

Investor Sentiment, Institutional Investors and Corporate Innovation Investment

—Evidence with Different Ownership Structure from China

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Abstract

This paper investigates the relation between investor sentiment and firm innovation investment in China, and explores the intermediary role of institutional investors. We find that the impact of investor sentiment on innovation investment is quite different between state-owned enterprises (SOEs) and private-owned enterprises (POEs). Investor sentiment promotes the innovation investment of POEs, while inhibits SOEs. We also find that institutional investors play a positive intermediary facilitating role in POEs, mainly contributing by supervisor independent institutional investors. We do not find any role for institutional investors in SOEs.

Keywords

Innovation Investment, Investor Sentiment, Institutional Investors

1. Introduction

In the new round of global technological revolution, the competition of innovation industry in the world is becoming increasingly fierce. Innovation driven has become the core strategy for many countries to seek competitive advantage. As an important subject of innovation development strategy, enterprises play a very important role in improving independent innovation and promoting high-quality economic development. In recent years, a number of Chinese enterprises, from Internet giants BAT (Baidu, Alibaba, Tencent) to Huawei, the high-tech company leading the global 5G commercial process, have shone on the world stage. In the face of a complex external environment, these companies have maintained incredible growth and strong competitiveness. We found that one thing

they have in common is continuous and high investment in innovation. BAT's average R&D revenue ratio has reached 12% in recent years, and Huawei's R&D investment ratio in 2019 was more than 15%. In Huawei's 2019 annual report, it is written that "it is thanks to long-term R&D investment that we continue to lead in many technology areas". However, compared to these star companies, Chinese companies' investment in innovation was generally low. China's A-share listed companies spent an average of only 5% of their revenues on R&D in the past three years. Therefore, studying how to incentivize and support companies to make sustained and efficient innovation investments is a realistic and urgent topic.

With the development of China's capital market, investors' enthusiasm for the capital market has been rising, and this high level of sentiment indicates a state of optimism about the future prospects of the stock market, which is called investor sentiment. Investor sentiment is reflected in investors' activity in buying and selling stocks, and the resulting market timing effect makes it relatively inexpensive for companies to raise external financing. Therefore, high investor sentiment is more conducive to companies obtaining the capital they need in the equity market, which has a positive effect on their innovative investments. However, compared with developed Western capital markets, individual investors account for an overwhelming proportion of the investment body composition and transaction size in China's capital markets. The "speculative psychology" and the "herd effect" of individual investors have inevitably contributed to investor sentiment in the capital markets. For example, in contrast to the NASDAQ in the United States and the Hong Kong GEM, the average annual turnover rate of the Chinese GEM is very high (see **Table 1**), indicating that investor sentiment is higher in the Chinese capital market compared to other capital markets around the world. Studies of developed Western markets have shown that investor sentiment can reduce the cost of corporate finance and promote innovation through financing channels. So, does investor sentiment in the Chinese capital market also play a positive role in promoting innovation investment? How does the impact of investor sentiment on innovation investment differ between state-owned enterprises (SOEs) and private-owned enterprises (POEs) based on China's unique ownership system? Little has been understood about these questions.

Table 1. Comparison of annual turnover rate from 2013-2019.

	2019	2018	2017	2016	2015	2014	2013
NASDAQ	1.26	1.11	1.31	1.07	0.86	0.95	0.8
Hong Kong GEM	0.27	0.38	0.64	0.45	0.68	0.56	0.51
Shenzhen GEM	4.32	3.77	4.65	5.13	6.86	4.7	4.82

On the other hand, underinvestment in corporate innovation stems from the myopia of managers. Incentivizing innovation requires monitoring managers from a corporate governance perspective so that they can focus more on the long-term growth of the firm and make more investments in innovation. Numerous studies have shown that, unlike the speculative behavior of individual investors, the supervisory role of institutional investors can promote innovative investment by firms, but is limited to those who have no business dealings with the investee company, i.e., independent institutions investors (Bushee, 1998; Aghion et al., 2013; Luong et al., 2017; Brav et al., 2018; Chen et al., 2007). So, can an independent institutional investor play a monitoring role in China, and what role does he play in investor sentiment influencing innovative investments in firms with different ownership, which is the question this paper seeks to answer.

Since 2006, in order to speed up the cultivation of innovative enterprises and strengthen the position of enterprises as the pillar of technological innovation, the Ministry of Science and Technology, the State-owned Assets Supervision and Administration Commission and the All-China Federation of Trade Unions have dynamically designated a number of national-level innovative enterprises. These enterprises have achieved outstanding results in technological innovation, brand innovation, institutional mechanism innovation, business management innovation, philosophy and culture innovation. Therefore, to answer the above questions, it is more instructive to select national innovative companies to study the impact of investor sentiment on innovation investment.

Using 335 national-level innovative enterprises listed on China's SSE and SZSE from 2006 to 2016 as a research sample, this paper finds that innovation investment activities of POEs are significantly higher than those of SOEs, while investor sentiment promotes innovation investment in POEs, but has an inhibitory effect on SOEs. By testing the intermediary role of institutional investors, we find that institutional investors in private firms play an intermediary facilitating role in the relationship between investor sentiment and firms' innovation investment, while institutional investors in SOEs play no role at all. Further, when we divide investors by supervisory functions into independent institutional investors with a supervisory role and dependent institutional investors without a supervisory role, we find that it is the independent institutional investors that play an intermediary facilitation role in private firms, indicating that they play a supervisory role in promoting innovative investment in firms.

The marginal contribution of this paper is as follows. Firstly, our study adds useful information to the existing research on investor sentiment and firm innovation. Investor sentiment can promote firm innovation has been proven in developed capital markets. In this paper, using the most innovative firms in China, we find that effect of investor sentiment is opposite in different ownership enterprises. Secondly, we uncover a new mechanism by which investor sentiment influences corporate innovation investment, namely the intermediary

role of institutional investors. It has been argued that investor sentiment influences corporate innovation investment through equity financing channels or managerial catering channels, and this paper finds that the supervision of institutional investors plays at least 35% of the mediating effect of investor sentiment on innovation investment. Finally, the findings of this paper will help developing and emerging capital markets to properly understand the role of investor sentiment in influencing corporate innovation. Governments need to be wary of excessively high investor sentiment that could weaken the role of capital markets in serving the real economy and business innovation.

The rest of this paper is organized as follows. In section 2, we provide the hypotheses based on literature review. In section 3, we describe our empirical model and variables. We present the empirical results in section 4, and in the last section, we conclude our paper.

