underwriter ranking [6-8]. At the valuation level, DCF model is still an important tool to identify the intrinsic value of enterprises, but its results are highly sensitive to the setting of discount rate, cash flow stability and risk handling methods [9-11]. Therefore, around the recent A-share IPO enterprises, there is still room for further analysis to test whether the time value of cash flow can be reflected in the actual issue price, and the differences between the multi-period cash flow model and PE method. Based on this, this paper takes A-share IPO enterprises from 2024 to 2025 as samples, investigates the correlation between the time value of cash flow and IPO pricing, and compares the explanatory effects of DCF model and PE method.

Based on the above theoretical analysis, this paper puts forward the following assumptions.

H1: There is a correlation between the discount rate of IPO enterprises and the IPO issue price, but its explanatory power may be obviously restricted by market pricing mechanism and investors' expectations.

H2: There is a significant correlation between the intrinsic value of enterprises calculated by multi-period cash flow model and the actual IPO issue price.

## 2. Research Design

### 2.1 Sample Selection and Data Source

This paper takes the A-share IPO enterprises from 2024 to 2025 as the research object, and the sample range is the companies that completed IPO and went public in the A-share market from 2024 to 2025. Key data such as issue price, EPS, P/E ratio, cash flow from operating activities and capital expenditure can be obtained from the prospectus, financial statements and issuance announcement of sample enterprises, while the samples of enterprises with missing relevant data and inconsistent financial caliber are excluded. Finally, after screening, this paper finally retained 50 IPO companies listed in science and technology innovation board and Growth Enterprise Market as research samples.

The data used in this paper come from: first, the prospectus, listing announcement and annual financial statements of enterprises; Second, the relevant financial indicators and data disclosed in the cash flow statement, balance sheet and income statement of the enterprise; Thirdly, the market-level data adopts risk-free interest rate ERP and China ten-year government bond yield, and the market risk premium is uniformly set at 6%; Fourth, the industry comparability coefficient is reflected by  $\beta$  coefficient; Fifth, the company's prospectus, listing announcement and annual financial statements all come from Juchao Information Network, and the company's cash flow statement, balance sheet and income statement come from Oriental Fortune Network.

In order to ensure the uniformity of caliber among samples, some parameters are set uniformly in this paper: the market risk premium is 6% and the long-term growth rate is 3%.

### 2.2 Definition of Variables

The explained variable in this paper is the IPO issue price per share, which is recorded as P. The IPO issue price can directly reflect the market pricing of enterprises in the process of listing, and it is also the core object of this paper.

The core explanatory variables in this paper are as follows. First, the discount rate is recorded as R. In this paper, the simplified CAPM method is used to estimate the discount rate, and its calculation formula is:

$$r_i = R_f + \beta_i \times ERP \quad (1)$$

Among them:

$r_i$  represents the discount rate of the  $i$ th enterprise and  $R_f$  represents the risk-free interest rate. In this paper, 1.82%,  $\beta_i$  represents the  $\beta$  coefficient of the  $i$ th enterprise, and  $ERP$  represents the market risk premium. In this paper, 6% is uniformly taken.

Second, the intrinsic value of DCF per share is recorded as  $V_{DCF}$ . This paper first calculates the free cash flow, then predicts the cash flow in the next five years, and predicts the final value, and finally gets the total value of the enterprise and the intrinsic value per share.

In order to analyze the IPO issue price more comprehensively, this paper sets the following control variables:

PE p/e ratio This paper adopts the issue price-earnings ratio, and further calculates the PE valuation method. Second, the enterprise scale. In this paper, the total assets are taken as the enterprise scale index. Third, ROE. This paper uses the return on net assets to measure the profitability of enterprises. The stronger the profitability, the easier it is to support higher issuance pricing in theory.

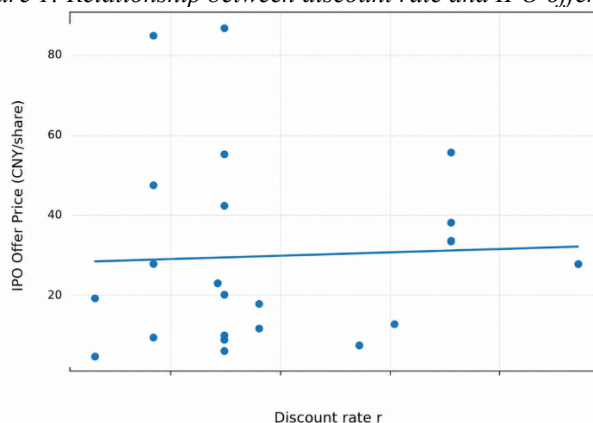
The core parameters of DCF valuation are uniformly set as follows. The long-term growth rate is 3%, which reflects the growth level of the enterprise entering a stable period and avoids excessive amplification of the final value, which is both reasonable and feasible. The risk-free interest rate is 1.82%, and the yield of China's 10-year government bonds in the sample period is adopted to meet the discounted cash flow demand in the next five years. The market risk premium is 6%, which adapts to the higher risk characteristics of IPO enterprises and conforms to the general valuation interval, which can reduce short-term fluctuation interference and improve sample comparability.

