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DIVIDEND AND EXCESS RETURN IN CHINA

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ABSTRACT

Investors are always chasing excess returns. To examine the three driving factors affecting China A-share excess returns, namely systematic risk, idiosyncratic risk and market sentiment, this study divided A-shares into non-dividend and dividend-paying groups based on the Dividend Paid for Common Shares in the notes of the financial report. In addition, this study used the Capital Asset Pricing model, Single-Index model, Arbitrage Pricing theory and Fama–French three- and five-factor model to analyse the three main driving factors. The Gibbons-Ross-Shanken test was used to test the model validity, and the optimal model for each group was extracted. Our findings show that after analysing the optimal models within each group, it becomes evident that systematic risk indeed exerts an influence on both dividend-paying and non-dividend companies. Nevertheless, when considering four specific systematic risks (inflation, exchange rates, crude oil and interest rates), this study's findings establish that these risks do not significantly impact

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the stock returns of any company group across all time periods. As for idiosyncratic risks, firm size and book-to-market factors emerge as substantial influencers across all firms. Additionally, market sentiment significantly affects the stock performance of small-sized dividend-paying companies.

Keywords: Asset pricing, China A-shares, Dividend, Market sentiment, Systematic risk

INTRODUCTION

In favourable market environments with excellent company operating conditions, dividends may be seen as a reflection of the company's value, leading to an increase in stock prices. Conversely, in unfavourable market conditions or when the company's performance is subpar, dividends may reduce a company's net assets and net assets per share, which may negatively affect stock prices. Research by Hameed and Xie (2019), Bouaddi et al. (2021), Kadioglu and Kirbas (2021), Ali et al. (2022), and Kumar et al. (2022) supports these observations. Therefore, the impact of dividends on stock prices depends on various factors, including the external economic environment, company operational conditions and market sentiment among others. What are the specific factors involved and how do they affect A-shares?

In 1952, Markowitz proposed the concept of systematic risks. However, systematic risk is caused by the external macroeconomics of the company, such as inflation, exchange rate, interest rate and crude oil prices, which may affect stock return. The vast majority of investors are unable to purchase all A-shares to diversify their risks. Different companies have unique features in terms of sizes, book-to-market ratios, investment ratio and profitability. According to China Securities and Futures Statistical Yearbook 2021, the proportion of A-shares retail investors is as high as 99%. The emergence of behavioural finance puts forward the concept of market sentiment. This innovation will enrich quantity and type of asset pricing models. What are the impacts of three main driving factors on stock return of different dividend policies companies?

Investors are always chasing excess returns. Some companies pay dividends, while others do not. Will the factors affecting the excess returns differ for these different dividend policies? Pursuant to the Wind financial terminal, there are more and more retail investors and institutes investing in A-shares listed companies in recent years. The research (e.g., Barberis & Huang, 2008; Kumar, 2009; Hu et al., 2021; Ali Taher & Al-Shboul, 2023) shows retail investors tend to buy stocks that pay dividends and are willing to pay a price for it with a premium. The lower stock price after dividends will attract more investors to speculate.

Dividend policy is an important financial components of China stock market. cash dividend ratio of China's stock market has always been higher than 50% and the ratio has been increasing from 2000 to 2021. We postulate that dividends will attract investors, because investors will profit from it. This research will study excess returns from the perspective of dividends.

Several researchers (Kumar et al., 2022; Gu et al., 2022; Wang et al., 2022; Mokni, 2020; Mroua & Trabelsi, 2020; Chen & Gong, 2019; Hirdinis, 2019; Pratiwi & Badjra, 2020; Tumpal Hutajulu & Puspitasari, 2019; Baker & Wurgler, 2006; Kim & Suh, 2020; Kim et al., 2019; Seok et al., 2019) have conducted extensive research on the three main driving factors namely systematic risk, idiosyncratic risk and market sentiment with classic asset pricing models (SIM, CAPM, APT, Fama–French three- and five-factor models) in various markets and countries, but they did not investigate the different type of company on the dividend. Furthermore, Ali and Bashir (2022) found that most of the research on asset pricing is focused on the U.S. stock market, and there are not much research on asset pricing in emerging markets.

The contribution of this article lies in several aspects. Firstly, there are only a few studies on dividend-paying and non-dividend companies, with most of the research focusing on state-owned and non-state-owned enterprises. Secondly, the data used in this study spans a longer period of 18 years (2004–2021), compared to many research studies that only use data that is less than decade. Thirdly, the study uses a large sample size of over 4,000 non-financial companies in A-shares, making it the largest sample used in this field. Therefore, a major contribution of this paper lies in the large sample size. Fourth, while many studies simply use a chi-square comparison to conclude the best model is, this study uses a formal Gibbons-Ross-Shanken (GRS) test, which is formal evaluation way. Fifth, China is an emerging market and boasts one of the largest stock markets in the world. By studying the China stock market, which follows the classic asset pricing model based on the U.S. stock market, one can perform out-of-sample testing for the models. Finally, this study contributes to the integration of traditional finance and behavioural finance by bringing together the traditional and classic asset pricing model and market sentiment model for A-share companies.