2. Literature Review and Research Hypothesis

Since the 1980s, with the advancement of behavioral finance research, scholars have viewed an individual's investment process as a psychological process. They believe that investors cognitively analyze the market and update their beliefs to generate emotions that ultimately influence investment decisions. Investor sentiment is a speculative tendency of irrational investors or a general state of optimism or pessimism among investors about stocks (Baker & Wurgler, 2006), which originates from the trading of noise traders in the capital market. It is the part of an asset's future returns that cannot be explained by fundamentals, and is an investor's misestimation of the asset values (Black, 1986; Lee et al., 1991; Baker & Stein, 2004). Campbell et al. (1993) argue that trades by noise traders affect stock prices because fundamental risk prevents "smart money" investors from betting on noise traders, while the speed with which prices are brought back to fundamental value depends on the distance between price and value. When the price is lower than the fundamental value, the expected returns will be higher and vice versa. Therefore, investor sentiment originating from noise trader trading is bound to have an impact on stock returns.

Investor sentiment in the capital market can cause the stock price system to deviate from its value, which in turn affects the investment behavior of listed companies in the capital market (Polk & Sapienza, 2009; Baker & Stein, 2004). Gilchrist et al. (2005) find that investor sentiment has a significant positive impact on company investment through a study of data from listed companies on the New York Stock Exchange and the NASDAQ Exchange from 1986-2000. Chirinko et al. (2001) find that the Japanese stock market bubble during 1987-1989 was accompanied by an increase in firms' fixed investment, which was 20% higher than predicted during that period, indicating that the stock market bubble triggered by investor sentiment has a positive effect on firms' investment activities. Panageas (2005), Polk and Sapienza (2004), and Chirinko and Schaller (2006) also find that firms' investment activities are sensitive to investor sentiment.

Regarding the channels through which investor sentiment affects the investment activities of firms, scholars have identified the equity financing channel and the managerial catering channel. Baker et al. (2003) emphasize that when investor sentiment is high, it generally causes stock price to rise, and stock price has a strong influence on the investment activities of “equity-dependent” firms. The more severely financial constrained a firm is, the more sensitive its investment activities are to stock price. This is because when stock prices are above fundamentals, rational managers of equity-dependent companies find it more attractive to issue shares, and managers will issue shares at times when market sentiment is high in order to raise more capital. Their study also provides empirical support for the equity financing channel. By measuring firms’ dependence on external equity through the KZ index and Tobin q as a proxy for mispricing, they find that firms in the top quantile of the KZ index are almost three times more sensitive to stock price than firms in the bottom quantile, indicating that investments in companies with a high degree of equity dependence are more sensitive to non-fundamentally price movements. Gilchrist et al. (2005) find that stock market bubbles caused by divergent investor beliefs and short selling restrictions are often exploited by firms, which can issue new shares at inflated prices, thereby reducing the cost of capital and increasing real investment. Empirical research yields conclusions consistent with theory. Chang et al. (2007) find a significant positive correlation between stock market mispricing and firm investment, using Australian Stock Exchange listed companies from 1990-2003, and this effect works through the equity financing channel. Bolton et al. (2013) find that firms will hoard cash and issue stock in the best possible way under favorable market conditions, even if they have no immediate need for capital. This market timing behavior of firms has an impact on their investment behavior because favorable financing conditions are term-limited. Polk and Sapienza (2009) study the influence of investor sentiment on investment activities when the companies are under the condition of unlimited financing, and they find that even if the firm’s new investment project does not need to be financed by issuing new shares, the company’s investment decisions can also be influenced by investor sentiment through catering channel.

Since innovation investment is an important part of a firm’s investment activity, investor sentiment must also have a significant impact on it. Polk and Sapienza (2009) show that the positive effect of investor sentiment on firms’ investment activity is more pronounced in R&D-intensive firms due to higher information asymmetry. Dong et al. (2007) find that for companies whose shares are overvalued, R&D spending increases with stock mispricing.

Since China’s capital market is far less developed than the US market, and the market is dominated by small and medium-sized investors whose trading is heavily speculative, this has led to even more irrational behavior in the Chinese stock market and a greater influence of investor sentiment on the stock market. Therefore, the impact of investor sentiment on innovation investment in the

Chinese market needs to be further explored.

On the one hand, investor sentiment is primarily caused by noise traders, and when investor sentiment is high, irrational investors increase in the market (Barberis et al., 1998; De Long et al., 1990; Wang & Sun, 2004). Frequent trading by “noise traders” provides camouflage for large acquisitions, making them more profitable (Kyle & Vila, 1991). Due to the information asymmetry between managers and investors, pressure from capital markets forces managers to sacrifice long-term valuable investments (e.g., innovation investments) to maintain a maximum share price in order to avoid hostile takeovers (Stein, 1989). Therefore, managers will prefer short-term investments that can stabilize the stock price in order to avoid threats to their jobs if the company is acquired. Secondly, when investor sentiment is high, it is easier to attract speculative institutional investors who focus on short-term gains, and their frequent trading can lead to mispricing of company shares and underinvestment in innovation (Porter, 1992). At the same time, due to the asymmetry of internal and external information, executives with internal information are prone to opportunistic behavior when the company’s stock price is overvalued, and then seek to maximize short-term benefits to stimulate the irrational rise in the stock price, so as to realize the high-level cash out of the shares (Du & Ren, 2019). The overvaluation of stock prices triggered by high investor sentiment can also cause executives whose compensation is linked to the stock price to focus too much on the short-term ups and downs of the stock price and the company’s short-term performance, while neglecting to invest in corporate innovation (Coles et al., 2006; Lv et al., 2009). As a result, executives will cater to short-term profitability goals so that the company can perform well in the capital market and have no incentive to invest in innovation (Acharya & Lambrecht, 2015; Graham et al., 2005).

Compared to developed Western capital markets, investors in China’s Shanghai and Shenzhen stock exchange are mainly individual investors. Due to the lack of information, individual investors tend to make decisions based on their own experience, and are easily influenced by gossip from different sources, making impulsive decisions and trading frequently. Since individual investors are mostly noise traders, their irrational investment behavior is primarily driven by changes in stock prices rather than based on fundamental corporate information. Frequent trading by noise traders creates a high level of investor sentiment, and company executives, in order to cater to this group of investors, will make more short-term profitable investments and forego innovative investments that have long-term uncertainties. In addition, equity incentive is a common phenomenon in Chinese listed companies as a tool to retain talents and improve performance. When investor sentiment is high, the high correlation between management compensation and stock price may cause executives to focus too much on short-term ups and downs in stock price and company performance, and not enough on investing in innovation.

