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Study on the Influence of Patient Capital on Stock Price Fluctuation

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Abstract: Based on the data of Chinese A-share listed companies from 2010 to 2023, this paper studies the impact of patient capital on the stock price volatility of enterprises. Through empirical analysis, it is found that patient capital can significantly reduce the stock price volatility of enterprises. This conclusion still exists after a series of robustness tests. Mechanism test showed that patient capital can ease maturity mismatch of enterprises, improve enterprise ESG performance to significantly reduce stock price volatility. Heterogeneity analysis shows that patient capital has a more significant easing effect on stock price volatility in non-state-owned enterprises and enterprises with high analyst attention. This study provides an important basis for the government, enterprises and investors to understand patient capital, and provides important reference and enlightenment for all market parties. Future research should further deepen the mechanism and expand the scope of research, so as to provide strong support for promoting the stable development of China's capital market.

Keywords: Patient capital, stock price volatility, relational debt, stable equity, ESG performance.

1. Introduction

As an important part of the capital market, the stock market price changes will be affected by various micro and macro factors such as corporate performance, investor sentiment and economic policies. In turn, the stock price changes will also have a multi-dimensional and far-reaching impact on corporate investment and financing, consumer behavior, capital flow, people's livelihood and employment. At present, China's capital market is in the development stage of continuous improvement and maturity. The stable operation of stock prices not only reflects the sound operation and sound performance of enterprises, but also provides a solid guarantee for the long-term and sustainable development of the real economy. However, in recent years, a series of major events have occurred one after another, which has brought a strong impact on the capital market. The sudden appearance of the "black swan" of COVID-19 has disrupted the normal operation of the global industrial and supply chains; The outbreak of the Russia-Ukraine war has sharply increased geopolitical risks and caused sharp fluctuations in the prices of energy, food and other commodities. The tariff war between China and the US continues to ferments and trade frictions continue to escalate. These events have triggered a high degree of panic and uncertainty in the financial market, making the price of risk assets such as the stock market fluctuate like a roller coaster. Such drastic fluctuations not only shake the confidence of investors, but also weaken the sustainable development ability of enterprises, thus forming a significant restriction on the healthy development of the real economy. In the context of profound adjustments and changes in the global landscape, both enterprises and investors are exposed to an environment full of variables and challenges. In this case, as a key link of economic development, the stable and orderly development of the stock market is particularly critical [2].

Patient capital is a form of capital that focuses on long-term investment. It does not prioritize short-term returns but rather places greater emphasis on long-term projects or investment activities. It is usually not disturbed by short-term market fluctuations and is a type of capital that has a relatively long-term outlook on capital returns and a high tolerance for risks. On April 30, 2024, the Political Bureau of the Central Committee of the Communist Party of China proposed that "we should actively develop venture capital and expand patient capital", closely linking it with the cultivation of new quality productive forces. In July 2024, the "Decision" of the Third Plenary Session of the 20th Central Committee of the Communist Party of China proposed to "encourage and regulate the development of angel investment, venture capital and private equity investment, better play the role of government investment funds, and develop patient capital." Existing studies have found that Patient Capital can enhance the risk-resistance capacity of enterprises by improving the level of internal control and reducing agency costs [5][8] [14]. Patient Capital focuses on long-term orientation and has a strong investment philosophy and value orientation. Patient Capital alleviates the financing constraints of enterprises and promotes their innovation, which is conducive to the long-term stable development of enterprises [6]. The capital structure of an enterprise will have a certain degree of influence on its stock price [13]. Patient capital, as a long-term source of funds for an enterprise, promotes the dynamic adjustment of the enterprise's capital structure to a certain extent and also plays an important governance role, exerting a non-negligible influence on the fluctuation of the enterprise's stock price.

As patient capital has become a hot topic during the two sessions, its attention has been increasing day by day, and a large number of research literature related to it has emerged in academia, laying a solid foundation for in-depth research in the field of patient capital. However, the academia is still a lack of focus on patient study of relationship between capital and enterprise share price volatility. In view of this, this paper aims to fill the gap in this research field by systematically and deeply analyzing the intrinsic connection between patient capital and the fluctuations of enterprise stock prices, and provide valuable references for the academic and practical communities.