### 3. Practice Test Results and Analysis

Hypothesis 1 holds that there is a significant correlation between the discount rate of IPO enterprises and the IPO issue price, and it is negatively correlated as a whole. In order to test this hypothesis, this paper makes correlation analysis and unitary regression analysis on the discount rate and IPO issue price per share of 50 sample enterprises.

The results of correlation analysis (as shown in Figure 1) show that the correlation coefficient between the discount rate and the IPO issue price is -0.0265, and the results of regression analysis show that the regression coefficient is -50.2716, but the determining coefficient  $R^2$  is only 0.0007, which shows that the explanatory power of the discount rate to the IPO issue price is very weak. The core reason for this result is that the formation mechanism of IPO issue price of A shares is more driven by market factors, and it is difficult to directly map the time value of funds and risk compensation logic represented by discount rate to the actual issue price. The IPO issue price itself has strong market-oriented pricing characteristics, and market expectation and growth premium also occupy an important position in IPO pricing. At the same time, the differentiation of discount rate in the sample is limited, which also weakens its statistical interpretation ability. This result is consistent with the conclusion of IPO pricing research in recent years. Relevant research shows that the issue price is formed under the joint action of bookkeeping, investors' attention and price discovery mechanism, and market sentiment and issuance mechanism will weaken the direct explanatory power of single valuation parameters such as discount rate to the issue price [4-6]. Therefore, assumption 1 is not supported.

Figure 1: Relationship between discount rate and IPO offer price



Hypothesis 2 holds that there is a significant correlation between the intrinsic value of enterprises calculated by multi-period cash flow model and the actual issue price of IPO. This paper also uses correlation analysis and regression analysis to test this hypothesis.

The whole sample test results show that the correlation coefficient between DCF intrinsic value per share and IPO issue price is -0.0614, the regression coefficient is -0.0436, and the determining coefficient  $R^2$  is 0.0038, as shown in Figure 2. It shows that the relationship between them is not significant under the condition of full sample. However, after excluding the samples with negative DCF intrinsic value, the correlation coefficient between DCF intrinsic value per share and IPO issue price rose to 0.5351, the regression coefficient was 0.5484, and the determining coefficient  $R^2$  was 0.2864, as shown in Figure 3, which showed an obvious positive correlation. Considering the particularity of IPO enterprises, DCF model has strong explanatory power in normal samples, which shows that DCF model has certain advantages in stabilizing the valuation of enterprises. Therefore, assumption 2 is partially supported. Judging from the valuation research in recent years, this result is reasonable. Relevant literature points out that although DCF model has the function of intrinsic value identification in a highly uncertain environment, its results are highly sensitive to discount rate setting, cash flow stability and risk treatment methods, so it is more prone to valuation bias in samples with large operating fluctuations, and its explanatory power is usually stronger in samples with stable cash flow [12-14].

Figure 2: DCF intrinsic value and IPO offer price (full sample)

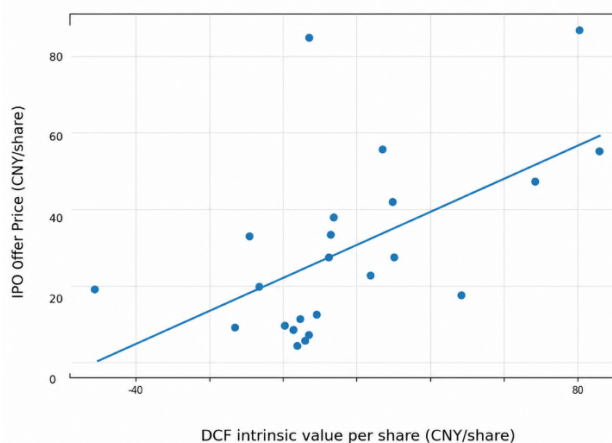
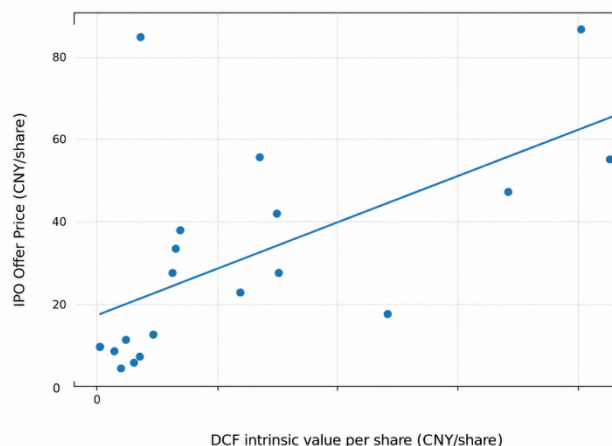