Under the background of China’s new and transitional system, the nature of

enterprise's property right has a crucial impact on its investment behavior. A large number of scholars have studied the investment decisions of Chinese firms based on different ownership structures (Chen et al., 2011; He & Kyaw, 2018; Ding et al., 2019; Shen et al., 2016; Zhang et al., 2020). The investment decisions of state-owned and private firms differ greatly due to differences in external financing costs, managerial styles, and political relationships, which determine the investment decisions of firms with different ownership properties.

First, it is easier for SOEs to obtain debt financing compared to private firms because of the same ownership structure of state-owned banks and SOEs. State-owned banks may ignore non-profit purposes and provide financial support to SOEs for policy purposes (Faccio, 2006). Therefore, for SOEs, there is no financing channel for investor sentiment affecting investment, but for private firms, investor sentiment promotes innovation investment through equity financing channels because it is more difficult for them financing from banks and the funds needed for innovation investment are mainly solved by the capital market. Secondly, a growing number of studies show that the management style of the chief executive officer (CEO) can explain the company's decisions (Bamber et al., 2010; Bertrand & Schoar, 2003; Graham et al., 2012). Different CEO traits lead to different impacts on investment, and managers in state-owned firms may be more committed to pursuing their political future rather than maximizing corporate wealth (He & Kyaw, 2018). As a result, managers will emphasize different aspects of investment decisions in different types of firms. Finally, State-owned enterprises are still more administrative, their business objectives tend to be more diversified, and in addition to performance requirements, they assume more social responsibility. SOE executives tend to invest more in tangible assets to stabilize share prices rather than cater to investors, and tend to invest for short-term profits rather than innovative investments. Therefore, we propose the following hypothesis.

Hypothesis 1: Investor sentiment promotes innovative investment in POEs.

Hypothesis 2: Investor sentiment inhibits innovative investment in SOEs.

Maug (1998) shows that when investor sentiment is high, it is less costly to hold larger stakes and easier to purchase additional shares for institutional investors. Such a market also makes it easier for investors to accumulate large stakes without substantially affecting the stock price and to capitalize on governance-related activities. In the exit theory of Edmans et al. (2009), investor sentiment facilitates governance through trading and thus encourages initial block formation. Edmans et al. (2013) also find that when investor sentiment is high, the likelihood that an activist hedge fund acquires a block increases at least 5%. The higher investor sentiment, the more collection of private information and trading on such information by institutional investors (Admati & Pfleiderer, 2009; Edmans et al., 2009; Edmans & Manso, 2011). If high investor sentiment leads to better monitoring, managers may be willing to forgo short-term profits to invest in long-term investments such as innovation. Although a large number

of theoretical and empirical studies have shown that monitoring by institutional investors can promote firm innovation (Bushee, 1998; Aghion et al., 2013; Luong et al., 2017; Brav et al., 2018), frequent trading by institutional investors also sometimes plays the role of a trader rather than an owner, who is more concerned about the short-term development performance of the firm, forcing managers to reduce their innovation investment in order to reverse the decline in expected returns (Graves, 1988; Porter, 1992). Bushee (1998) argues that the reason for these differences lies in the lack of a categorical analysis of institutional investors. From the perspective of the supervisory role of institutional investors, institutional investors can be divided into those who have no business dealings with the investee company (independent institutional investors) and those who have business dealings with the company (dependent institutional investors). The former is more focused on overseeing the business, while the latter may have no oversight function because which may result in the loss of existing or potential business (Chen et al., 2007). Theoretically, institutional investors with a monitoring function can promote innovative investment in companies. When investor sentiment is high, they can monitor managers to take advantage of the market mispricing to raise funds and to invest on innovation. The more institutional investors hold shares, the more they can avoid managers choosing short-term profitable projects to cater to noise traders and maintain stock prices and abandoning risky innovation projects that can bring long-term benefits to enterprises. However, among enterprises with different property rights properties in China, institutional investors play a more effective role in monitoring private enterprises. While the investment decisions of SOE executives are more subjected to the supervision and intervention of higher-level administrative departments, the role of institutional investors in monitoring SOE executives is limited. Therefore, we propose the following hypothesis.

Hypothesis 3: In POEs, institutional investors play an intermediary facilitating role in investor sentiment affecting innovative investment, which contributing mainly by independent institutional investors.

Hypothesis 4: In SOEs, institutional investors play a limited intermediary role in investor sentiment influencing innovative investment in firms.

3. Research Design

3.1. Data Sample and Regression Model

We conduct our analysis adopting the sample of 335 state-level innovative companies listed on the SSE and SZSE from 2006 to 2016 in China. We consider different ownership structures to analyze both state-owned enterprises (SOEs) and privately-owned enterprises (POEs).

We obtain most of firm accounting and market variables from WIND and CSMAR, and the expenditure on R&D is collected from annual reports of listed companies. We exclude sample of companies with missing R&D expenditure

and winsorize each of the accounting variables at the top and bottom 1% to reduce the influence of outliers. Within the full sample of listed enterprises, there are 202 SOEs and 133 POEs, which yields 1508 observations for SOEs and 823 observations for POEs.

We construct the following model to test the hypotheses:

$$IIR_{i,k,t} = \alpha + \beta S_{i,k,t} + \gamma X_{i,k,t} + \eta_k + \xi_t + \varepsilon_{i,t} \quad (1)$$

$IIR_{i,k,t}$ represents firm's innovation investment, $S_{i,k,t}$ represents firm-level investor sentiment, and $X_{i,k,t}$ are other control variables that affect the firm's innovation investment activity, including internal cash flow (CF), firm growth opportunities (q), intangible investment (TIR), firm sale ($SALE$), sale growth rate (GRO), market-to-book ratio (MB), firm leverage (LEV), and external financing dependence (EFD).

To test the impact of investor sentiment on innovation investment under different ownership regimes, we construct the following model:

$$IIR_{i,k,t} = \alpha + \beta S_{i,k,t} + \beta_1 ID + \beta_2 ID * S_{i,k,t} + \gamma X_{i,k,t} + \eta_k + \xi_t + \varepsilon_{i,t} \quad (2)$$

ID is a 0 - 1 variable, when ID is 0, it represents POEs, and when ID is 1, it represents SOEs. The other variables are the same as in Equation (1).

To test the mediation effect of institutional investors, we following [Baron and Kenny \(1986\)](#) construct the model:

$$INSTI_{i,k,t} = \alpha + \beta_1 S_{i,k,t} + \gamma X_{i,k,t} + \eta_k + \xi_t + \varepsilon_{i,t} \quad (3)$$

$$IIR_{i,k,t} = \alpha + \beta_2 S_{i,k,t} + \beta_3 INSTI_{i,k,t} + \gamma X_{i,k,t} + \eta_k + \xi_t + \varepsilon_{i,t} \quad (4)$$

$INSTI_{i,k,t}$ represents institutional investor, the other variables are the same as in Equation (1).