This paper takes all non-financial enterprises in the A-share

market from 2010 to 2023 as the research sample and empirically examines the impact of patient capital investment on the stock price fluctuations of enterprises. Research has found that the investment of patient capital can significantly reduce the fluctuation range of enterprise stock prices. This conclusion still holds true after a series of robustness tests. Patient capital can alleviate the degree of maturity mismatch of enterprises and enhance their ESG performance, thereby alleviating the fluctuations in their stock prices. Further analysis indicates that Patient Capital has a more significant alleviating effect on the fluctuations of enterprise stock prices when it is not a state-owned enterprise and has received high attention from analysts.

The innovation of this paper is mainly reflected in the following three aspects: Firstly, this paper systematically and deeply explores the relationship between patient capital and the volatility of enterprise stock prices for the first time, filling the gap in this research field and providing a new perspective and reference for the academic and practical circles. Secondly, this paper constructs a theoretical framework between patient capital and the volatility of enterprise stock prices. Through empirical analysis, it verifies the positive effect of patient capital on the stability of enterprise stock prices, providing a theoretical basis and analytical framework for subsequent research. Finally, from the perspectives of property rights nature and analysts' concerns, this paper explores the impact of patient capital on the fluctuations of enterprise stock prices. This provides more direct evidence for the connection between patient capital and the fluctuations of enterprise stock prices under different circumstances, and offers important references and inspirations for all market participants.

2. Theoretical Analysis and Research Hypotheses

1. The impact of patient capital on stock price fluctuation

Patient capital is a type of capital that focuses on long-term value investment. It does not take short-term profits as its primary goal but sets its sights on long-term returns, possessing the ability to withstand the impact of short-term market fluctuations. Based on the current research status at home and abroad, some scholars define capital with a strong risk tolerance and a long investment period as patient capital based on the risk tolerance and investment period of capital. On this basis, some scholars further classify it into stable equity and relational debt [19]. Institutional investors are typical representatives of stable equity in patient capital, and they attach particular importance to long-term value investment. To effectively prevent potential risks such as insider trading and embezzlement of major shareholders' interests, institutional investors have a strong demand for supervision. These institutional investors often deeply participate in corporate governance as external board members. Relying on their strong financial strength and powerful information collection and analysis capabilities, they effectively mitigate the negative impacts brought by information asymmetry and demonstrate a powerful supervisory force in corporate governance [18].This not only helps to reduce the probability of extreme events occurring, but also can stabilize the fluctuation range of the enterprise's stock price. Relational debt, as another important form of patient capital, is committed to establishing long-term and stable cooperative relationships with enterprises. In order to seek more long-term benefits and returns, relational creditors will take a series of measures that are conducive to enterprise loans, helping enterprises flexibly raise funds, meet the liquidity needs of daily operations, and prevent significant fluctuations in stock prices caused by liquidity crises.

Therefore, this paper puts forward the following hypothesis:

H1: The investment of patient capital can reduce the fluctuation range of a company's stock price.

2. Patient capital, ESG performance and corporate stock price fluctuations

Patient Capital adheres to long-term investment, attaches great importance to the sustainable development capacity of enterprises, and can provide necessary financial and strategic support for the environmental governance of enterprises. Patient Capital attaches great importance to social responsibility and the long-term promoting role of enterprises in social development. It will actively support enterprises in making these long-term social investments. Patient Capital usually pays more attention to the fundamentals and governance quality of a company. It will actively participate in corporate governance, influence the ESG concept of the enterprise through post-investment management, promote the optimization of the capital structure of the enterprise, strengthen internal management, improve the scientificity and transparency of decision-making, and enhance the overall governance level [6]. Good ESG performance can enhance the quality of enterprise information disclosure and improve the stability of the stock market [12] [15]. In terms of the environment, enterprises enhance the quality of environmental information disclosure by increasing environmental protection actions and improving the efficiency of resource management, thereby reducing environmental information asymmetry with external stakeholders. In terms of society, enterprises actively fulfilling their social responsibilities indicates their willingness to fulfill their commitments to social values and employee well-being. By enhancing public trust and brand loyalty, improving the quality of information disclosure on corporate social responsibility, and increasing the reputation capital of the enterprises, it helps them obtain more resources in times of crisis [9][10]. In terms of corporate governance, enterprises enhance the transparency of corporate governance by publicly disclosing their governance structures and internal control mechanisms. Investors can comprehensively assess corporate governance practices, thereby effectively curbing internal misconduct, mitigating the risk of stock price crashes, and promoting the stability of the stock market [15].