Because the dividend data in the annual financial report is updated slowly, the 2022 dividend will not be available until the second and third quarters of 2023, so this study uses the 2021 cut-off data. Considering the market sentiment proxy data available since 2004, spanning from January 2004 to December 2021 with total of 216 months data. Pursuant to the Dividend Paid for Common Shares in the notes to the financial report, A-shares is divided into non-dividend and

dividend-paying groups respectively. In order to interpret stock return, Single Index Model (SIM), Capital Asset Pricing Model (CAPM), Arbitrage Pricing Theory (APT) Model, Fama–French three-factor model (FF3) and Fama–French five-factor model (FF5) are used in this study. The findings of this study found general systematic risk, firm size and book-to-market factors have impacts on dividend-paying and non-dividend companies, Market sentiment has a significant impact on small size stocks of dividend-paying companies.

LITERATURE REVIEW

There exists some research on how systematic risks like crude oil prices, exchange rate, inflation and interest rate impact on stock returns. Adekunle et al. (2020) and Mokni (2020) investigated relationship between crude oil price with stock return. Adekunle et al. (2020) studied nine major oil and gas listed companies of Nigeria from 2014 to 2019 and they illustrated that those companies stock returns are very sensitive to the negative impact of oil prices. Mokni (2020) investigated impacts of crude oil price on the three oil-exporting (Canada, Norway, Russia) and three oil-importing (China, Japan, the U.S.) countries in 2000 to 2018, Mokni (2020) revealed stock market's response to oil is asymmetric, the negative impact of oil on stocks is even greater. The studies of Celik (2020) and Fateye et al. (2019) are about exchange rate impact on stock returns. Celik (2020) studied five Turkish insurance companies from 2009 to 2020 and concluded that the exchange rate has a significant impact on the volatility of insurance company stocks, but it has no effect on the average return. Similarly, Fateye et al. (2019) showed that the impacts of exchange rates on four Nigeria real estate trust fund stock returns from 2010 to 2018 are huge and significant, two companies are negatively affected by the exchange rate, another two companies are positively affected. In addition, the research on inflation is as flowing. Salisu et al. (2020) examined the U.S. S&P500 in pre- and post-global financial crisis periods and found the U.S. stocks have good hedging ability against inflation, there exists a time-varying relation for asset-inflation hedging ability. In another study, Chen and Gong (2019) found that the higher inflation brought more risks to the China Securities Index (CSI) 300 Index in the pre- and post of the stock market crash. Lastly, study by Gu et al. (2022) concluded that, while average interest rates have a negative impact on stock returns, raising rates when the economy overheats does not depress stocks, the effect of interest rates on stocks is time-varying Fateye et al. (2019) showed that amongst four Nigerian real estate fund stocks from 2010 to 2018, three real estate fund stocks reacted negatively to interest, and one fund stock non-responsive to interest.

Aside from systematic risks, some studies have looked into the influence of idiosyncratic risk on stock market returns, for instance firm size, B/M ratio, profitability and investment. Hirdinis (2019) and Zuhroh (2019) showed that firm size has negative influences on stock return. Hirdinis (2019) found that the sizes of Indonesian mining companies are negatively correlated with the stock returns during 2011 to 2015. Likewise, Zuhroh (2019) studied 31 real estate and public property companies from 2012 to 2016, Zuhroh (2019) revealed that small companies gave the public more confidence in stock market, firm size has negative insignificant impact on the company's value. Gunadi et al. (2020) and Chandra et al. (2019) concluded that profitability has a positive impact on the company's stock returns, which causes the company's stock returns to rise and eventually, increases the company's value. With regard to B/M value, Nia (2020) observed 100 Indonesian medium-value and small-scale listed companies during COVID-19 pandemic, the effect of B/M on stock returns is not obvious, but as the company stock value increases, low-B/M companies can bring excess returns. In terms of research on investment, Lalwani and Chakraborty (2019) extracted 10 markets data during 1992 to 2017 and divided them into two groups, in the five developed markets, the investment factor is effective; in another five emerging markets, the investment factor has a significant impact on the average rate of return. Besides, Molla Ahmetoğlu (2020) paid attention to investment factor of German and Turkish markets from 2009 to 2018 and they found that the investment factor in the FF5 is not able to explain the stock returns and not robust.

