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Journal of Business Administration Research
http://ojs.bilpublishing.com/index.php/jbar

REVIEW

Expected Investment Premium in China Capital Market

Di Liu*

Central University of Finance and Economics, Chinese Academy of Finance and Development, China

ARTICLE INFO

Article history
Received: 13 March 2020
Accepted: 14 March 2020
Published Online: 30 April 2020

Keywords:
Investment premium
Expected stock return
China capital market

ABSTRACT

Through a measurement of corporate investment plan, i.e. expected investment cash flow growth (EICFG), which combines historical equity issuance and factors that influence firm's future investment, this paper studies the impact of investment expectation on firm's cross-sectional return of stock in China capital market. I document the negative correlation between EICFG and future stock return in A-share market, and find out that stocks of firms with higher growth of investment cash flow performs significantly worse than those with lower growth of investment cash flow in one year. Our long-short EICFG portfolio generates a statistically and economically significant return which cannot be captured by leading factor models. I further disentangle the covariation between EICFG and expected stock return from rational and behavioral perspective. This paper also extends the research of investment premium to investment-based asset pricing model.

1. Introduction

Investment premium has been a hot issue in asset pricing research field recently. Basic economics and finance theory show that firm's investment decision has a great impact on their operation performance as well as stock return performance. Many literatures discover the significant covariance between firm's investment decision and its stock performance, both on firm-level and aggregate level, although the relation is still mixed.

On aggregate level, Cochrane [1] construct an investment-to-capital ratio (I/K) to study the relation between aggregate investment and capital market return. His research on the US market reveals a significant negative correlation within aggregate investment and stock market performance, although this relation would be weakened by dividend yield. Lamont [2] finds out a significant predicting power of firm's investment plan on future stock return in the US market: those years with high investment generate low market return, while high investment expectations generate low future market return. Arif and Lee [3] discover a co-movement between aggregate investment and investors' sentiment in their study of the US public market. When investors' sentiment index peaks, aggregate investment hits a high level as well, followed by a negative abnormal return afterward. This negative correlation between aggregate investment and future market return is still robust after adding controlling variables such as PE ratio, book-to-market ratio, credit spread, term spread, equity issuance and so on. They also expand the research to global market and find the similar relation in 13 out of 14 developed capital market. On the other hand, Hirshleifer, Hou and Teoh [4] give us a different story when they analyze operating accruals and future stock return. As an investment indicator, operating accruals is positively cor-

**Corresponding Author:*
Di Liu,
Central University of Finance and Economics, Chinese Academy of Finance and Development, China;
Email: 474846044@qq.com

DOI: https://doi.org/10.30564/jbar.v3i2.1750

related with market return in the future.

On firm-level, this relation is also controversial. Cooper, Gulen and Schill [5] study the US market and find out asset growth has a strong explanatory power to firm's cross-sectional return. A long-short portfolio based on total asset growth of last fiscal year demonstrates a significant negative abnormal return. Moreover, this negative relation between asset growth and firm's stock performance can last for longer than 5 years. Using last 3-years moving average capital expenditures as a proxy of firm's investment, Liu, Whited and Zhang [6] has a similar finding in the US market that firms with higher capital expenditure generate a lower average return in next period. A research of Cooper and Priestley [7] summarize that for the US public firms, their actual investment are negatively correlated with future stick return, with measurements of I/K, total assets growth and total investment growth. On the contrary, Li and Wang [8] find different relation when they study on firms' expected investment rather than actual investment. By constructing an expected investment growth variable EIG, they discover a strong and positive relation between firms' expected investment and future stock return. A long-short portfolio based on EIG deciles generates a positive abnormal return in the US market and other G7 countries. However, using a similar approach, Li, Wang and Yu [9] find that aggregate market expected investment growth is negatively covaried with future market return, indicating that the effect of expected investment on future stock return might be volatile.

Naturally, we are also interested in the mechanism behind investment premium. Some scholars (Liu, Whited and Zhang [6], Li and Zhang [10], Cooper and Priestley [7], Arif and Lee [3], Gennaioli, Ma and Shleifer [11]) try to explain it from risk pricing aspect. They argue that assuming firms' investment has a lag, which means firms cannot adjust their investment immediately, when discount rate falls, on one side, the hurdle rate falls, leading to higher investment level; on the other side, risk premium falls as well, indicating a lower future return. Therefore, with existence of investment lag, more investment encounters with lower return. However, Li and Wang [8] point out that unsystematic characters of the firm also play an important role and cash flow effect of the investment might overweight interest rate effect, resulting to a synchronous change within expected investment and future stock return.