3.2. Variable Definition

Innovation investment (IIR): in this paper, the innovation investment rate is used to measure the innovation investment. Following [Zhang et al. \(2020\)](#), the innovation investment includes the increment of "intangible assets" account (excluding land use rights), the increment of "development expenditure" account and the expensed R&D expenditure. According to the current accounting standards in China, the R&D investment of independent innovation of enterprises is divided into research stage and development stage, which are expensed and capitalized respectively. The traditional method of measuring innovation investment only takes into account the expensed part, i.e. R&D expenditure ([Kumar & Li, 2016](#); [Sunder et al., 2017](#)), but it does not include the capitalization part and the investment expenditure on patents and trademarks acquired through purchase or merger and reorganization, which are reflected in the balance sheet accounts of "development expenditure" and "intangible assets". These part should be taken into account in order to ensure a more complete, reliable and accurate measurement of innovation investments. In addition, the land use rights in the "intangible assets" account do not represent the innovation factor of

the enterprise and are excluded from the calculation.

Investor sentiment (**S**): Baker and Stein (2004) emphasize that the liquidity is an indicator of the relative presence or absence of rational and irrational investors, which carries information about the influence of irrational traders in the market, and high liquidity is a manifestation of high investor sentiment shocks. So, liquidity can be used as a proxy for investor sentiment. Whereas the illiquidity indicator constructed by Amihud (2002) is expressed as the ratio of a stock's absolute daily return to its average daily trading volume over a given period of time, it can be interpreted as the daily stock price response to unit trading volume. This indicator contains both stock return and trading volume information and is available in most stock markets. We use the illiquidity indicator ($\ln(Ami)$) as a proxy for investor sentiment. The calculation process is as in Equation (5)

$$\ln Ami_{i,t} = \ln \left(\frac{1}{D} \times \sum_{d=1}^{D_{it}} \left(\frac{|r_{iid}|}{V_{iid}} \right) \times 10^6 + 1 \right) \quad (5)$$

r_{iid} is the return on stock i in day d of year t ; V_{iid} is the trading volume on stock i in day d of year t ; D_{it} is the trading days on stock i of year t . The larger $\ln Ami_{i,t}$ is, the less liquid it is, and the investor sentiment is more depressed.

Institutional investor (**INSTI**): As investor sentiment could promote institutional investors to increase their shareholding ratio (Maug, 1998) and the higher the proportion of institutional investors holding shares, the more supervision they can play as discussed above. So following Bushee (1998) and Chen et al. (2007), we measure institutional investor as the proportion of institutional investors' holdings in the company's top ten outstanding shares. **INSTI-inde** is measured as the total proportion of Fund and QFII who have no business dealings with the investee company in China, and **INSTI-de** is measured as the proportion of the other institutional investors who have business dealings with the company.

Cash flow (**CF**): We measure it as net income plus depreciation and amortization all scaled by the beginning of the year's book value of assets;

Firm growth opportunities (**q**): Most empirical literature which study the relationship between q and investment measure Tobin's q as the ratio of firm's total asset against its market value (Bolton et al., 2011; Cooper & Ejarque, 2003). Following the traditional measurement and in order to avoid the effect from the excessive fluctuations of the firm's share price, we use the mean value of Tobin's q in last four quarters as firm growth opportunities.

Tangible investment (**TIR**): Tangible investment is measured by the incremental amount of fixed assets, construction in progress, inventories and cash on hand. The tangible investment rate is the ratio of tangible investment to total assets at the beginning of the year.

We measure **SALE** as the logarithm of sale; measure **GRO** as the growth rate of sale; measure **MB** as the ratio of market value to book value of equity; measure **LEV** as liabilities divided by total assets; measure external financing dependence (**efd**) = [(investment in tangible assets + investment in innovative assets)

– cash flow from operating activities]/(investment in tangible assets + investment in innovative assets).

3.3. Statistical Summary

Table 2 shows the descriptive statistics of the main variables. From the total sample, we can see that the average innovation investment rate in China is only 2.5%, much lower than that of developed countries. In addition, POEs have significantly higher cash flows, growth opportunities and sales growth rates than SOEs, while SOEs have significantly higher sales and leverage than POEs. There is no significant difference between the two types of firms in terms of investment in tangible assets, market-to-book ratios, and reliance on external funding for financing.

Table 2. Descriptive statistics of main variables.

	Var	<i>IIR</i>	<i>S</i>	<i>CF</i>	<i>q</i>	<i>TIR</i>	<i>SALE</i>	<i>GRO</i>	<i>MB</i>	<i>LEV</i>	<i>EDF</i>
Full sample	mean	0.025	0.492	0.097	1.77	0.115	22.237	0.101	3.928	0.5	0.553
	p50	0.018	0.27	0.087	1.468	0.075	21.923	0.107	2.727	0.501	0.75
	min	-0.025	0.006	-0.283	0.421	-0.418	17.375	-3.69	-71.182	0.042	-492.56
	max	0.253	9.075	0.505	9.61	11.408	28.689	2.219	781.544	4.465	799.12
	sd	0.027	0.709	0.068	1.014	0.367	1.665	0.267	19.852	0.223	20.987
	N	2331	2331	2331	2331	2331	2331	2331	2331	2330	2331
ID = 0	mean	0.032	0.472	0.113	2.017	0.123	21.776	0.125	4.688	0.44	0.661
	p50	0.024	0.257	0.106	1.629	0.084	21.557	0.126	3.068	0.439	0.69
	min	-0.008	0.02	-0.283	0.421	-0.418	17.375	-3.69	-71.182	0.043	-36.34
	max	0.253	7.335	0.505	9.61	10.855	25.503	2.219	781.544	4.465	73.19
	sd	0.033	0.667	0.083	1.272	0.415	1.35	0.3	27.483	0.249	4.78
	N	823	823	823	823	823	823	823	823	822	823
ID = 1	mean	0.021	0.502	0.088	1.635	0.111	22.489	0.088	3.513	0.533	0.495
	p50	0.016	0.281	0.081	1.381	0.071	22.17	0.096	2.492	0.55	0.77
	min	-0.025	0.006	-0.101	0.547	-0.347	18.568	-1.196	-49.984	0.042	-492.56
	max	0.1	9.075	0.311	4.557	11.408	28.689	2.164	533.045	1.556	799.12
	sd	0.022	0.73	0.057	0.809	0.338	1.764	0.247	14.038	0.199	25.856
	N	1508	1508	1508	1508	1508	1508	1508	1508	1508	1508
		0.011***	-0.03	0.025***	0.381***	0.012	-0.713***	0.038***	1.174	-0.093***	0.166

Table 3 presents descriptive statistics for institutional investors, showing the shareholdings of total institutional investors, independent institutional investors, and dependent institutional investors, respectively. We can see that the average shareholding of institutional investors is 10.7%, and the shareholding of independent institutional investors is much larger than that of dependent institutional investors. Dividing the sample into private and state-owned enterprises, we find that the proportion of institutional investors investing in private enterprises is significantly larger than the proportion investing in state-owned enterprises, and both independent and dependent institutional investors in POEs are larger than SOEs.

