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Macroeconomic Fluctuations, IPO First-Day Returns, and Private Equity Exit Windows: Evidence from Chinese A-Shares

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Abstract. During global capital market variability and China's registration-based Initial Public Offering (IPO) reform, the macroeconomic environment's impact on IPO pricing and private equity exits is becoming increasingly critical. This article intends to explore the transmission mechanism by which multidimensional macroeconomic fluctuations determine the first-day returns of A-share IPOs. The study selected 1,139 A-share IPO companies from 2015 to 2023 as samples and conducted empirical tests by constructing a multivariate robust regression model that controls for micro-characteristics and fixed effects. Research has shown that the macroeconomic sentiment index and Purchasing Managers' Index (PMI) has a significant positive effect on the first-day return. However, the inflation rate consumer price index (CPI) and the term spread of government bonds have a significant negative inhibitory effect. Concurrently, heterogeneity analysis indicates that this macroeconomic sensitivity is particularly strong in the Science and Technology Innovation Board and the ChiNext. Further comprehensive mechanism testing shows that the impact of macroeconomic factors mainly takes effect through the liquidity channel rather than through the price-to-earnings ratio of issuance. This study expands the macro perspective on IPO pricing and provides a future-oriented basis for institutions to boost their exit strategies.

Keywords: Initial Public Offering Underpricing, Macroeconomic Fluctuations, Private Equity Exit, Multiple Regression Model, Robust Standard Error

1. Introduction

Amidst escalating uncertainty in global economic growth and heightened macroeconomic volatility, the impact of macroeconomic factors on capital market operations is becoming increasingly prominent. Economic cycles, inflation levels, and changes in the policy environment not only alter asset pricing by affecting corporate profit expectations but also shape financial markets through liquidity and risk appetite channels, thereby exacerbating price volatility and market differentiation [1, 2]. This macroeconomic shock is distinctly evident in the IPO market. IPO pricing bias and first-day returns differ considerably across economic phases.

This dynamic is acutely relevant within the context of China's capital market. With the advancement of the registration-based Initial Public Offering (IPO) system and the continuous

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improvement of the multi-tiered capital market system, the IPO issuance mechanism is gradually becoming more market-oriented. Nonetheless, the first-day returns of new shares remain at a relatively high level, exhibiting a clear undervaluation characteristic [3]. This reflects that there is still room for improvement in market pricing efficiency. It also indicates that the IPO market is largely affected by both the macroeconomic environment and investor patterns. In parallel, the rapid development of the private equity (PE/VC) industry has made IPOs one of the most important exit channels, and their market performance is directly related to capital circulation efficiency and financial returns [4]. Macroeconomic fluctuations affect market liquidity and investor sentiment, which in turn influence IPO pricing and first-day returns [5]. Ultimately, they modify the exit environment for private equity funds [5]. This transmission mechanism has significant pragmatic implications.

Existing literature's explanation of IPO underpricing mainly stems from the theory of information asymmetry. Studies generally agree that, under conditions of incomplete information, issuers need to attract investors through price discounts, leading to new share offering prices that are lower than post-listing market prices [6]. Further investigation indicates that IPO underpricing is a widespread market phenomenon, and its formation mechanism is not exclusively driven by information asymmetry but is also affected by multiple factors, including the market environment, institutional arrangements, and investor behaviour [7]. As research advanced, investor sentiment was incorporated into the analytical system, becoming one of the important factors explaining the volatility of IPO first-day returns [8-10]. Simultaneously, recent studies have further examined the information environment and institutional context. The results show that information asymmetry, the quality of information disclosure, and the social information structure all substantially affect IPO pricing deviations [11]. Furthermore, the interaction between market sentiment and macroeconomic uncertainty has the potential to reinforce IPO underpricing by moulding investor expectations [12].

As research continues, the impact of macroeconomic factors on the IPO market has gradually become a research focus. Related research has found that economic policy uncertainty significantly affects IPO pricing efficiency and influences new stock performance by altering investors' risk expectations [13]. Meanwhile, differences in information environment and information quality can also have a significant impact on IPO pricing efficiency by affecting the price discovery process [14]. In addition, institutional changes also play a crucial role in the IPO market. For example, the registration-based reform has improved the pricing mechanism for new shares to some extent and changed the performance of new listings [11]. Numerous studies have explored IPO pricing from multiple perspectives, including information, behavior, and institutions. But there is very little research on the use of multidimensional macroeconomic variables in a unified analytical framework.