Therefore, this paper proposes the following hypothesis:

H2: The investment of patient capital helps to improve ESG performance, thus reducing the volatility of enterprise stock price.

3. Patient capital, maturity mismatch and fluctuation in enterprise stock prices

When the maturity of the asset side does not match that of the liability side, it will cause maturity mismatch, trigger liquidity risk, and may even lead to systemic risk[3][4][7]. For instance, if an enterprise relies on short-term financing to support long-term investment projects, once the short-term financing channels are blocked, the enterprise may be forced to sell assets or suspend projects, resulting in significant fluctuations in stock prices. Patient capital usually has a relatively long investment cycle, with an investment period that may exceed five years or even indefinitely, and will not exit due to medium and short-term fluctuations. The long-

term investment attribute of patient capital provides enterprises with a stable source of funds and reduces their reliance on short-term financing [11]. This helps enterprises better plan long-term investment projects and reduce the risk of project interruption caused by a shortage of funds. Meanwhile, the active participation and long-term holding of Patient Capital have sent positive signals to the market and enhanced investors' confidence in the enterprise. All these are conducive to stabilizing stock prices and reducing significant fluctuations in stock prices caused by market panic [1][16][17].

Therefore, this paper proposes the following hypothesis:

H3: The investment of patient capital helps to alleviate the degree of maturity mismatch, thus reducing the volatility of corporate stock price.

3. Research Design

1. Sample selection and data sources

This paper selects Chinese A-share listed companies from 2010 to 2023 as the research object. The basic characteristics and financial data of listed companies are from Wind and CSMAR databases. In order to ensure the reliability of the results,* the samples of ST, ST and financial enterprises were deleted, and all continuous variables were winsorized by 1% and 99%. In the regression analysis, individual fixed effects and year fixed effects are controlled.

2. Model construction and variable definition

(1) Model construction

In order to test the relationship between patient capital and stock price volatility, Model (1) is set. Patient capital includes stable equity and relational debt, in which stable equity is represented by $IV_{i,t}$, and relational debt is represented by $DB_{i,t}$; $VL_{i,t}$ represents the volatility of stock price; $\sum Controls_{i,t}$ represents control variables; u_i and v_t represent individual fixed effect and year fixed effect respectively; $\varepsilon_{i,t}$ represents the residual term.

$$VL_{i,t}=\beta_0+\beta_1 IV_{i,t}+\beta_2 DB_{i,t}+\beta_3 \sum Controls_{i,t}+u_i+v_t+\varepsilon_{i,t} \quad (1)$$

In order to test how patient capital affects stock price volatility, Model (2) is set, and $MD_{i,t}$ represents the mediating variable.

$$MD_{i,t}=\gamma_0+\gamma_1 IV_{i,t}+\gamma_2 db_{i,t}+\gamma_3 \sum Controls_{i,t}+u_i+v_t+\varepsilon_{i,t} \quad (2)$$

(2) Variable definition

① Explained variable

Stock price volatility. The daily individual stock return variance was calculated by referring to the methods of Xin Qingquan , Rajgopal and Venkatachalam , and then multiplied by the trading days of the current month to obtain the monthly individual stock return variance. Finally, the monthly individual stock return variance $VL_{i,t}$ for the corresponding accounting year were calculated. $VL_{i,t}$ represent the stock price return variance of Company i in year t. Represents the stock price volatility of Company i in year t.

② Explanatory variables

Patient capital. Referring to the research of Qiangqiangling , Jiang Zhongyu and Wu Fuxiang ,this paper divides patient capital into stable equity and relational debt, and refers to the research of Chen Jian to divide institutional investors into stable and transactional. Select the ratio of the shareholding ratio of stable institutional investors to the variance of the shareholding ratio changes in the past three years, and then represent the stable equity through standardization. As for the relational debt, this paper uses the ratio between the long-term liabilities of listed companies and the total liabilities of the company to express it.

③ Control variables

The selection of control variables includes whether it is a state-owned enterprise (SOE), enterprise Size (Size), return on assets (ROA), company cash flow (CashFlow), years of enterprise establishment (Age), enterprise development prospects (TobinQ), enterprise Growth ability (Growth), equity Balance (Balance), and enterprise asset-liability ratio (Lev).