With regard to market sentiment, Baker and Wurgler (2006) found that when investor sentiment is relatively low, some stocks such as distressed stocks, high volatility stocks, unprofitable stocks, small stocks, extreme growth stocks, young stocks and non-dividend-paying stocks, would obtain high subsequent returns. However, in the case of high investor sentiment, the performance of these stocks would be the opposite. In other study on investor sentiment, Kim et al. (2019) found that analysts' recommendations have an impact on investor sentiment in South Korea market during 2010 to 2017, where both investor sentiment and analyst recommendations affect the stock market together. Wang et al. (2022) studied the sentiment of China's A-share market from 2013 to 2020 and found that during the stock market crash, market sentiment has a greater impact on the return of China stocks, and market investors like to focus on stocks with large market capitalisation.

Finally, in relation to dividend. Basse et al. (2021) studied the importance of dividend policy to stock prices in S&P 500 stocks from 1871 to 2014. This study found that dividend policy does cause speculative bubbles, whether it is the Nasdaq stock market or other stock markets. Yan and Zhu (2020) paid attention to

dividend policy from 2007 to 2018, they found that the dividend payment is largely affected by the proportion of state-owned enterprises in the same industry. Ali and Al-Shboul (2023) found that high dividends can reduce stock liquidity. Ali and Al-Shboul's research analysed 411 non-financial U.S. stock companies from 2006 to 2017 and concluded that the dividend policy is inversely proportional to stock liquidity. Kumar et al. (2022) researched on the U.S. stocks from 2004 to 2020 found that dividend sentiment affects stock prices. When the economy is weak, investors' demand for dividends increases, leading to an increase in dividend sentiment, which indicates a call for higher dividends.

The previous study explored the systematic risk, idiosyncratic risk and market sentiment can positively or negatively affect stock markets, but they did not study China A-share market performances of diverse dividend policy, there exist several asset pricing models like CAPM, SIM, APT, FF3 and FF5. The scholars did not investigate applicability of each model on companies of various dividend policies company.

RESEARCH METHODOLOGY

All data are extracted from Wind financial terminal and China Stock Market and Accounting Research (CSMAR) database except, crude oil price and interest, which the two came from the U.S. Energy Information Administration (EIA) and RESSET database, respectively. All the monthly data are used in the calculation.

In the end of 2021, there exist a total of over 4,000 listed companies in A-shares, after a data preprocessing, 4,062 non-financial firms are extracted. The data preprocessing specifications are as follows:

1. Because the dividend data in the annual financial report is updated slowly, the 2022 dividend will not be available until the second and third quarters of 2023, so this study uses the 2021 cut-off data.
2. Considering the market sentiment proxy data available since 2004, spanning from January 2004 to December 2021 with total 216 months data.
3. Pursuant to the Dividend Paid for Common Shares in the notes to the financial report, A-shares is divided into non-dividend and dividend-paying company groups, respectively.
4. Excluding the IPO new stock within six months.
5. Excluding all Particular Transfer (PT) Special Treatment ST stock.

6. Excluding the 30% smallest market value to prevent shell-value contamination (Liu et al., 2019).
7. Excluding negative book value of equity firms.
8. Excluding abnormal trading shares.

Table 1 shows the application of the grouping method of the Fama–French model in this article. We will use Fama–French model to construct idiosyncratic risk and general systemic risk factor in this study.

Table 1
Fama–French Model grouping (Source: Fama & French, 1993; 2015)

Variable	Description	Fama–French method	Grouping point
SMB_t	Firm Size Factor	$SMB_{FF3} = SMB_{B/M} = (SH + SN + SL)/3 – (BH + BN + BL)/3$	The median of market value of negotiable shares.
		$SMB_{OP} = (SR + SN + SW)/3 – (BR + BN + BW)/3$	
		$SMB_{INV} = (SC + SN + SA)/3 – (BC + BN + BA)/3$	
		$SMB_{FF5} = (SMB_{B/M} + SMB_{OP} + SMB_{INV})/3$	
HML_t	B/M Ratio Factor	$HML = (SH + BH)/2 – (SL + BL)/2$	Percentile 30 and 70 of book-to-market (B/M).
RMW_t	Profitability Factor	$RMW = (SR + BR)/2 – (SW + BW)/2$	Percentile 30 and 70 of operating profit margin of negotiable shares.
CMA_t	Investment Pattern Factor	$CMA = (SC + BC)/2 – (SA+ BA)/2$	Percentile 30 and 70 of reinvestment ratio of negotiable shares.
		SMB_t and HML_t 2×3 group SMB_t and RMW_t 2×3 group SMB_t and CMA_t 2×3 group	

Notes: MKT = Market Risk factor; SMB = small minus big; HML = high minus low; RMW = robust minus weak; CMA = conservative minus aggressive.