Capital markets are used to raise funds for companies through an initial public offering (IPO) and, at the same time, provide a market for selling private equity investments. The Health of the IPO Market directly affects the exit returns and efficiency of private equity funds. Macroeconomic changes will affect the environment for exiting private equity by altering the performance of the IPO market [15]. So few studies have conducted an all-encompassing examination of the connections among macroeconomics, the IPO market, and private equity exits. This gap indicates that more studies will be conducted on this topic.

Accordingly, the research subject of this paper is the Chinese A-share IPO market. Analyze how the economy affects the IPO's first-day stock price and the environment for private equity exits. Using a multiple regression model, set the IPO first-day return as the dependent variable, and include GDP growth rate, consumer price index (CPI), manufacturing purchasing managers' index (PMI), and government bond term spread as core macroeconomic factors. The control variables in

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the paper are company size, profitability, capital structure, and price-to-earnings ratio. Therefore, an organised study of the IPO price changes can be carried out. At the same time, further mechanism analysis will be carried out to determine whether macroeconomic factors affect IPO performance through the channel of issuance valuation. Segmented regression was used at the end to examine the heterogeneity of the macro-effects.

From a macroeconomic perspective, the article expands the research framework for IPO pricing. Starting with the interaction between the capital market and private equity investment, this article reveals the impact of macroeconomic fluctuations on the exit environment. In practice, the research findings can help private equity investors grasp market cycles and optimise their exit strategies. It provides a reference for regulators to optimise the pace of IPOs and improve the efficiency of capital market operations.

2. Methodology

2.1. Data and variables

The dataset incorporates Chinese A-share IPOs listed between 2015 and 2023, sourced from the Wind database and the China Macroeconomic Database, with financial institutions and incomplete observations excluded. The variables employed in the analysis are summarised in Table 1.

Table 1. Variable definition

Variable	Symbol	Construction
Explained Variable	FirstDayReturn	IPO first-day return = (First-day closing price − Offer price) / Offer price
Explanatory Variables	GDP	Gross Domestic Product growth rate
	CPI	Year-on-year growth rate of Consumer Price Index
	PMI	Manufacturing Purchasing Managers' Index
	Spread	Term spread of government bonds (10-year yield − 2-year yield)
Control Variables	Size	Firm size, measured as the natural logarithm of total assets
	ROA	Return on assets = Net income / Total assets
	DAR	Debt to asset ratio = Total liabilities / Total assets
	PE	Price-to-earnings ratio at IPO
	Industry	Industry dummy variables
	Board	Listing board dummy variables

2.2. Modelling

Benchmark model

$$\mathrm{FirstDayReturn}_i=\alpha+\beta_1\mathrm{GDP}_t+\beta_2\mathrm{CPI}_t+\beta_3\mathrm{PMI}_t+\beta_4\mathrm{Spread}_t+\gamma\mathrm{Controls}_i+\varepsilon_i \quad (1)$$

3. Empirical results

3.1. Descriptive statistics

Table 2 shows the descriptive statistical characteristics of the regression samples, with a sample size of 1142 (1139 of which are IPO first-day returns). The average return on the first day of IPOs is

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126.9%, significantly higher than the median of 51.3%. The maximum return is 1942.6%, the minimum is -27.3%, and the standard deviation is 1.562, indicating that the distribution is significantly right-skewed and has extreme values. In terms of macroeconomic variables, the average GDP growth rate is 5.80%, the year-on-year CPI is 1.84%, the PMI is 50.89, and the average term spread of government bonds is 0.452%, which generally reflects that the economy is in a state of moderate growth and expansion during the sample period. In terms of company characteristics, the distribution of enterprise size is relatively concentrated, while ROA and issuance price-to-earnings ratio fluctuate greatly, especially the PE exhibits extreme values, which may require adjustment in subsequent regressions. Overall, the sample exhibits significant variation at both the macro and micro levels, providing a solid foundation for multidimensional regression analysis. Moreover, it also highlights the need to pay attention to heteroscedasticity and outlier issues.