Table 1. Definition of variables

Types of variables	Variable name	Variable measure method
Dependent variable	Stock price volatility	The average monthly stock price return variance multiplied by 100 for a firm's fiscal year is denoted by VL
Independent variables	Patient capital	Stable equity, the ratio of the shareholding ratio of stable institutional investors to the variance of the shareholding ratio over the past three years, normalized and expressed by IV
		For relational debt, the ratio of long-term liabilities to total liabilities is expressed as DB
Control variables	Nature of property rights	It is 1 for soes and 0 for non-soes, denoted by SOE
	Enterprise size	The natural logarithm of a firm's total assets at the end of the year plus 1 is denoted by Size
	Return on assets	The ratio of a firm's net profit at the end of the year to total assets at the end of the year, represented by ROA
	Corporate cash flow	The ratio of net cash flow from operating activities to total assets, expressed as CashFlow
	The years of establishment of the enterprise	The number of years the company has been established by the end of 2023 is denoted by Age
	Enterprise development prospect	The market value of the company/the replacement cost of the company's assets, expressed in TobinQ
	Business growth	Net profit margin on sales, denoted by Growth
	Equity balance	Shareholding ratio of the largest shareholder/shareholding ratio of the second largest shareholder, denoted by Balance
	Asset-liability ratio	Total liabilities/total assets, denoted by Lev

3. Descriptive statistics

The descriptive statistics of the main variables are shown in Table 2. The mean value of VL is 1.690, the standard deviation is 1.009, the minimum value is 0.372, and the maximum value is 5.952, indicating that there are certain differences in the range of stock price volatility of different enterprises in different periods. The mean value of relational debt DB is 0.126, the standard deviation is 0.153, the minimum value is 0.000, and the maximum value is 0.625. The mean value of stable equity IV is 0.045, the standard deviation is 0.068, the minimum value is 0.000, and the maximum value is 0.507, which indicates that the investment proportion of patient capital in different enterprises is different, which lays a good foundation for the research of this paper. In addition, the average Size and ROA of this paper are 22.230 and 0.036, respectively, and the values of the main variables are basically distributed within a reasonable range.

Table 2. Descriptive statistics

Variables	Number of samples	Mean	Standard deviation	Minimum	Maximum
VL	35497	1.690	1.009	0.372	5.952
DB	35497	0.126	0.153	0.000	0.625
IV	35497	0.045	0.068	0.000	0.507
SOE	35497	0.366	0.482	0.000	1.000
Size	35497	22.230	1.262	19.313	26.452
ROA	35497	0.036	0.067	-0.578	0.220
CashFlow	35497	0.049	0.070	-0.226	0.282
ListAge	35497	2.141	0.822	0.000	3.434
TobinQ	35497	2.039	1.309	0.795	17.676
Balance	35497	0.355	0.283	0.006	1.000
Lev	35497	0.425	0.204	0.028	0.934
Growth	35497	-0.344	3.709	-37.027	19.559

Table 3. Patient capital and corporate stock price volatility

Variables	(1)	(2)
	VL	VL
DB	0.227 * * *	0.160 * * *
	(0.037)	(0.039)
IV	0.400 * * *	0.412 * * *
	(0.064)	(0.063)
SOE		-0.008
		(0.025)
Size		0.036 * * *
		(0.012)
ROA		0.812 * * *
		(0.104)
CashFlow		0.231 * * *
		(0.070)
Age		0.152 * * *
		(0.017)
TobinQ		0.160 * * *
		(0.008)
Balance		0.022
		(0.029)
Lev		0.460 * * *
		(0.050)
Growth		0.004 * * *
		(0.001)
_cons	2.088 * * *	2.489 * * *
	(0.013)	(0.244)
Individual fixed effects	yes	yes
Industry fixed effects	yes	yes
Sample size	35497	35497
R^2	0.562	0.587