In this research, the construction of the market sentiment index involves the utilisation of the five proxies presented in Table 2. Baker and Wurgler (2007) assert that the number of IPOs fluctuates in response to the business cycle, indicating that there may be a rational basis for IPO data variations. Consequently, to account for macroeconomic effects, three macroeconomic variables: Consumer Price Index (CPI), Producer Price Index (PPI) and Business Climate Index (BCI); are employed for regression analysis on these proxies. Subsequently, the resulting series of residuals from each regression are subjected to principal component analysis, leading to the derivation of the final market sentiment index.

Table 2
Proxies of market sentiment index

Proxy	Description
NIA	Previous month new investor accounts
IPOR	Return on the first day of IPO
IPON	IPO number
TURN	Previous month trading volume
DCEF	Closed-end fund discount

There are many well-known financial models that can be used for factor research, such as single index model (SIM); Sharpe (1964), Lintner (1965) and Black (1972)'s Capital Asset Pricing Model (CAPM); Ross (1976)'s Arbitrage Pricing Theory (APT) model; the three-factor model (FF3) proposed by Fama and French in 1992; and the five-factor model (FF5) proposed in 2015. As shown by Fama and MacBeth (1973), the absolute value intercept average (A|a|) is closer to 0, the interpreter power of that model is better. This study will use Gibbons-Ross-Shanken test (Gibbons et al., 1989) to examine the validity of each model with the Fama and French size-B/M grouping method. Size-B/M grouping is used because considering FF3 model has not included profitability and investment factors. This paper will apply the following models for this study.

For the impacts of all variables, we use APT model.

$$\begin{aligned} R_{it} - R_{Ft} = {} & a_i + b_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + r_i RMW_t + \\ & c_i CMA_t + o_i Ln(Oil_t) + x_i Ln(Exc_t) + t_i Ln(Int_t) + \\ & f_i Inf_t + m_i Sen_t + d_i Div_t + e_{it} \end{aligned} \quad (1)$$

For the general and the 4-specific systematic risks, we use APM and APT models, respectively.

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + d_i Div_t + e_{it} \quad (2)$$

$$R_{it} - R_{Ft} = a_i + o_i Ln(Oil_t) + x_i Ln(Exc_t) + t_i Ln(Int_t) + f_i Inf_t + d_i Div_t + e_{it} \quad (3)$$

For the 4-specific idiosyncratic risks, we use APT models.

$$R_{it} - R_{Ft} = a_i + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + d_i Div_t + e_{it} \quad (4)$$

For Market Sentiment index, we use SIM.

$$R_{it} - R_{Ft} = a_i + \mathrm{m}_i \mathrm{Sen}_t + d_i Div_t + e_{it} \quad (5)$$

Fama–French three/five-factor models:

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + d_i Div_t + e_{it} \quad (6)$$

$$R_{it} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + d_i Div_t + e_{it} \quad (7)$$

For i = 1, 2, 3, …, N; and t = 1, 2, 3, …, T; where, R_{it} = the return of stock i at time t; R_{Ft} = risk free interest at time t; a = constant term; SMB_t = firm size factor at time t; HML_t = B/M factor at time t; RMW_t = profitability factor at time t; Ln(Int) = logarithmic interest rate at time t; Inf = inflation rate at time t; Sen = market sentiment at time t; e_{it} = residual i at time t; R_{Mt} = aggregated market return at time t; CMA_t = investment factor at time t; Ln(Oil) = logarithmic West Texas, Intermediate (WTI) crude oil price at time t; Ln(Exc) = logarithmic CNY/USD exchange rate at time t; Div = dividend policy; and $Ownership_t$ = enterprise attributes at time t.

For data stationarity, Augmented Dickey–Fuller (ADF) test is used in this study (Said & Dickey, 1984):

$$\Delta \mathrm{y}_t = (\rho - 1)\mathrm{y}_{t-1} + \mathrm{u}_t = \delta \mathrm{y}_{t-1} + \mathrm{u}_t \quad (8)$$

For multivariate cointegration, this study utilised Johansen cointegration test (Johansen,1988; 1991).