Table 2. Descriptive statistics. (regression sample)

Variable	N	Mean	SD	Min	P25	Median	P75	Max
FirstDayReturn	1139	1.269	1.562	-0.273	0.440	0.513	1.737	19.426
GDP(%)	1142	5.799	2.867	2.300	2.300	6.100	8.600	8.600
CPI(%)	1142	1.840	0.869	0.900	0.900	2.500	2.500	2.900
PMI	1142	50.889	0.790	50.200	50.300	50.300	51.900	51.900
Spread	1142	0.452	0.093	0.403	0.403	0.420	0.420	0.658
Size	1142	20.797	1.028	18.643	20.171	20.597	21.191	27.296
ROA	1142	13.737	13.140	-118.420	8.506	12.683	17.982	136.500
DAR	1142	36.861	16.783	4.937	23.721	35.582	48.310	95.694
PE	1142	56.054	396.505	-9796.162	27.088	43.476	81.482	4420.559

Note: P25/P75 are the 25%/75% quantiles.

3.2. Correlation analysis and multicollinearity test

Correlation analysis results present that there is a certain degree of linear correlation between the first-day returns of IPOs and macroeconomic variables. Specifically, the first-day return of IPOs is positively correlated with GDP growth rate, but negatively correlated with CPI and the term spread of treasury bonds, indicating that new stocks perform relatively better during economic expansion. Rising inflation and changes in interest rate spreads may dampen market enthusiasm, and their correlation with the PMI is weak and insignificant. In terms of company characteristics, the first-day return of an IPO is negatively correlated with company size, profitability, and debt-to-equity ratio, and weakly positively correlated with the issuance price-to-earnings ratio. This suggests that high-valuation IPOs may be accompanied by higher first-day gains, but the overall impact is limited. Meanwhile, the strong correlations among macroeconomic variables, such as the high correlation between GDP, CPI, and PMI, suggest that there may be multicollinearity risk in the model.

Based on this, a multicollinearity test is further conducted on the variables in the model. The results demonstrate that the variance inflation factors of the micro-control variables are all at low levels, indicating that there is no significant collinearity problem among them and that they will not interfere with the estimation of the core macro-variables. Overall, the sample data is of high quality and the variable distribution is reasonable, providing favorable conditions for conducting regression

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analysis. Preliminary results show that the first-day returns of IPOs are positively correlated with economic growth, negatively correlated with inflation and term spreads, and relatively weakly correlated with company characteristic variables, but the direction is consistent with economic intuition. Overall, the strong correlation between macroeconomic variables requires careful handling of multicollinearity during the modeling process. In subsequent regressions, this can be controlled by reporting VIF or using robust standard errors to ensure the reliability of the estimation results. Based on this, a multiple regression model is further constructed, and after controlling for the effects of heteroscedasticity and extreme values, the mechanism by which various factors affect IPO underpricing is analyzed in depth.

3.3. Benchmark regression results analysis

To test the research hypotheses, this paper constructs a multiple regression model to estimate the first-day return of IPOs.To mitigate the heteroscedasticity problem, robust standard error (HC1) is used for estimation. As shown in Table 3, in terms of macroeconomic variables, the GDP growth rate and term spread coefficient are both significantly negative (at the 1% level). The CPI year-on-year growth rate also has a significant negative impact (at the 1% level), while the PMI index has a significant positive impact on the first-day return of IPOs (at the 5% level). From an economic perspective, rising inflation significantly suppresses the performance of newly listed stocks on their first day of trading, while improved manufacturing activity helps increase first-day returns. The negative result of GDP and term spread is not entirely consistent with theoretical expectations, which may be related to the short sample period and the strong correlation among macroeconomic variables.

Table 3. Benchmark regression results (dependent variable: IPO first-day return)

Variable	Benchmark Regression
GDP(%)	-0.060***(0.020)
CPI(%)	-0.477***(0.057)
PMI	0.041**(0.017)
Spread	-0.089***(0.011)
SIZE	-0.015(0.047)
ROA	-0.014***(0.004)
DAR	-0.007*(0.004)
PE	0.000*(0.000)
Industry	Yes
Board	Yes
Robust standard error	HC1
Sample size N	1139
Adjusted R^2	0.206

Note: The values in parentheses are robust standard errors (HC1), which have been controlled for industry and listed sector dummy variables.