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

4. Empirical Results and Analysis

1. Benchmark regression

Table 3 shows the regression results of the impact of patient capital on the stock price volatility of enterprises. Columns (1) and (2) show that when IV and DB are used as the measurement indicators of patient capital for regression, the

estimated coefficients of IV and DB are significantly negative at the level of 1% regardless of whether control variables are added, indicating that they can significantly reduce the stock price volatility of enterprises. This is mainly because stable equity is usually represented by major shareholders or institutional investors holding corporate shares for a long time, which avoids frequent trading to a certain extent and effectively reduces the sharp fluctuation of stock price caused by short-term selling pressure. At the same time, stable shareholders usually have stronger information acquisition and analysis ability, and their long-term shareholding behavior conveys confidence in the long-term development of enterprises to the market. This information transfer effect helps to reduce market uncertainty and inhibit speculative trading, thus reducing stock price volatility. In addition, stable shareholders are more likely to participate in corporate governance, improve the long-term competitiveness of enterprises by monitoring and motivating the management, reduce short-term profit-seeking behavior, enhance the ability of enterprises to resist risks, and stabilize the stock price. On the other hand, relation-based creditor's rights can avoid the stock price crash caused by debt crisis by reducing the risk of high cost financing due to tight market liquidity. At the same time, the creditors of relational claims usually have stronger supervision ability, and can restrain the behavior of enterprises through debt contracts to prevent excessive expansion or high-risk investment, so as to reduce the volatility of corporate performance and stabilize the stock price. To sum up, patient capital can reduce the fluctuation range of enterprise stock price and provide strong support for the long-term healthy development of enterprises. H1 is verified. H1 is verified.

2. Robustness test

(1) Change the measurement method of explained variables

The above analysis mainly uses the stock price volatility VL calculated by the daily stock return variance without market adjustment. In this part, the corporate stock price volatility M_VL calculated using the variance of daily individual stock returns adjusted by the market is used, and a regression analysis is conducted on it with the model remaining unchanged. The regression results are shown in Table 4. Columns (1) and (2) show that after controlling the individual fixed effect and year fixed effect, the estimates of DB and IV are significantly negative at the level of 1% regardless of whether the control variables are added, which indicates that the injection of patient capital helps to reduce the stock price volatility of enterprises. In other words, after changing the measurement method of explained variable, the conclusion remains unchanged and passes the robustness test.

Table 4. Sample regression with the measurement method of explained variable changed

	(1)	(2)
Variables	M_VL	M_VL
DB	0.203 * * *	0.147 * * *
	(0.034)	(0.035)
IV	0.324 * * *	0.327 * * *
	(0.059)	(0.057)
SOE		-0.006
		(0.024)
Size		0.067 * * *
		(0.011)
ROA		0.806 * * *
		(0.095)
CashFlow		0.222 * * *
		(0.062)
Age		0.083 * * *
		(0.016)
TobinQ		0.149 * * *
		(0.006)
Balance		0.025
		(0.026)
Lev		0.504 * * *
		(0.045)
Growth		0.004 * * *
		(0.001)
cons	1.326 * * *	2.302 * * *
	(0.012)	(0.222)
Individual fixed effects	yes	yes
Industry fixed effects	yes	yes
Sample size	35497	35497
R^2	0.228	0.281

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

(2) Exclude special year data

During the financial crisis, the market operation mechanism, economic environment, policy intervention and other factors are very different from the usual ones. These special factors will interfere with the relationship between the research variables, leading to the deviation of the regression results from the real situation. Eliminating the samples in this period can avoid the influence of special factors on the

research conclusion, so that the research results can better reflect the real relationship between variables in the normal economic environment. Therefore, this paper eliminates the data during the financial crisis and conducts regression analysis. The regression results are shown in Table 5. Columns (1) and (2) show that after controlling individual fixed effects and year fixed effects, the estimates of DB and IV are significantly negative at the level of 1% regardless of whether control variables are added. That is, this conclusion is consistent with expectations after excluding the special samples during the financial crisis, which further verifies the robustness of the research conclusion.

Table 5. Regression with special year data excluded

	(1)	(2)
Variables	VL	VL
DB	0.246 * * *	0.186 * * *
	(0.041)	(0.042)
IV	0.353 * * *	0.349 * * *
	(0.069)	(0.066))
SOE		-0.029
		(0.028)
Size		0.025 *
		(0.013)
ROA		0.827 * * *
		(0.110)
CashFlow		0.170 * *
		(0.076)
Age		0.144 * * *
		(0.019)
TobinQ		0.208 * * *
		(0.008)
Balance		0.010
		(0.031)
Lev		0.464 * * *
		(0.053)
Growth		0.005 * * *
		(0.001)
_cons	2.104 * * *	2.159 * * *
	(0.013)	(0.271)
Individual fixed effects	yes	yes
Industry fixed effects	yes	yes
Sample size	29708	29708
R^2	0.162	0.221