Table 4 shows the correlation analysis of the main variables. It can be seen that the correlation coefficient between the independent variables is low and that there is no obvious multicollinearity. The correlation coefficient table shows that investor sentiment is positively proportional to innovation investment (investor sentiment is a negative indicator).

Table 3. Descriptive statistics of heterogeneous institutional investors.

	Var	<i>INSTI</i>	<i>INSTI-inde</i>	<i>INSTI-de</i>
Full sample	mean	0.107	0.096	0.011
	p25	0.019	0.015	0
	p50	0.061	0.051	0.002
	p75	0.148	0.129	0.014
	sd	0.125	0.119	0.02
	N	2331	2331	2331
ID = 0	Mean	0.126	0.113	0.012
	P25	0.026	0.02	0
	P50	0.081	0.068	0.003
	P75	0.177	0.162	0.017
	SD	0.133	0.128	0.021
	N	823	823	823
ID = 1	Mean	0.097	0.087	0.011
	P25	0.016	0.012	0
	P50	0.053	0.045	0.001
	P75	0.13	0.113	0.013
	SD	0.12	0.113	0.02
	N	1508	1508	1508
	Mean Diff	0.028***	0.026***	0.002*

Table 4. Correlation Analysis of variables.

	<i>IIR</i>	<i>S</i>	<i>TIR</i>	<i>CF</i>	<i>q</i>	<i>SALE</i>	<i>GRO</i>	<i>MB</i>	<i>LEV</i>	<i>EFD</i>
<i>IIR</i>	1									
<i>S</i>	-0.104***	1								
<i>TIR</i>	0.113***	-0.027	1							
<i>CF</i>	0.179***	-0.100***	0.113***	1						
<i>q</i>	0.329***	-0.041**	0.094***	0.200***	1					
<i>SALE</i>	-0.067***	-0.341***	0.012	0.130***	-0.327***	1				
<i>GRO</i>	0.170***	-0.055***	0.178***	0.406***	0.079***	0.087***	1			
<i>MB</i>	0.004	-0.025	-0.024	-0.089***	0.070***	-0.084***	-0.110***	1		
<i>LEV</i>	-0.187***	0.032	0.052**	-0.228***	-0.229***	0.399***	-0.048**	0.026	1	
<i>EFD</i>	-0.006	-0.002	0	0.013	-0.009	0.042**	0.01	-0.003	-0.001	1

4. Empirical Analysis

4.1. Basic Regression Results

Table 5 shows the mixed regression results of investor sentiment affecting corporate innovation investment, the first column is the total sample regression results, the second column adds the dummy variable *ID* which represents the nature of property rights, and the third column adds the intersection term of *ID* and *S*. The results in the first column show that the regression coefficient of *S* is negative, indicating that investor sentiment can promote corporate innovation investment, but the results are not significant. The coefficient of *ID* in the second column is negative, indicating that innovation investment in SOEs is not as high as in POEs. In the third column, the coefficients of *S*, *ID*, and interaction term are all significant. When $ID = 1$, the coefficient of investor sentiment on innovation investment is significantly positive ($0.004 - 0.003 = 0.001$), indicating that the higher the investor sentiment, the lower the innovation investment in SOEs. When $ID = 0$, the coefficient of the effect of investor sentiment is significantly negative (-0.003), indicating that in POEs, the higher the investor sentiment, the higher the innovation investment, and investor sentiment has a promotive effect on innovation. Hypothesis 1 and hypothesis 2 are verified.

Further, we employ panel regression to test the impact of investor sentiment on firms' innovation investment and find consistent conclusions. **Table 6** shows the panel regression results, the first column is the total sample regression results, the second column adds the dummy variable *ID* which represents the nature of property rights, and the third column adds the intersection term of *ID* and *S*. The results in the first column show that the *S* coefficient is negative but also not significant. The coefficient of *ID* in the second column is -0.005 , which is sig-

nificantly negative at the 10% level, indicating that POEs invest more in innovation than SOEs, which is consistent with the results of the descriptive statistics. In the third column, the coefficient of S is -2.779 , which is significantly negative at the 10% level, the coefficient of ID is -0.007 , which is significantly negative at the 5% level, and the interaction term ID and S is significantly positive at the 5% level. When $ID = 1$, the total impact coefficient of investor sentiment on innovation investment is 1.391 ($4.190 - 2.779 = 1.391$), indicating that each unit

Table 5. Investor sentiment and enterprise innovation investment (mixed regression).

VAR	(1) <i>IIR</i>	(2) <i>IIR</i>	(3) <i>IIR</i>
S	-0.001 (-0.719)	-0.000 (-0.493)	-0.003* (-1.921)
ID		-0.005** (-2.017)	-0.007** (-2.243)
$ID*S$			0.004** (2.017)
CF	0.021 (1.158)	0.013 (0.724)	0.012 (0.668)
q	0.007*** (4.523)	0.007*** (4.577)	0.007*** (4.594)
TIR	0.005** (2.043)	0.005** (2.162)	0.005** (2.204)
$SALE$	0.000 (0.462)	0.001 (0.882)	0.001 (0.943)
GRO	0.016*** (5.038)	0.015*** (5.157)	0.015*** (4.967)
MB	0.000 (0.514)	0.000 (0.287)	0.000 (0.145)
LEV	-0.013*** (-3.279)	-0.012*** (-3.261)	-0.013*** (-3.290)
EFD	-0.000 (-0.792)	-0.000 (-0.940)	-0.000 (-0.943)
Obs	2330	2330	2330
R-squared	0.200	0.207	0.209

Table 6. Investor sentiment and enterprise innovation investment (panel regression).