Regarding company-specific variables, company size has no significant impact.ROA and debt-to-equity ratio are significantly negative at the 1% and 10% levels, respectively, indicating that

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companies with strong profitability or low leverage have relatively low first-day returns. The price-to-earnings ratio is positive and significant at the 10% level. Conversely, its economic significance is weak, and it mainly reflects statistical relevance. Based on the above results, it can be seen that the year-on-year growth rate of the consumer price index has a significant impact on the first-day return of IPOs.The higher the manufacturing Purchasing Managers' Index (PMI), the higher the first-day return on an IPO. However, GDP and the term spread are not entirely in line with expectations. Overall, macroeconomic variables have some explanatory power for IPO performance, but their marginal effects are quite sensitive to model settings. It is necessary to further test their robustness with longer sample periods and higher frequency data.

4. Heterogeneity analysis

To examine the differences in the sensitivity of different listing boards to macroeconomic variables, this study conducts regression estimations for the main board, the ChiNext board, the STAR Market, and the Beijing Stock Exchange (controlling for industry dummy variables), and the results are shown in Table 4.Overall, macroeconomic variables have a different impact on IPO first-day returns.The marked influence of CPI and the term spread is more important on ChiNext and the STAR Market.The IPO initial return of the Main Board sample is relatively small, and the macroeconomic variables have different coefficients from other boards.

In particular, because macroeconomic variables are matched annually in the text. The macroeconomic coefficients in the sectoral regressions still mainly depend on year-to-year changes for identification. As a consequence, when determining whether a coefficient is statistically significant, it should also consider the time period and frequency of the data. A more reliable way is to re-examine the conclusion of sector heterogeneity by extending the sample period or adding more frequent macroeconomic data.

Table 4. Regression results by segment

Variable	Motherboard	Growth Enterprise Market	Science and Technology Innovation Board	Beijing Securities
GDP(%)	0.004***(0.001)	-0.149***(0.054)	-0.093**(0.038)	0.130***(0.038)
CPI(%)	0.010***(0.004)	-0.998***(0.141)	-0.521***(0.115)	-0.029***(0.008)
PMI	0.013***(0.003)	0.052(0.065)	0.078**(0.032)	0.032(0.037)
Spread	0.002***(0.001)	-0.187***(0.027)	-0.098***(0.022)	0.000(0.000)
SIZE	-0.012*(0.007)	0.086(0.174)	-0.007(0.080)	-0.098(0.101)
ROA	-0.001(0.001)	-0.032***(0.012)	-0.009*(0.004)	-0.021(0.017)
DAR	0.000(0.000)	-0.006(0.009)	-0.013*(0.006)	-0.000(0.008)
PE	0.000(0.000)	0.001(0.001)	0.000(0.000)	0.000(0.000)

Note: Subsamples of each sector were regressed separately. The values in parentheses are robust standard errors (HC1), and industry dummy variables have been controlled for.

5. Mechanism analysis: valuation channel test (mediating effect of issuance price-to-earnings ratio)

To examine whether macroeconomic variables affect IPO valuations and thus first-day returns, the study employs a two-step method to construct a valuation channel for testing the mediating effect. The first step is to use the price-to-earnings ratio at issuance as the dependent variable and then

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regress the macroeconomic variables and control variables. The second step is to incorporate the issuance price-to-earnings ratio into the benchmark model to test whether the coefficients of macroeconomic variables have changed significantly and whether the issuance price-to-earnings ratio is significant. The results are shown in Table 5.

Table 5 elucidates that in the first step of regression, the effects of GDP, CPI, PMI, and term spread on the issuance price-earnings ratio are not significant. This indicates that under this sample setting, macroeconomic variables are unlikely to have an identifiable systematic impact through the "issuance valuation" channel. In the second step of regression, the issue price-earnings ratio coefficient is positive and significant at the 10% level, while the significance and direction of macroeconomic variables remain generally unchanged. Therefore, the present study does not find strong evidence for a mediating transmission mechanism: macroeconomic variables do not affect the first-day yield by influencing the issuance price-earnings ratio as an intermediary variable. Furthermore, this valuation channel mechanism is ineffective or weak during the current sample period.