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

(3) Re-select the sample

Manufacturing is an important part of the real economy and occupies an important position in the A-share market. It covers many segments, and its business model, financial characteristics and industrial rules have certain universality and typicality. Taking the manufacturing industry as A sample for robustness test, it can better reflect the general situation of a certain type of enterprises in the overall A-share market, and verify the stability of research conclusions under different industry characteristics. The regression results are shown in Table 6. Columns (1) and (2) show that after controlling individual fixed effects and year fixed effects, the estimates of DB and IV are significantly negative at the level of 1% regardless of whether control variables are added, which verifies the internal stability of the research model and research conclusions.

(4) Endogeneity test

Considering that there may be a self-selection bias between patient capital and the volatility of an enterprise's stock price, that is, certain characteristics of the enterprise may affect both simultaneously, thereby leading to endogeneity problems. This paper refers to the practices of existing scholars and takes the mean values of stable equity and relational debt as the basis for division. Those above the mean value are classified as the experimental group, and those below the mean value are classified as the control group. A 1:1 matching method with replacement is adopted for sample matching. The specific regression results are shown in Table 7. The regression coefficients of DB and IV in columns (1) and (2) are both significantly negative at the 1% level, which is consistent with the conclusion of the benchmark regression.

Table 6. Regression of re-selected samples

Variables	(1)	(2)
	VL	VL
DB	0.223 * * *	0.182 * * *
	(0.047)	(0.048)
IV	0.354 * * *	0.363 * * *
	(0.085)	(0.084)
SOE		-0.022
		(0.032)
Size		-0.024
		(0.015)
ROA		0.879 * * *
		(0.139)
CashFlow		0.278 * * *
		(0.090)
Age		0.169 * * *
		(0.022)
TobinQ		0.176 * * *
		(0.009)
Balance		0.066 *
		(0.035)
Lev		0.508 * * *
		(0.060)
Growth		0.006 * * *
		(0.002)
_cons	2.098 * * *	2.270 * * *
	(0.017)	(0.305)
Individual fixed effects	yes	yes
Industry fixed effects	yes	yes
Sample size	23768	23768
R^2	0.563	0.591

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 7. Sample regression based on propensity score matching

Variables	(1)	(2)
	VL	VL
DB	0.176 * * *	
	(0.065)	
IV		0.325 * * *
		(0.083)
_cons	2.764 * * *	1.939 * * *
	(0.426)	(0.509)
Controls	yes	yes
Individual/year fixed effects	yes	yes
Sample size	13147	9663
R^2	0.642	0.559

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

5. Mechanism Analysis

1. Patient capital, ESG performance and stock price fluctuation of enterprises

Patient capital provides long-term financial and governance support to promote enterprises to formulate ESG strategies, so that enterprises can reduce operational risks and the probability of extreme risks through environmental governance (such as carbon emission reduction), social responsibility (such as supply chain ethics) and governance optimization (such as anti-corruption mechanism), and enhance the long-term value of enterprise [9], making investors more willing to hold stocks. So as to reduce market uncertainty and stock price volatility. This paper refers to the practices of existing studies and selects the ESG rating data of Huazheng to measure the ESG performance of enterprises. The higher the comprehensive score, the better the ESG performance of the enterprise. The regression results are shown in Table 8. Column (1) shows the regression results when no control variables are added. The coefficients of DB and IV are significantly positive at the level of 1%. Column (2) shows the regression results when control variables are added, and the coefficients of DB and IV are still significantly positive at the level of 1%. This shows that patient capital can improve the ESG performance of enterprises, and thus reduce the volatility of enterprise stock price. Consistent with the expected results, H2 is verified.