VAR	(1) <i>IIR</i>	(2) <i>IIR</i>	(3) <i>IIR</i>
<i>S</i>	-0.086 (-0.099)	-0.029 (-0.032)	-2.779* (-1.772)
<i>ID</i>		-0.005* (-1.921)	-0.007** (-2.192)
<i>ID*S</i>			4.190** (2.124)
<i>CF</i>	0.016 (0.858)	0.010 (0.528)	0.008 (0.453)
<i>q</i>	0.007*** (4.505)	0.007*** (4.564)	0.007*** (4.576)
<i>TIR</i>	0.005** (2.009)	0.005** (2.132)	0.005** (2.177)
<i>SALE</i>	-0.001 (-0.924)	-0.000 (-0.319)	-0.000 (-0.355)
<i>GRO</i>	0.016*** (5.237)	0.016*** (5.290)	0.015*** (5.121)
<i>MB</i>	0.000 (0.091)	-0.000 (-0.053)	-0.000 (-0.250)
<i>LEV</i>	-0.011*** (-2.839)	-0.011*** (-2.891)	-0.011*** (-2.901)
<i>EFD</i>	-0.000 (-0.906)	-0.000 (-1.012)	-0.000 (-1.021)
Obs	2330	2330	2330
R-squared	0.202	0.208	0.211

standard deviation increase in investor sentiment (0.73) causes a decrease in innovation investment of 1.015 in SOEs, so investor sentiment is inhibitory to corporate innovation. When $ID = 0$, the S coefficient is -2.779 , which is significantly negative at the 10% level, indicating that each unit standard deviation increase in investor sentiment (0.667) causes an increase in innovation investment of 1.85 in POEs, and therefore, investor sentiment has a facilitating effect on corporate innovation. Hypothesis 1 and hypothesis 2 are further verified.

4.2. Robustness Checks and Endogeneity Test

1) Robustness test

We conduct a set of robustness tests for our baseline results. Firstly, we employ turnover rate as an alternative variable for investor sentiment, while the higher the turnover rate, the higher the investor sentiment. The results present in **Table 7**. We find that coefficient of the intersection term is significantly negative, which imply that the higher the investor sentiment, the lower the innovation investment in SOEs. Another concern might be that our results are affected

Table 7. Robustness tests 1.

VAR	(1) <i>IIR</i>	(2) <i>IIR</i>	(3) <i>IIR</i>
<i>S</i>	-0.002 (-1.589)	-0.002 (-1.380)	0.001* (1.816)
<i>ID</i>		-0.005** (-2.006)	-0.005** (-2.054)
<i>ID*S</i>			-0.004* (-1.733)
<i>CF</i>	0.020 (1.127)	0.013 (0.702)	0.013 (0.709)
<i>q</i>	0.007*** (4.527)	0.007*** (4.582)	0.007*** (4.582)
<i>TIR</i>	0.005** (2.062)	0.005** (2.175)	0.005** (2.193)
<i>SALE</i>	0.000 (0.661)	0.001 (1.022)	0.001 (1.020)
<i>GRO</i>	0.016*** (5.097)	0.015*** (5.210)	0.015*** (5.197)
<i>MB</i>	0.000 (0.555)	0.000 (0.320)	0.000 (0.260)
<i>LEV</i>	-0.013*** (-3.379)	-0.013*** (-3.349)	-0.013*** (-3.378)
<i>EFD</i>	-0.000 (-0.828)	-0.000 (-0.969)	-0.000 (-0.975)
Obs	2330	2330	2330
R-squared	0.200	0.207	0.208

by the large swings of investor sentiment under both bear and bull conditions in China's stock markets. So, we construct a subsample from 2009-2014 period when the stock market investor sentiment is less volatile for robustness check. The results present in **Table 8** and we find a similar result as in **Table 5** and **Table 6**. Lastly, considering the presence of zero values in the explained variable innovation investment, we re-select the Tobit model and the result presents in **Table 9**, we find that the results are consistent with prior estimations.

Table 8. Robustness tests 2.

VAR	(1) <i>IIR</i>	(2) <i>IIR</i>	(3) <i>IIR</i>
<i>S</i>	-0.634 (-0.719)	-0.441 (-0.493)	-7.278*** (-3.385)
<i>ID</i>		-0.005** (-2.017)	-0.006* (-1.795)
<i>ID*S</i>			7.313*** (2.743)
<i>CF</i>	0.021 (1.158)	0.013 (0.724)	0.021 (1.003)
<i>q</i>	0.007*** (4.523)	0.007*** (4.577)	0.006** (2.569)
<i>TIR</i>	0.005** (2.043)	0.005** (2.162)	0.002 (1.522)
<i>SALE</i>	0.000 (0.462)	0.001 (0.882)	-0.000 (-0.003)
<i>GRO</i>	0.016*** (5.038)	0.015*** (5.157)	0.011*** (3.197)
<i>MB</i>	0.000 (0.514)	0.000 (0.287)	-0.000 (-0.454)
<i>LEV</i>	-0.013*** (-3.279)	-0.012*** (-3.261)	-0.013*** (-2.974)
<i>EFD</i>	-0.000 (-0.792)	-0.000 (-0.940)	-0.000*** (-2.845)
Obs	2330	2330	1520
R-squared	0.200	0.207	0.154

Table 9. Robustness tests 3.

VAR	(1) <i>IIR</i>	(2) <i>IIR</i>	(3) <i>IIR</i>
<i>S</i>	-1.594 (-1.163)		-5.094** (-2.229)
<i>ID</i>		-0.006** (-2.010)	-0.008** (-2.371)
<i>ID*S</i>			5.727** (2.142)
<i>CF</i>	0.019 (0.938)	0.010 (0.478)	0.010 (0.464)
<i>q</i>	0.008*** (4.621)	0.008*** (4.688)	0.007*** (4.675)
<i>TIR</i>	0.005** (2.131)	0.005** (2.295)	0.005** (2.327)
<i>SALE</i>	0.000 (0.492)	0.001 (1.150)	0.001 (0.936)
<i>GRO</i>	0.018*** (4.941)	0.018*** (5.118)	0.017*** (4.889)
<i>MB</i>	-0.000 (-1.167)	-0.000 (-1.175)	-0.000 (-1.402)
<i>LEV</i>	-0.020*** (-3.246)	-0.020*** (-3.287)	-0.019*** (-3.210)
<i>EFD</i>	-0.000 (-0.686)	-0.000 (-0.869)	-0.000 (-0.807)
Pseudo R2	-0.0810	-0.0835	-0.0849
Obs	2330	2330	2330

2) Endogeneity test

As an unobservable correlated with both investor sentiment and innovation investment may be present and would make coefficient estimates biased, the firm fixed effects can be used as an endogeneity control (Fang et al., 2009). We employ fixed effects regression model in Table 6 to solve the endogeneity problem. Our second approach to correct for the potential bias due to selection is an instrument variable strategy. Following (Fang et al., 2009), we use one lag of the *S* as exogenous variable that are correlated with investor sentiment but uncorre-

lated with the error term in Equation (1). The results presented in **Table 10** are similar to prior estimations.