Figure 3: DCF intrinsic value and IPO offer price (excluding abnormal samples)



#### 4. Result Analysis

This paper draws the following conclusions through three hypothesis tests. First, there is a weak negative correlation between the discount rate and the IPO issue price as a whole, and the linear relationship is not significant, indicating that the time value has limited influence on pricing. This is the result of multiple factors,

such as cash flow characteristics of enterprises, market sentiment, issuance mechanism and underwriter's reputation, and is not simply determined by the discount rate. Secondly, the intrinsic value of DCF has no obvious explanatory power to the issue price under the whole sample; After excluding the samples with negative cash flow, the two showed a significant positive correlation. It shows that the applicability of DCF depends on the stability of enterprise cash flow, which is easy to be distorted for IPO enterprises with large cash flow fluctuations in the growth period and has strong explanatory power for enterprises with stable operation. Thirdly, PE method is superior to DCF model as a whole, which is highly consistent with the IPO pricing practice in China, and also consistent with the related research on IPO pricing deviation and quotation correction in recent years [8-10]. In practice, pricing needs comprehensive quotation correction, market acceptance, liquidity and investor structure, and the relative valuation method is more realistic. DCF is superior in theory, but it is highly sensitive to the discount rate, growth rate and free cash flow, and it is easy to produce a big deviation under the unstable cash flow and unified parameter setting of IPO enterprises.

From the market level, IPO pricing is not only determined by intrinsic value, but also influenced by investor preference and market sentiment. At the enterprise level, the samples are mostly in the growth stage, with high capital expenditure, unclear profit model and more stable PE method; At the institutional level, China's inquiry mechanism strengthens the logic of relative valuation, and PE method is more in line with the current system and market habits.

## 5. Research Conclusions and Suggestions

This paper takes A-share IPO enterprises from 2024 to 2025 as the research object, based on the multi-period cash flow model, investigates the relationship between the time value of cash flow and IPO pricing, and compares the explanatory effects of DCF model and PE method. The results show that the direct explanation of the discount rate to the IPO issue price is weak, indicating that the actual issue pricing is more influenced by market valuation, industry comparison and investor expectations; The explanatory effect of DCF intrinsic value per share in the whole sample is limited, but the correlation is obviously enhanced after excluding abnormal samples, which shows that the multi-period cash flow model has certain applicability in enterprises with stable cash flow. In contrast, PE method is closer to the actual issue price as a whole, showing stronger explanatory power of realistic pricing. Based on the above conclusions, combined with the research results, this paper puts forward suggestions from three aspects: for issuers, the PE method should be the core of IPO pricing, and the DCF model should be used as an auxiliary reference for intrinsic value. DCF can reflect the long-term value, but it is easily influenced by the fluctuation of parameters and cash flow. PE method is more suitable for the pricing of a shares. The issuer can use DCF to determine the value range first, and then use PE method to price according to the industry valuation and market environment to improve the pricing rationality. For investors, it is necessary to recognize the limitations of DCF in IPO valuation and be wary of high deviation risks, especially for companies with growth and large cash flow fluctuations. When investing, we should combine profit stability, cash flow quality and capital expenditure structure. For stable enterprises, we can refer to DCF, and for high-growth enterprises, we should make a comprehensive judgment with PE method and industry valuation to enhance the robustness of decision-making. For regulators, we should strengthen the disclosure of IPO valuation information and improve pricing transparency. The issuer is required to simultaneously disclose DCF and PE valuations and their deviations from the issue price, reveal risks and differences, improve pricing efficiency, curb irrational high valuations, and promote the standardized and rational development of the IPO market. There are still some limitations in this paper. First, the limited number of samples and the short sample time interval may affect the universality of the conclusion; Second, the parameters are set uniformly, which fails to fully reflect the individual differences of enterprises; Third, the empirical analysis method is relatively basic, and more complicated grouping and robustness test have not been further developed. In the future, the sample range can be expanded, the research interval can be extended, and the explanatory power and academic value of the research can be further enhanced by combining industry, development stage and multiple regression analysis.

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## **Conflicts of Interest**

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