Inspired by them, this paper tries to investigate the impact of investment expectation on stock return in China capital market. Firm's investment plan is determined by various factors, including interest rate, investors sentiment, risk preference, liquidity pressure, etc. With risk pricing theory, I decompose investment decision-making parameters into systematic one and idiosyncratic one. From the perspective of systematic risk, when risk-free rate drops, the IRR of investment falls as well, resulting to a higher level of future investment. Meanwhile, current stock price rises due to lower discount rate, leading to a lower future stock return. Therefore, investment expectation is negatively correlated to future stock return. From the perspective of idiosyncratic risk, in spite of the fact that firm-specific factors may have complicated impact on investment decision-making process, for those who decided to increase their investment, assuming they are rational, market expectation of their earnings will rise. Such expectation reflects a higher current stock price, meaning a lower future return.

According to Chinese accounting principle for public firms, investment cash flow for purchase of fixed assets, intangible assets and other long-term assets can be regarded as capital expenditure. In this paper, I study the impact of expected investment cash flow growth (EICFG) on cross-sectional return in China capital market and find out that EICFG has a strong predicting power on firm's stock return and for those firms with higher investment expectations, they will experience a lower abnormal return in next period. This paper applies the risk pricing theory in the study of investment premium and elaborate the correlation behind it comes from interest rate and profitability, contributing to related research in China capital market.

The rest of this paper is organized as followed: Section II describes the sample and variables. Section III is empirical analysis and discussion. At last, a conclusion will be made in Section IV.

2. Sample Selection and Variable Construction

Sample

After a reform in 2006, most of Chinese public firms can liquidate their common stocks in the capital market. So our sample selects the data from 2006 to 2019 in *CSMAR*, a wildly used financial database, including financial statement reports, monthly return profile, market return profile and etc. After excluding financial industry and utility industry, the sample leaves us 260,251 entries.

EICFG

I combine the approach of Li and Wang [8] and that of Pontiff and Woodgate [12] to construct our main explained variable EICFG as two stages.

At stage I, I do the cross-sectional regression for all public firms on April of year t with the model (1):

 DOI: https://doi.org/10.30564/jbar.v3i2.1750

$$ICFG_{i,t} = \alpha + b_{MOM,t} * MOM_{i,t-1} + b_{q,t} * q_{i,t-1} + b_{CF,t} * CF_{i,t-1} + b_{ISSUE,t} * ISSUE_{i,t-1} + \varepsilon \quad (1)$$

where $ICFG_{i,t}$ is the actual investment cash flow growth of firm i at year t, i.e. the natural logarithm of investment cash flow at year t over that at year t-1; $MOM_{i,t-1}$ is the momentum factor of firm i at year t-1 comes from Jegadeesh and Titman [13]; $q_{i,t-1}$ is the q factor of firm i at year t-1 which is the natural logarithm of firm's market value over its total equity; $CF_{i,t-1}$ is the cash flow measurement of firm i at year t-1 which is the sum of net income before extraordinary items and depreciation divided by total equity; $ISSUE_{i,t-1}$ is the equity issuance of firm i at year t-1 comes from Pontiff and Woodgate [12].

At stage II, I use the estimated parameters *a*, $b_{MOM,t}$, $b_{q,t}$, $b_{CF,t}$ and $b_{ISSUE,t}$, together with latest MOM, q, CF and ISSUE, to calculate EICFG of firm i on each month. This method guarantees that EICFG only contains public information and avoids forward-looking problem.

Fama-MacBeth [14] regression of model(1) on full sample shows that MOM, q, CF and ISSUE can explain the actual investment growth, in hence they have good predicting power to expected investment.

Table 1. Fama-MacBeth regression analysis of ICFG

	ICFG				
Intercept	0.111	-0.059	0.086	0.117	-0.000
	[1.38]	[-0.65]	[0.93]	[1.12]	[-0.01]
MOM	0.171***				0.139**
	[3.41]				[2.39]
q		0.077***			0.036**
		[4.40]			[2.01]
CF			0.100***		0.065**
			[3.71]		[2.35]
ISSUE				0.007*	0.132**
				[1.85]	[2.20]
Adj R-square	0.002***	0.001***	0.002***	0.001***	0.006***
	[3.12]	[5.33]	[4.14]	[4.30]	[8.09]

Note: Robust t-statistics with Newey-West [15] corrections are reported in the parentheses. *Significant at 10%; **significant at 5%; ***significant at 1%.