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{g} ln(1 - \hat{\lambda}_i) \quad (9)$$

$$\lambda_{max}(r, r+1) = -Tln(1 - \hat{\lambda}_{r+1}) \quad (10)$$

For autocorrelation and heteroscedasticity, The Newey–West estimator of Q will be recorded as following if the residuals meet both autocorrelation and heteroscedasticity (Newey & West, 1987).

$$Q^* = \frac{1}{T}\sum_{t=1}^{T} e_t^2 x_t x'_t + \frac{1}{T}\sum_{l=1+1}^{L} w_1 e_t e_{t-1}(x_t x'_{t-1} + x_{t-1} x'_t) \tag{11}$$

$$w_t = 1 - \frac{1}{L+1} \tag{12}$$

For multiple collinear problems, In FF3 and FF5 models, the orthogonal factors would be used to replace the collineated factor.

$$e_i = y - \hat{y} \tag{13}$$

For the model validity, GRS test is applied to determine the best model according to test which asset portfolio models intercept term is close to 0. In this analysis, all the portfolios will be constructed into serval 5*5 groups by using method of Fama–French Size-B/M grouping models for GRS tests.

$$GRS = \left(\frac{T}{N}\right)\left(\frac{T-N-L}{T-L-1}\right)\left(\frac{\hat{\alpha}'\sum^{-1}\hat{\alpha}}{1+\bar{\mu}'\hat{\Omega}^{-1}\bar{\mu}}\right) \sim F(N, T-N-L) \tag{14}$$

For Lead-Lag effect in market sentiment, a two-stage principal component analysis method is applied (Baker & Wurgler, 2006).

DATA ANALYSIS

According to Fama and French (1993), the intercept represents the part not explained by the model, the smaller the absolute value of intercept average A|a|, the better the model to explain the stock return. In the multi-factor explanation of the stock return of non-dividend companies, the analysis of this study is as follows:

Non-Dividend Companies

As shown in Table 3, the FF3 model has the strongest ability to explain the stock returns of non-dividend companies, which has the smallest A|a|. Tables 4 and 5 examined the explanatory power of 4-specific idiosyncratic risks and 4-specific systematic risks (exchange rate, interest rate, crude oil and inflation), respectively. From these two tables, it can be concluded that the explanatory power of the single-index model (SIM) is generally not as good as that of the multi-factor model on top of Table 3.

In Table 3, since there is only a 0.001 A|a| gap between the top two models, namely FF3 and the 4-factor model (Inf + FF3), both of which have the smallest A|a|, it is necessary to compare these two top models separately. The comparison results are shown in Table 6. Whether in Firm Size grouping or B/M grouping, FF3 model has four bold items smaller than the FF3 + Infl model. Additionally, In the highest B/M value group of Table 6, although the A|a| values are the same, the GRS value of FF3 is smaller, and the explanatory power of FF3 is better. Therefore, the FF3 model is indeed better than FF3 + Infl in explaining the returns of non-dividend stocks.

Table 3
Non-dividend firm models' GRS tests

Ranking	25 Size-B/M portfolios	Models	Risks	A|a|	GRS
1	MKT SMB_{FF3} HML	FF3	SYS-IDI	0.201	1.004
2	Inf MKT SMB_{FF3} HML	APT	SYS-IDI	0.202	1.003
3	MKT SMB_{FF3} HML SEN	APT	SYS-IDI-SEN	0.204	0.986
4	Inf MKT SMB_{FF3} HML SEN	APT	SYS-IDI-SEN	0.207	0.983
5	MKT SMB_{FF5} HML RMWO CMA	FF5	SYS-IDI	0.216	0.931
6	MKT SMB_{FF5} HML RMWO CMA SEN	APT	SYS-IDI-SEN	0.221	0.913
7	Inf MKT SMB_{FF5} HML RMWO CMA SEN	APT	SYS-IDI-SEN	0.223	0.909
8	MKT SEN	APT	SYS- SEN	0.305	0.973
9	MKT	CAPM	SYS	0.312	0.989
10	SMB_{FF3} HML SEN	APT	IDI-SEN	0.676	1.016
11	SMB_{FF5} HML RMWO CMA SEN	APT	IDI-SEN	0.648	0.912
12	SMB_{FF5} HML RMWO CMA	APT	IDI	0.727	0.939
13	SMB_{FF3} HML	APT	IDI	0.757	1.044
14	SEN	SIM	SEN	1.217	1.006
15	MKT SMB_{FF5} HML RMWO CMA Ln(Oil) Inf Ln(Int) Ln(Exc) SEN	APT	SYS-IDI-SEN	5.936	1.006
16	MKT SMB_{FF3} HML Ln(Oil) Inf Ln(Int) Ln(Exc) SEN	APT	SYS-IDI-SEN	7.471	1.085
17	Ln(Oil) Inf Ln(Int) Ln(Exc)	APT	SYS	41.906	1.053

Notes: The abbreviation for systematic risk, idiosyncratic risk and market sentiment are SYS, IDI and SEN, respectively. Because of multi-collinearity, the RMW factor has been orthogonalised, and abbreviated as RMWO.