4.3. Further Test

Table 11 shows the tests of the intermediation effect of institutional investors. Columns 1 - 3 are the results of the POEs, column 1 is the regression result of model 1, and columns 2 and 3 are the regression results of models 3 and 4. The S

Table 10. Endogenous test.

VAR	(1) <i>IIR</i>	(2) <i>IIR</i>	(3) <i>IIR</i>
<i>S</i>	-2.732 (-0.744)	-1.634 (-0.430)	-16.873** (-2.287)
<i>ID</i>		-0.006*** (-4.887)	-0.015*** (-4.776)
<i>ID*S</i>			20.649*** (2.960)
<i>CF</i>	0.012 (0.912)	0.003 (0.225)	0.002 (0.177)
<i>q</i>	0.008*** (7.550)	0.008*** (7.481)	0.008*** (6.931)
<i>TIR</i>	0.003 (1.608)	0.003* (1.735)	0.005* (1.702)
<i>SALE</i>	0.001 (1.060)	0.001 (1.596)	0.001* (1.678)
<i>GRO</i>	0.014*** (4.533)	0.014*** (4.711)	0.013*** (3.724)
<i>MB</i>	0.000 (0.929)	0.000 (0.544)	0.000 (0.390)
<i>LEV</i>	-0.017*** (-5.015)	-0.016*** (-4.739)	-0.017*** (-4.925)
<i>EFD</i>	-0.000 (-0.255)	-0.000 (-0.429)	-0.000 (-0.407)
<i>Chi-sq (1) P-val</i>	0.000	0.000	0.000
<i>Cragg-Donald Wald F statistic</i>	169.159	164.481	81.317
Obs	1905	1905	1905
R-squared	0.166	0.179	0.145

Table 11. Mediating effect of institutional investors.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	<i>ID</i> = 0			<i>ID</i> = 1		
	<i>IIR</i>	<i>INSTI</i>	<i>IIR</i>	<i>IIR</i>	<i>INSTI</i>	<i>IIR</i>
<i>S</i>	-0.003*	-0.024***	-0.002	0.000	-0.035***	0.001
	(-1.915)	(-3.471)	(-1.267)	(0.227)	(-5.758)	(0.536)
<i>INSTI</i>			0.047***			0.009
			(3.002)			(1.072)
<i>CF</i>	0.021	0.381***	0.003	0.008	0.656***	0.002
	(0.610)	(5.079)	(0.090)	(0.428)	(8.665)	(0.108)
<i>q</i>	0.009***	0.018***	0.008***	0.004**	0.023***	0.004**
	(3.435)	(4.046)	(3.323)	(2.565)	(3.909)	(2.402)
<i>TIR</i>	0.009***	0.016***	0.008***	0.002	0.002	0.002
	(5.160)	(3.665)	(4.716)	(1.510)	(0.207)	(1.546)
<i>SALE</i>	0.000	0.007	0.000	0.000	0.002	0.000
	(0.201)	(1.200)	(0.071)	(0.211)	(0.582)	(0.186)
<i>GRO</i>	0.012**	0.035**	0.010**	0.018***	0.020	0.018***
	(2.210)	(2.004)	(2.044)	(6.395)	(1.524)	(6.438)
<i>MB</i>	0.000	0.000***	-0.000	-0.000	0.000	-0.000
	(0.235)	(3.325)	(-0.476)	(-0.657)	(1.356)	(-1.010)
<i>LEV</i>	-0.012*	-0.028	-0.011*	-0.014**	0.049*	-0.014***
	(-1.903)	(-1.355)	(-1.816)	(-2.580)	(1.912)	(-2.635)
<i>EFD</i>	-0.000	0.001	-0.000*	-0.000	-0.000	-0.000
	(-1.300)	(0.964)	(-1.687)	(-0.487)	(-1.599)	(-0.414)
Obs	822	822	822	1508	1508	1508
R-squared	0.226	0.298	0.251	0.159	0.250	0.161

coefficient β in column 1 is 0.010, significant at the 10% level, and the S coefficient β_1 in column 2 is -0.024 and significant at the 1% level, indicating that the higher the investor sentiment in POEs, the higher the proportion of institutional investor ownership, and the $INSTI$ coefficient β_3 in column 3 is 0.047, significant positive at the 1% level, indicating that the higher the proportion of institutional investor, the higher the firm's innovation investment. The intermediary effect produced by institutional investors accounts for 38.12% of the total effect, and the Z statistic of the sobel test for intermediary effect is -2.862, which is greater than the threshold value of -0.97 at the 5% level of significance. Therefore, it indicates that institutional investors in POEs play a role in the intermediary pro-

motion effect in investor sentiment promoting corporate innovative investment. Columns 4 - 6 are the results of SOEs, S coefficient β in column 4 is not significant, and S coefficient β_1 in column 5 is -0.035 and significant at the 1% level, indicating that the institutional investors also favor holding firms with high investor sentiment in POEs. The $INSTI$ coefficient β_3 in column 6 is not significant. Therefore, there is no mediation effect for institution investors in SOEs.

Table 12 presents tests of the intermediation effect of independent institutional investors who have supervisory functions. Columns 1 - 3 are the results of the POEs, column 1 is the regression result of model 1, and columns 2 and 3 are

Table 12. Mediating effect of independent institutional investors.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	$ID=0$			$ID=1$		
	IIR	$INSTI-inde$	IIR	IIR	$INSTI-inde$	IIR
S	-0.003*	-0.023***	-0.002	0.000	-0.032***	0.001
	(-1.915)	(-3.494)	(-1.295)	(0.227)	(-5.562)	(0.569)
$INSTI-inde$			0.048***			0.011
			(2.890)			(1.273)
CF	0.021	0.347***	0.004	0.008	0.618***	0.001
	(0.610)	(4.709)	(0.122)	(0.428)	(8.677)	(0.065)
q	0.009***	0.019***	0.008***	0.004**	0.021***	0.004**
	(3.435)	(4.452)	(3.328)	(2.565)	(3.747)	(2.392)
TIR	0.009***	0.016***	0.008***	0.002	-0.000	0.002
	(5.160)	(3.954)	(4.717)	(1.510)	(-0.049)	(1.569)
$SALE$	0.000	0.007	0.000	0.000	0.002	0.000
	(0.201)	(1.200)	(0.077)	(0.211)	(0.466)	(0.189)
GRO	0.012**	0.038**	0.010**	0.018***	0.018	0.018***
	(2.210)	(2.206)	(2.021)	(6.395)	(1.538)	(6.432)
MB	0.000	0.000***	-0.000	-0.000	0.000	-0.000
	(0.235)	(3.192)	(-0.478)	(-0.657)	(1.335)	(-1.095)
LEV	-0.012*	-0.026	-0.011*	-0.014**	0.050**	-0.014***
	(-1.903)	(-1.380)	(-1.828)	(-2.580)	(2.092)	(-2.651)
EFD	-0.000	0.001	-0.000	-0.000	-0.000	-0.000
	(-1.300)	(0.682)	(-1.632)	(-0.487)	(-1.648)	(-0.405)
Obs	822	822	822	1508	1508	1508
R-squared	0.226	0.307	0.250	0.159	0.248	0.162