Univariate analysis of MOM, q, CF and ISSUE demonstrate that estimated parameters are at least significant at 10% level. A higher historical return, market value, cash inflow or historical equity financing will lead to a higher investment. Multivariate analysis presents a similar implication at 5% level. Therefore, MOM, q, CF and ISSUE are good indicators for actual investment growth and EICFG can be a good proxy for investment expectation.

3. Empirical Analysis and Discussion

At the end of each month, I sort all firms into 10 groups by computed EICFG value from low to high. The descriptive statistics is presented in table 2, where EICFG is the growth of expected investment cash flow, ICFG is the growth of actual investment cash flow, Size is the natural logarithm of firm's market value, B/M is firm's book-to-market ratio, MOM is the momentum variable comes from Jegadeesh and Titman [13], q is tobin's q facor, CF is the measurement of firm's cash flow and ISSUE is a proxy of equity financing comes from Pontiff and Woodgate [12].

Table 2. Descriptive statistics of EICFG portfolio

EICFG rank	EICFG	ICFG	Size	B/M	MOM	q	CF	ISSUE
Low	-0.083	0.173	22.234	0.372	-0.170	2.487	0.093	0.029
2	-0.035	0.218	22.228	0.381	-0.063	2.406	0.283	0.048
3	-0.012	0.292	22.239	0.379	0.014	2.350	0.324	0.067
4	0.007	0.257	22.276	0.372	0.082	2.330	0.358	0.096
5	0.026	0.318	22.288	0.375	0.149	2.309	0.393	0.149
6	0.045	0.327	22.356	0.368	0.222	2.321	0.444	0.234
7	0.068	0.322	22.424	0.359	0.308	2.327	0.503	0.355
8	0.097	0.296	22.541	0.344	0.420	2.361	0.594	0.491
9	0.141	0.283	22.719	0.327	0.591	2.418	0.745	0.673
High	0.287	0.420	23.059	0.293	1.106	2.531	1.336	1.002

As we can see, EICFG deciles generally express a low to high trend in ICFG. The size and book-to-market ratio for each decile have minor differences, and for those firms with higher EICFG, their historical return, cash flow and historical equity financing is higher as expected.

Then we construct the return matrix for 10 EICFG portfolios as presented in table 3, where Portret is annualized 1-month buy-and-hold return, CAPM_Alpha is annualized CAPM adjusted abnormal return, FF-Alpha is annualized Fama-French 3-factor model adjusted abnormal return, FRET_1Y is 1-year buy-and-hold return, FRET_2Y is 2-year buy-and-hold return and FRET_3Y is 3-year buy-and-hold return. I also construct a zero investment portfolio each month by long low EICFG decile and short high EICFG decile, and examine the return of this long-short portfolio. The empirical result shows that EICFG is negatively correlated to future stock return, i.e. firms with lower investment expectation outperform those with higher investment expectation. The long-short portfolio that update each month based upon EICFG deciles realize an annual return of 11.5%, which is statistically and economically significant. This abnormal return is not captured by both CAPM and Fama-French 3-factor model as the model adjusted alphas are 9.1% and 6.8%, respec-

DOI: https://doi.org/10.30564/jbar.v3i2.1750

tively. With a longer investment horizon, if we hold the long-short portfolio for three years, in first year, its raw return is 14.2%, even higher than that of holding for one month. In second year, its raw return plunges to 3.8% and in third year, it even generates a negative return of -8.5%. As my long-short portfolio updates in a monthly basis, the predicting power of EICFG is more profound in a shorter investment horizon.

Table 3. Return matrix of EICFG portfolio

EICFG rank	Portret	CAPM_ Alpha	FF-Alpha	FRET_1Y	FRET_2Y	FRET_3Y
Low	0.218	0.185	0.088	0.231	-1.019	-1.255
2	0.207	0.173	0.076	0.238	-0.994	-1.256
3	0.218	0.184	0.082	0.238	-0.991	-1.239
4	0.237	0.205	0.098	0.222	-0.998	-1.231
5	0.186	0.158	0.061	0.210	-1.003	-1.232
6	0.206	0.177	0.079	0.203	-1.014	-1.227
7	0.183	0.157	0.063	0.185	-1.019	-1.200
8	0.164	0.143	0.052	0.161	-1.023	-1.216
9	0.136	0.111	0.034	0.136	-1.043	-1.199
High	0.103	0.093	0.020	0.089	-1.057	-1.170
Low-High	0.115***	0.091**	0.068**	0.142***	0.038*	-0.085*
t-stats	[2.58]	[2.14]	[2.05]	[5.89]	[1.91]	[-1.87]

Note: Robust t-statistics with Newey-West (1987)[15] corrections are reported in the parentheses. *Significant at 10%; **significant at 5%; ***significant at 1%.