Table 4
Non-dividend firms specific idiosyncratic risk GRS test

Ranking	25 Size-B/M portfolios	A|a|	GRS
1	SMB_{FF5}	0.830	0.920
2	SMB_{FF3}	0.858	1.006
3	HML	0.989	0.980
4	RMWO	1.295	1.030
5	CMA	1.310	1.030

Table 5
Non-dividend firms specific systematic risk GRS test

Ranking	25 Size-B/M portfolios	A|a|	GRS
1	Inflation	1.297	1.028
2	Ln (Exchange rate)	5.972	0.911
3	Ln (Interest rate)	6.602	1.615
4	Ln (Crude oil)	13.757	0.412

Table 6
Non-dividend firms top two models comparison

Firm size grouping						
Model		Small	2	3	4	Big
FF3	A|a|	**0.144**	**0.091**	**0.250**	0.238	**0.278**
	GRS	0.432	0.0830	1.012	1.402	1.290
Four-factor model (Inf + FF3)	A|a|	**0.145**	**0.093**	**0.253**	0.237	**0.279**
	GRS	0.436	0.087	1.024	1.387	1.293
B/M grouping						
Model		Low	2	3	4	High
FF3	A|a|	**0.173**	**0.346**	**0.139**	**0.185**	0.158
	GRS	0.271	2.287	0.440	0.788	**1.067**
Four-factor model (Inf + FF3)	A|a|	**0.174**	**0.347**	**0.141**	**0.186**	0.158
	GRS	0.268	2.300	0.437	0.780	**1.088**

In Table 7, in the intercept item. Among the 25 coefficients of FF3, only three items are significantly different from 0, of which one item is at the 5% significance level, and two items are at the 10% significance level. The intercept represents the part that cannot be explained by the model (Fama & French, 1993), so FF3 model has strong explanatory power for non-dividend company.

In Table 7, all 25 coefficients in the market risk passed the 1% significance level test, indicating that non-dividend companies are affected by the general systematic. Under the firm size (SMB) coefficient, the top 5 smallest size portfolios are all significant; while in bottom 5 largest size portfolios, 2 coefficients are not significant different from 0. In addition, the absolute value of the coefficient of 5 smallest size group are larger than five biggest size group, firm size effect is obvious that small company get higher stock returns. In the aspect of B/M coefficient, the absolute value of the coefficient of 5 lowest B/M groups are greater than 5 highest B/M groups. among the 25 B/M coefficients, 14 items are significantly different from 0, and they are mainly concentrated in low-to-medium B/M enterprises. Hence, the value effect is obvious, which represents low B/M have higher stock returns. In summary, for non-dividend companies, they are significantly affected by general systematic risk, firm size and B/M factor which are over half of 25 groups coefficient are significantly different from 0.

Table 7
Non-dividend firms optimal model regression

			B/M		
Size	Low	2	3	4	High
			a (Intercept)		
Small	–0.168	0.237	–0.031	0.162	0.127
2	–0.198	0.004	–0.050	–0.095	–0.110
3	–0.172	–0.401	–0.201	–0.019	–0.458*
4	–0.240	–0.578**	–0.049	–0.309	0.015
Big	0.091	–0.512*	–0.365	0.345	–0.081
			b (MKT coefficient)		
Small	1.006***	1.063***	1.094***	1.117***	1.113***
2	1.107***	0.985***	1.053***	1.078***	1.114***
3	1.081***	1.017***	1.056***	1.066***	1.119***
4	1.063***	1.108***	1.063***	1.161***	1.139***
Big	1.112***	1.122***	1.077***	1.109***	0.969***
			s (SMB coefficient)		
Small	0.995***	1.111***	1.173***	1.204***	1.210***
2	1.40***	1.020***	1.052***	1.122***	1.007***
3	0.739***	0.815***	0.942***	0.873***	0.787***
4	0.326***	0.549***	0.862***	0.777***	0.530***

(*Continued on next page*)

Table 7 (*Continued*)

			B/M		
Size	Low	2	3	4	High
Big	–0.388***	–0.001	0.361***	–0.087	–0.324***
			h (HML coefficient)		
Small	–0.374***	–0.234***	–0.013	–0.037	0.282***
2	–1.034**	–0.148	–0.062	0.078	0.251***
3	–0.571***	–0.340***	–0.130	0.077	0.279***
4	–0.727***	–0.301***	–0.194	0.077	0.304***
Big	–0.923***	–0.396***	–0.042	0.071	0.552***

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Dividend-Paying Companies

In Table 8, the 5-factor model (Infl + FF3 + Sen) has the strongest ability to explain the stock returns of dividend-paying companies, which has the smallest A|a|. Tables 9 and 10 examined the explanatory power of 4-specific idiosyncratic risks and 4-specific systematic risks (exchange rate, interest rate, crude oil and inflation), respectively.