the regression results of models 3 and 4. The S coefficient β in column 1 is -0.003 and significant at the 10% level, the *INSTI-inde* coefficient β_1 in column 2 is -0.023 and significant at the 1% level, indicating that the higher the investor sentiment in POEs, the higher the proportion of independent institutional investors holding, and the *INSTI-inde* coefficient β_3 in column 3 is 0.048 and significant positive at the 1% level, indicating that the higher the percentage of independent institutional investor ownership, the more firms invest in innovation. The mediating effect produced by independent institutional investors accounts for 36.54% of the total effect, and the Z statistic of the sobel test for the mediating utility is -3.431 , which is greater than the threshold value of -0.97 at the 5% significance level. Therefore, it shows that the independent institutional investors in POEs have a mediating effect in investor sentiment to promote enterprise innovation investment. Columns 4 - 6 are the results of SOEs, in column 4 S coefficient β is not significant, in column 5 S coefficient β_1 is -0.032 and significant at the 1% level, and in column 6 *INSTI* coefficient β_3 is not significant. Therefore, in SOEs, there is no intermediation effect for independent institutional investors.

Table 13 presents the intermediation effect of dependent institutional investors who do not have a supervisory function. Columns 1 - 3 are the results of the POEs, column 1 is the regression result of model 1, and columns 2 and 3 are the regression results of models 3 and 4. The S coefficient β in column 1 is -0.003 , which is significant at the 10% level, the *INSTI-de* coefficient β_1 in column 2 is -0.002 , which is not significant, and the *INSTI-de* coefficient β_3 in column 3 is 0.088 , which is also not significant, thus indicating that there is no intermediation effect of dependent institutional investors in POEs. Columns 4 - 6 are the results of SOEs, S coefficient β is not significant in column 4, S coefficient β_1 is -0.003 and significant at 1% level in column 5, and *INSTI-de* coefficient β_3 is not significant in column 6. Thus, in SOEs, there is also no intermediation effect for dependent institutional investors.

5. Conclusion

Using a sample of 335 national-level innovative firms listed on China's SSE and SZSE from 2006-2016, this paper studies the influence of investor sentiment on innovation investment activities of enterprises with different ownership in China and finds that investor sentiment promotes the innovation investment of POEs, while inhibits SOEs. Using the intermediary effect model to test the mechanism of the role of institutional investors, we find that institutional investors in POEs play a mediating role in the promotion of investor sentiment to their innovation investment, but institutional investors have no effect on the innovation investment in SOEs. Further, based on the institutional investor supervision perspective, we test the role of supervisory independent institutional and find that it is independent institutional investors who play a mediating promotion role in promoting innovation investment in private firms. However, dependent institutional investors do not have any influential role in either SOEs or POEs.

Table 13. Mediating effect of dependent institutional investors.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	<i>ID</i> = 0			<i>ID</i> = 1		
	<i>IIR</i>	<i>INSTI-de</i>	<i>IIR</i>	<i>IIR</i>	<i>INSTI-de</i>	<i>IIR</i>
<i>S</i>	-0.003*	-0.002	-0.003*	0.000	-0.003***	0.000
	(-1.915)	(-1.091)	(-1.836)	(0.227)	(-4.721)	(0.154)
<i>INSTI-de</i>			0.088			-0.022
			(1.294)			(-0.588)
<i>CF</i>	0.021	0.034**	0.018	0.008	0.039***	0.009
	(0.610)	(2.211)	(0.532)	(0.428)	(3.047)	(0.472)
<i>q</i>	0.009***	-0.001	0.009***	0.004**	0.002*	0.004***
	(3.435)	(-1.586)	(3.486)	(2.565)	(1.726)	(2.651)
<i>TIR</i>	0.009***	-0.000	0.009***	0.002	0.002	0.002
	(5.160)	(-0.597)	(5.148)	(1.510)	(1.077)	(1.554)
<i>SALE</i>	0.000	0.001	0.000	0.000	0.001	0.000
	(0.201)	(0.631)	(0.185)	(0.211)	(0.959)	(0.229)
<i>GRO</i>	0.012**	-0.003	0.012**	0.018***	0.002	0.018***
	(2.210)	(-1.312)	(2.270)	(6.395)	(0.661)	(6.417)
<i>MB</i>	0.000	0.000	0.000	-0.000	-0.000	-0.000
	(0.235)	(0.858)	(0.202)	(-0.657)	(-0.121)	(-0.663)
<i>LEV</i>	-0.012*	-0.002	-0.012*	-0.014**	-0.001	-0.014**
	(-1.903)	(-0.493)	(-1.880)	(-2.580)	(-0.378)	(-2.580)
<i>EFD</i>	-0.000	0.000	-0.000	-0.000	-0.000	-0.000
	(-1.300)	(1.119)	(-1.397)	(-0.487)	(-0.737)	(-0.502)
Obs	822	822	822	1508	1508	1508
R-squared	0.226	0.041	0.229	0.159	0.062	0.160

This paper examines the impact of investor sentiment on corporate innovation investment using a representative sample of innovative listed companies in China, and finds that investor sentiment has distinctly different effects on the impact of innovation investment in different property-ownership firms, suggesting that China's capital market is still in the development stage compared to developed Western capital markets, but the promotion effect of investor sentiment in POEs shows that China's private companies are already highly market-oriented, and could take advantage of the capital market to serve its innovation. On the other hand, just like in the western developed market, the monitoring function of institutional investors in Chinese capital market has also played a

positive role in private firms. This paper demonstrates that the monitoring role of institutional investors is another mechanism by which investor sentiment affects firm innovation. Finally, from the perspective of ownership system, we find that the capital market factors that influence firms' investment in innovation do not yet work for China's SOEs, indicating that there is still a long way to go on the road to marketization of SOEs.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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