Based on return matrix, I also run a Fama-MacBeth regression of firms' excess return to investigate the comovement of EICFG and one-month leading return. Regression analysis contains size, book-to-market ratio, momentum and actual investment ICFG as control variables. Empirical result in table 4 shows that expected investment variable EICFG has a correlation coefficient of -0.052 with a t-stat of -4.46. After controlling firm size, book-to-market ratio, momentum and actual investment, such negative correlation is still significant in 1% level.

Table 4. Fama-MacBeth regression of firms' excess return

	Excess Return				
Intercept	-0.047***	-0.026***	-0.268***	-0.268***	-0.269***
	[-11.86]	[-8.15]	[-7.69]	[-7.66]	[-7.81]
EICFG	-0.052***	-0.017***	-0.036***	-0.043***	-0.042***
	[-4.46]	[-5.56]	[-7.82]	[-7.30]	[-7.03]
B/M		-0.049***	-0.048***	-0.046***	-0.046***
		[-8.69]	[-8.61]	[-7.18]	[-7.24]
ln(ME)			0.011***	0.011***	0.011***
			[7.38]	[7.15]	[7.32]
MOM				0.004***	0.004***
				[8.14]	[7.96]
ICFG					-0.001***
					[-3.86]
Adj R-square	**0.010*****	**0.011*****	**0.017*****	**0.018*****	**0.018*****

Note: Robust t-statistics with Newey-West [15] corrections are reported in the parentheses. *Significant at 10%; **significant at 5%; ***significant at 1%.

Now we are interested in the logic behind the negative correlation between expected investment and future return. In finance theory, the net present value of a project is determined by two factors, discount rate and future cash flow. If firm's investment decision is rational, expansion of investment comes from a fall of interest rate, or a rise in future cash inflow, or both. If interest rate falls, expected return of the firm falls as well. If future cash flow rises, a better earning expectation will reflect on current stock price, resulting to a higher present value and lower expected return. A Fama-MacBeth regression of firms' ROE presented in table 5 demonstrates that firm's investment expectation covaries with its profitability at 1% level of significance, after controlling size, book-to-market ratio and actual investment. Also, firm's ROE is positively correlated to firm's actual investment. An expansion of investment leads to a higher expectation of profit, a higher stock price and a lower future return.

Table 5. Fama-MacBeth regression of firm's ROE

	ROE			
Intercept	0.030***	0.017***	-0.285***	-0.282***
	[8.94]	[7.04]	[-8.40]	[-6.68]
EICFG	0.095***	0.104***	0.081***	0.080***
	[8.10]	[7.61]	[6.22]	[5.59]
B\M		0.032***	0.034***	0.034***
		[5.54]	[5.23]	[5.33]
ln(ME)			0.014***	0.013***
			[4.76]	[3.98]
ICFG				0.001***
				[3.83]
Adj R-square	**0.074*****	**0.089*****	**0.121*****	**0.122*****

Note: Robust t-statistics with Newey-West [15] corrections are reported in the parentheses. *Significant at 10%; **significant at 5%; ***significant at 1%.

4. Conclusion

This paper disentangle the correlation between firm's investment expectation and future return through an EICFG variable that measures firm's expected investment cash flow growth. The empirical analysis of China public firms

 DOI: https://doi.org/10.30564/jbar.v3i2.1750

from 2006 to 2019 shows that there exists a significant and negative relation between EICFG and future stock return. Firms with lower expected investment outperform those with higher expected investment in a short holding period. The zero investment portfolio by a long position in lowest EICFG decile and a short position in highest EICFG decile generates an annual return of 11.5% if we update the portfolio in a monthly basis, which is statistically and economically significant. Such anomaly cannot be mitigated by mainstream assets pricing model, such as CAPM and Fama-French 3-factor model. The predicting power of expected investment growth is better in a short horizon (within one year) than a long horizon.

I further investigate the logic behind firm's investment expectation and future stock return. In general, assuming that firm's investment decision is rational, expansion of investment comes from either a fall of interest rate, or a rise in future cash inflow. If interest rate falls, expected return of the firm falls as well. And if future cash flow rises, a better earning expectation will reflect on current stock price instantly, resulting to a lower expected return. Firm's investment expectation covaries with its profitability. Also, firm's ROE is positively correlated to firm's actual investment. An expansion of investment leads to a higher expectation of profit, a higher stock price and a lower future return.

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DOI: https://doi.org/10.30564/jbar.v3i2.1750