Table 8. Patient capital, ESG performance and firm stock price volatility

Variables	(1)	(2)
	ESG performance	ESG performance
DB	0.996 * * *	1.122 * * *
	(0.269)	(0.278)
VL	0.656 * * *	1.255 * * *
	(0.313)	(0.310)
SOE		0.167
		(0.234)
Size		1.187 * * *
		(0.091)
ROA		4.306 * * *
		(0.693)
CashFlow		1.345 * * *
		(0.429)
Age		-0.124
		(0.562)
TobinQ		0.026
		(0.031)
Balance		0.507 * *
		(0.213)
Lev		4.542 * * *
		(0.328)
Growth		0.019 * * *
		(0.007)
_cons	73.39 * * *	50.45 * * *
	(0.109)	(2.218)
Individual fixed effects	yes	yes
Industry fixed effects	yes	yes
Sample size	34408	34408
R^2	0.015	0.047

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

2. Patient capital, maturity mismatch and corporate stock price volatility

When an enterprise has a maturity mismatch, once short-term liabilities mature and long-term assets cannot be realized in a timely manner, the enterprise may face the risk of a broken capital chain. This liquidity crisis may trigger market panic, causing investors to sell stocks and subsequently leading to a significant drop in stock prices [4]. Patient Capital, by providing long-term sources of funds, reduces maturity mismatch, lowers the liquidity risk of enterprises, and at the same time reduces the risk of innovation interruption caused by capital shortage, which is conducive to the long-term development of enterprises and thus stabilizes stock prices. This paper refers to the existing practice and uses the degree of short-term loans and long-term investments to measure the maturity mismatch of enterprises. Maturity mismatch =[Cash expenditure on investment activities such as the purchase and construction of fixed assets -(the increase in long-term loans in the current period + the increase in equity in the current period + Net cash flow from operating activities + cash inflow from the sale of fixed assets)]/ Total assets of the previous period. The regression results are shown in Table 9. Column (1) represents the regression results without adding control variables. The coefficients of DB and IV are both significantly positive at the 1% level. Column (2) represents the regression results when control variables are added. The coefficients of DB and IV are still significantly positive at the 1% level. This indicates that patient capital can alleviate the current situation of maturity mismatch in enterprises and thereby reduce the volatility of enterprise stock prices. Consistent with the expected result, Hypothesis H3 was verified.

6. Heterogeneity Analysis

1. Heterogeneity analysis based on the nature of ownership

The external financing costs of non-state-owned enterprises are relatively high, while the stable funds and resource support brought by patient capital are of great significance to them, and the stock price fluctuations also react more obviously to them. State-owned enterprises enjoy state credit guarantees and are subject to budgetary "soft constraints". Compared with non-state-owned enterprises, they are more likely to obtain loans from banks, and the role of patient capital is relatively less prominent. The equity structure of non-state-owned enterprises is dispersed. The introduction of patient capital may change the equity structure and affect corporate governance and decision-making. The equity structure of state-owned enterprises is concentrated, with state-owned shareholders holding the majority. The introduction of patient capital has a small impact on the equity structure and governance mechanism. The decision-making and management of enterprises are controlled by state-owned shareholders, and the stock price fluctuations are not sensitive to the response of patient capital. This paper conducts group regression based on enterprise property rights. The regression results are shown in Table 10. The DB in column (1) is not significant, and the DB in column (3) is significantly negative at the 1% level. In Column (2), IV is significantly negative at the 1% level, and in column (4), IV is significantly negative at the 1% level, but the absolute value of the coefficient in

column (4) is larger. It indicates that the alleviating effect of patient capital on the stock price fluctuations of non-state-owned enterprises is more significant, that is, non-state-owned enterprises need the injection of patient capital more.

Table 9. Patient capital, maturity mismatch and firm stock price volatility

Variables	(1)	(2)
	Maturity mismatch	Maturity mismatch
DB	0.055 * * *	0.085 * * *
	(0.017)	(0.016)
VL	0.129 * * *	0.154 * * *
	(0.018)	(0.016)
SOE		0.004
		(0.009)
Size		0.098 * * *
		(0.005)
ROA		0.896 * * *
		(0.041)
CashFlow		1.012 * * *
		(0.025)
Age		0.043 * * *
		(0.010)
TobinQ		0.008 * * *
		(0.002)
Balance		0.042 * * *
		(0.011)
Lev		0.166 * * *
		(0.020)
Growth		0.004 * * *
		(0.001)
_cons	0.146 * * *	1.907 * * *
	(0.007)	(0.107)
Individual fixed effects	yes	yes
Industry fixed effects	yes	yes
Sample size	35200	35200
R^2	0.027	0.186

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively.