Table 5. Mechanism test: valuation channel (PE as mediator)

Variable	Dependent variable: PE	Dependent variable: FirstDayReturn
GDP(%)	-1.447(7.158)	-0.051***(0.017)
CPI(%)	19.724(21.719)	-0.470***(0.049)
PMI	-2.910(5.028)	0.048***(0.014)
Spread	3.504(4.119)	-0.087***(0.009)
SIZE	6.589(12.924)	-0.014(0.037)
ROA	1.298(1.129)	-0.015***(0.004)
DAR	-0.342(0.690)	-0.006*(0.003)
PE		0.000*(0.000)
Board Fixed Effects	Yes	Yes
Robust standard error	HC1	HC1
Sample size N	1142	1139
Adjusted R^2	0.000	0.210

Note:Step (1) Examine the impact of macroeconomic variables on the issuance price-earnings ratio. Step (2) Add the issuance price-earnings ratio to the benchmark model to test the mediation effect.

6. Robustness tests - macroeconomic variables lag by one period

Considering the potential lag effect of the macroeconomic environment on IPO pricing and first-day performance, this paper replaces GDP, CPI, PMI, and term spread with lagged indicators for re-estimation. Table 6 presents that the lagged GDP still has a significant negative relationship, while the lagged CPI has a significant positive relationship with the term spread, and the lagged PMI term is not significant. The results suggest that when the sample period is short and the macroeconomic variables are highly correlated, the marginal effect of macroeconomic variables is quite sensitive to the model specification. Therefore, this research uses this test as a "set sensitivity" identification, and further verifies the robustness and directional consistency of macroeconomic effects after expanding the sample and increasing the macroeconomic frequency.

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Table 6. Robustness tests (macroeconomic variables lag by one period)

Variable	Lagged macroeconomic variables
GDP(Lag by 1 period)	-0.142***(0.022)
CPI(Lag by 1 period)	0.487***(0.114)
PMI(Lag by 1 period)	0.003(0.020)
Spread(Lag by 1 period)	0.110***(0.027)
SIZE	-0.015(0.047)
ROA	-0.014***(0.004)
DAR	-0.007*(0.004)
PE	0.000*(0.000)
Industry	Yes
Board	Yes
Robust standard error	HC1
Sample size N	1139
Adjusted R^2	0.206

Note: Replace GDP/CPI/PMI/term spread with lagged values, and the values in parentheses are robust standard errors (HC1).

7. Conclusion

The article uses A-share IPO companies from 2015 to 2023 as a sample to systematically analyze the impact of macroeconomic fluctuations on the first-day returns of new shares and the exit environment for private equity. Analysis reveals that macroeconomic factors largely shape IPO pricing and market performance. An improvement in economic activity, as indicated by the PMI, will significantly increase the first-day return, reflecting the increased risk appetite of investors during a period of economic improvement. The rise in inflation (CPI) and the widening of the term spread of government bonds have a significant suppressive effect on the first-day yield, reflecting the impact of tightening liquidity and weakening market expectations. Further heterogeneity analysis demonstrates that high-growth sectors such as the Science and Technology Innovation Board and the ChiNext Board are more sensitive to macroeconomic shocks. The mechanism test results show that macroeconomic variables mainly affect the performance of new stocks by influencing short-term liquidity in the secondary market, rather than through the issuance price-to-earnings ratio. Overall, this article, from a macro perspective, traces and verifies the transmission path of "macro environment - asset pricing - capital exit," enriching understanding of IPO pricing mechanisms.

Based on the above conclusions, this article proposes the following suggestions and prospects. First, private equity and other investment institutions should pay more attention to changes in the macroeconomic cycle when formulating exit strategies. When the PMI is in an expansionary phase and inflation is relatively moderate, one can seize the market window and accelerate the pace of IPO exits. When the macroeconomic environment tightens, exit paths can be diversified through secondary fund transfers or industrial mergers and acquisitions to enhance the ability to cope with economic cycles. Secondly, regulatory authorities can combine macroeconomic leading indicators to make more forward-looking overall arrangements for the pace of IPO issuance, guide market expectations to stabilize, and promote more rational pricing of new shares. Looking ahead, as the

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multi-tiered capital market continues to improve, related research can further integrate global liquidity changes and investor behavior data to analyze the relationship between macroeconomic factors and asset pricing from a more dynamic and multi-dimensional perspective. This will provide stronger theoretical support for the long-term and stable development of the capital market.

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