In Table 8, since there is only 0.001 A|a| gap between the top two models that 5-factor model (Infl + FF3 + Sen) and 4-factor model (FF3 + Sen), it is necessary to compare these two top models separately. The comparison results are shown in Table 11. Among the 5 firm size groups, there are 3 bold items of 5-factor model that are smaller than 4-factor model. In addition, although A|a| of the top 2 models are the same in the biggest firm size group, the 5-factor model GRS values are smaller. In the five B/M groupings, two items of 5-factor model have a smaller A|a| value, but the other three bold items in 5-factor model have a smaller GRS value. Therefore, the 5-factor model (Infl + FF3 + Sen) is indeed better than 4-factor model (FF3 + Sen) in explaining the returns of dividend-paying company.

Table 8
Dividend-paying firms models GRS test

Ranking	25 Size-B/M portfolios	Models	Risks	A|a|	GRS
1	Infl MKT SMB_{FF3} HML SEN	APT	SYS-IDI-SEN	**0.181**	**1.411**
2	MKT SMB_{FF3} HML SEN	APT	SYS-IDI-SEN	**0.182**	**1.413**
3	Infl MKT SMB_{FF3} HML	APT	SYS-IDI-SEN	0.189	1.425

(*Continued on next page*)

Table 8 (*Continued*)

Ranking	25 Size-B/M portfolios	Models	Risks	A|a|	GRS
4	MKT SMB_{FF3} HML	FF3	SYS-IDI	0.190	1.424
5	Infl MKT SMB_{FF5} HML RMWO CMA SEN	APT	SYS-IDI-SEN	0.193	1.502
6	MKT SMB_{FF5} HML RMWO CMA SEN	APT	SYS-IDI-SEN	0.193	1.504
7	MKT SMB_{FF5} HML RMW CMA	FF5	SYS-IDI	0.200	1.514
9	MKT	CAPM	SYS	0.468	1.530
10	MKT SEN	APT	SYS- SEN	0.470	1.519
11	SMB_{FF3} HML SEN	APT	IDI-SEN	1.065	1.349
12	SMB_{FF5} HML RMW CMA SEN	APT	IDI-SEN	1.082	1.386
13	SMB_{FF3} HML	APT	IDI	1.146	1.382
14	SMB_{FF5} HML RMWO CMA	APT	IDI	1.161	1.420
15	SEN	SIM	SEN	1.408	1.478
16	MKT SMB_{FF5} HML RMWO CMA Ln(Oil) Inf Ln(Int) Ln(Exc) SEN	APT	SYS-IDI-SEN	6.519	1.188
17	MKT SMB_{FF3} HML Ln(Oil) Inf Ln(Int) Ln(Exc) SEN	APT	SYS-IDI-SEN	6.813	1.160
18	Ln(Oil) Inf Ln(Int) Ln(Exc)	APT	SYS	33.544	0.843

Note: The abbreviation for systematic, idiosyncratic risk, and market sentiment are SYS, IDI and SEN respectively. Because of multi-collinearity, the SMB_{FF5} factor has been orthogonalised, and abbreviated as $SMBO_{FF5}$.

Table 9
Dividend-paying firms specific idiosyncratic risk GRS test

Ranking	25 Size-B/M portfolios	A|a|	GRS
1	SMB_{FF3}	1.126	1.430
2	SMB_{FF5}	1.172	1.500
3	HML	1.340	1.415
4	CMA	1.354	1.449
5	RMWO	1.470	1.500

Table 10
Dividend-paying firms specific systematic risk GRS test

Ranking	25 Size-B/M portfolios	A|a|	GRS
1	Inflation	1.474	1.514
2	Ln (Interest rate)	5.951	1.250
3	Ln (Exchange rate)	9.557	0.732
4	Ln (Crude oil)	17.130	0.858

Table 11
Dividend-paying firms top two models comparison

Model		Firm size grouping				
		Small	2	3	4	Big
5-factor model (Infl + FF3 + Sen)	A|a|	**0.300**	0.123	**0.134**	**0.205**	0.141
	GRS	2.299	0.613	0.856	1.541	**1.110**
4-factor model (FF3 + Sen)	A|a|	**0.301**	0.123	**0.137**	**0.207**	0.141
	GRS	2.317	0.606	0.870	1.556	**1.120**
		B/M grouping				
		Low	2	3	4	High
5-factor model (Infl + FF3 + Sen)	A|a|	0.275	**0.107**	0.136	0.232	**0.154**
	GRS	**1.929**	0.310	**3.082**	**0.921**	0.861
4-factor model (FF3 + Sen)	A|a|	0.275	**0.109**	0.136	0.232	**0.157**
	GRS	**1.937**	0.318	**3.109**	**0.926**	0.883

In Table 12, the regression results of 5-factor model (Infl + FF3 + Sen) are here. First, look at the intercept item. Among the 25 coefficients, only 5 items are significantly different from 0, 1 item at the 1% level, 1 item at the 10% level, and 3 items at the 10% significance level. The intercept represents the part that cannot be explained by the model, so the 5-factor model (Infl + FF3 + Sen) has strong explanatory power.