Table 10. Heterogeneity analysis based on the nature of ownership

Variables	VL			
	(1)	(2)	(3)	(4)
	State-owned enterprises	State-owned enterprises	Non-soes	Non-soes
DB	0.016		0.261 * * *	
	(0.054)		(0.054)	
IV		0.353 * * *		0.417 * * *
		(0.076)		(0.103)
Control variables	yes	yes	yes	yes
Individual fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
R^2	0.664	0.665	0.547	0.546
Sample size	13003	13003	22494	22494

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

2.Heterogeneity analysis based on analyst focus

In the high analyst concern group, patient capital may have a significant negative impact on the stock price fluctuations of enterprises. Because the attention of analysts makes enterprise information more transparent, investors can better understand the enhancing effect of patient capital investment on the long-term value of enterprises, thereby reducing overreactions caused by information asymmetry and lowering stock price fluctuations. In the low analyst concern group, patient capital may not have a significant impact on the fluctuations of enterprise stock prices. Due to the limited dissemination of information and the insufficient understanding of the patient capital investment of enterprises by investors, it is difficult to incorporate it into investment decisions. Therefore, the impact of patient capital on stock price fluctuations is not obvious. In this paper, the number of analysis reports of a certain enterprise by analysts within the accounting year is taken as the indicator to measure the attention of analysts, and the samples are divided into the high analyst attention group and the low analyst attention group

according to the mean value for regression respectively. The regression results are shown in Table 11. The DB in column (1) is not significant, while the DB in column (3) is significantly negative at the 1% level. In Column (2), IV is significantly negative at the 5% level, and in column (4), IV is significantly negative at the 1% level, and the absolute value of the coefficient in column (4) is larger. It indicates that Patient Capital has a greater mitigating effect on corporate stock price fluctuations in an environment of high analyst attention, which is consistent with the expected result.

Table 11. Heterogeneity analysis based on analyst attention

Variables	VL			
	(1)	(2)	(3)	(4)
	Low external attention	Low external attention	High external attention	High external attention
DB	-0.095 (0.063)		0.167 * * * (0.049)	
IV		0.262 * * (0.119)		0.365 * * * (0.073)
Control variables	yes	yes	yes	yes
Individual fixed effects	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes
R^2	0.678	0.678	0.562	0.562
Sample size	10745	10745	10745	10745

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

7. Conclusions, Recommendations and Prospects

1.Conclusions and suggestions

This paper conducts a study using the data of all non-financial enterprises in the A-share market from 2010 to 2023. Through empirical analysis, it is found that the investment of patient capital can significantly reduce the stock price fluctuations of enterprises. This conclusion still holds true after a series of robustness tests, indicating that patient capital plays a positive role in stabilizing corporate stock prices. In terms of the mechanism of action, Patient Capital can reduce the degree of maturity mismatch of enterprises by providing long-term sources of funds, thereby reducing the liquidity risk caused by the inability to realize long-term assets in a timely manner due to the maturity of short-term liabilities, and thus stabilizing stock prices. At the same time, the investment of patient capital helps enterprises enhance their ESG performance. By reducing operational risks and the probability of extreme risks, it increases the long-term value of enterprises and thereby reduces the fluctuation range of short-term stock prices. Heterogeneity analysis shows that patient capital has a more significant effect on reducing the fluctuation of enterprise stock prices in non-state-owned enterprises and enterprises with high analyst attention.

The research conclusion of this article provides important references and inspirations for the government, enterprises and investors. First of all, the government should introduce more policies and measures to encourage the development of patient capital, improve the laws and regulations of the capital market, optimize the capital market environment, and promote the formation of the concept of long-term investment. Secondly, enterprises should actively introduce Patient Capital, optimize the equity structure, improve the quality of information disclosure, and establish long-term and stable cooperative relationships with Patient Capital investors. Finally, investors should establish a long-term investment concept, pay attention to the investment opportunities of patient capital, and reduce risks through diversified investment.

2. Future outlook

The research conclusion of this article provides important references and inspirations for the government, enterprises and investors. First of all, the government should introduce more policies and measures to encourage the development of patient capital, improve the laws and regulations of the capital market, optimize the capital market environment, and promote the formation of the concept of long-term investment. Secondly, enterprises should actively introduce Patient Capital, optimize the equity structure, improve the quality of information disclosure, and establish long-term and stable cooperative relationships with Patient Capital investors. Finally, investors should establish a long-term investment concept, pay attention to the investment opportunities of patient capital, and reduce risks through diversified investment.

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