In Table 12, all 25 coefficients of regressions in the market risk passed the 1% significance level test, indicating that dividend-paying enterprises are affected by the general systematic risk. Under the firm size coefficient, the company size effect is obvious. Among the 25 firm-size coefficients, the 5 smallest size groups are greater than the 5 largest size groups, small companies get greater stock returns. The value effect is also obvious that low B/M have higher stock returns, the absolute value of the coefficient of 5 lowest B/M are greater 5 highest B/M. Under the inflation coefficient, all 25 coefficients are insignificant, therefore, the effect of inflation is insignificant. In contrast, there are 2 coefficients of market sentiment are significantly different from 0, which are concentrated in small companies. Therefore, because the significant items do not exceed half of 25 coefficients, the market sentiment has no significant impact on the overall A-shares, but on the small size stocks of dividend-paying company.

Table 12
Dividend-paying firms optimal model regression

			B/M		
Size	Low	2	3	4	High
			a (Intercept)		
Small	0.210	0.194	0.538***	0.329**	0.233
2	0.237	0.062	–0.029	0.232	0.058
3	0.155	0.028	–0.048	0.168	0.277*
4	0.447**	0.091	0.015	0.304	0.173
Big	0.330**	0.162	–0.053	0.129	0.033
			b (MKT coefficient)		
Small	1.002***	0.977***	0.982***	0.995***	1.022***
2	0.982***	0.933***	0.989***	1.031***	1.007***
3	0.930***	1.067***	1.026***	1.074***	1.031***
4	0.955***	1.066***	1.095***	1.077***	1.029***
Big	0.991***	1.099***	0.982***	0.956***	0.988***
			s (SMB coefficient)		
Small	0.894***	1.018***	1.017***	1.047***	0.895***
2	0.953***	0.931***	0.897***	0.837***	0.765***
3	0.694***	0.606***	0.741***	0.615***	0.471***
4	0.320***	0.361***	0.353***	0.374***	0.202***
Big	–0.473***	–0.241***	–0.272***	–0.253***	–0.353***
			h (HML coefficient)		
Small	0.560***	–0.356***	–0.159***	0.099**	0.271***
2	–0.713***	–0.418***	–0.128**	0.157***	0.284***
3	–0.638***	–0.462***	–0.147**	0.028	0.337***
4	–0.901***	–0.416***	–0.157**	0.158***	0.364***
Big	–0.814***	–0.296***	–0.153***	0.134*	0.429***
			f (Inflation coefficient)		
Small	36.368	–34.590	–10.631	11.557	–44.188
2	23.208	16.798	–7.902	5.349	–28.825
3	–31.887	–29.340	9.286	4.978	–15.821
4	1.691	–20.291	8.455	–20.027	–50.211
Big	–11.143	–7.305	–11.736	11.750	15.197

(*Continued on next page*)

Table 12 (*Continued*)

			B/M		
Size	Low	2	3	4	High
			m (Sentiment coefficient)		
Small	0.406	0.671**	0.609*	0.460	0.403
2	0.593	0.048	0.157	0.509	0.022
3	0.082	0.414	0.114	0.455	0.403
4	0.593	–0.142	0.123	0.270	0.441
Big	0.297	0.475	0.153	0.557	0.093

Notes: m = sentiment coefficient; f = inflation coefficient, a = intercept, b = MKT coefficient, h = HML coefficient.

CONCLUSION

From the perspective of the optimal models in each group, it can be concluded that systematic risk has an impact on dividend-paying and non-dividend companies, However, in relation to the 4-specific systematic risks (inflation, exchange rate, crude oil and interest), the results of this study proved that those risks do not significantly affect stock return of any group of company in all time period. In terms of idiosyncratic risks, the firm size and book-to-market factors have significant influences on all firms. Market sentiment has a significant impact on small size stocks of dividend-paying companies.

In general, the factors affecting excess return of dividend-paying and non-dividend enterprises are different. Through this research, the majority of A-shares investors need to pay attention to the above risks when investing in non-dividends, dividend-paying companies, to ensure they can invest in a better secured environment. A limitation of the study is that the momentum factor was not included. Future research will strive to add the momentum factor the classic asset pricing models (SIM, CAPM, APT, FF3 and FF5 models).

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