The Impact of Asset Growth on Stock Returns

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Abstract. This essay aims to investigate the connection between asset growth rate and equity returns. We find that stocks with higher asset growth rates can generate better returns. However, there is no substantial return rule for the risk-adjusted returns based on the CAPM and Fama-French (1993) three-factor model. Additionally, this asset growth rate factor is added as a new pricing element to the Fama-French three-factor model in order to examine the effectiveness of asset growth risk factors in explaining asset prices. The findings demonstrate that the risk of asset expansion has a major impact on stock returns. This further validates previous studies and findings and adds to the body of knowledge about asset pricing.

Keywords: Asset growth rate, Stock return, Fama-French Three Factor Model, CAPM

1 Introduction

With development of financial market and technology, investors are eager to find the changing factors related to stock returns by collecting a large number of corporate-related data, and then use these pricing factor to predict the future stock price and bring extra returns for themselves. According to the capital asset pricing model (CAPM) in use today, the main systematic risk factor influencing the returns on individual assets is the stock market premium. Later, the size factor and value factor—which together make up the Fama-French three-factor model (FF3)—are proposed as additional two elements that help to explain stock returns. Relevant literatures [9][16][2] show that the asset growth rate is of great help in predicting stock prices. Stocks with high asset growth rate usually outperform stocks with low asset growth rate, which means investors can get higher returns by choosing stocks with high asset growth rate.

This essay aims to determine whether the asset growth rate can be used to explain stock return. Additionally, we employ the long-short investing strategy, in which we hold equities with high rates of asset growth and short-sell those with low rates of asset growth. Evidence suggests that such an investment strategy can yield significant positive returns. Furthermore, we add the asset growth rate to the Fama-French three-factor model as a new pricing factor. We then investigate if this asset growth risk factor can bring additional explanatory power in explaining the return on the portfolio.

The structure of the essay is as follows. The introduction is in Section 1. Second 2 explores pertinent literature. The sample information and data sources are described in the section 3. In section 4, the empirical technique is provided. Section 5 examines the application and analyzes the empirical findings. Section 6 is conclusion.

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2 Literature Review

Li, Becker and Rosenfeld focus on the predictive ability of variables associated to asset growth and capital investment in the US market. The authors utilize stock return data from MSCI and financial statement data from Worldscope. In particular, the authors use various different asset growth measures, 'LSZ measure' from Lyandres, Sun, and Zhang [7], 'XING measure' from Xing [19], 'TWX measure' from Titman, Wei, and Xie [14], PS measure' from Polk and Sapienza [12] and 'AG measure' from Anderson and Garcia-Feijóo [1]. The classic one- and two-year total asset growth metric is found to have the strongest ability to forecast stock returns. The total asset growth indicator has strong predictive ability across samples of various nations, industries, and businesses. Meanwhile, it addresses data spying as discussed in MacKinlay [8] as well as various market anomalies.

Wen studies exams whether the firm-level asset growth effect on stock returns would present in the aggregate level and the potential economic mechanism on such predictability, by using data on the G7 countries. The author finds that market level asset growth can significantly predict future market returns, both in and out-of-sample. Furthermore, the author concludes that the predictability of aggregate asset growth variable is related to business cycles and the time-varying risk premium. This paper confirms the findings of Lam and Wei [10].

G. Artikis et al. research the effect of growth in companies' statement of financial position on stock returns. As well as they explain the anomalies in asset growth by exploring the role of actual investment growth and other possible potential reasons. The authors analysed 15 European Union countries, with similar economic status, legal traditions and accounting systems. Furthermore, asset growth in these countries is divided into two parts, one that real investment asset and one that accounting distortions and/or declined efficiency. Then the cross-sectional regression analysis of their asset growth is carried out. Finally, the article comes to the conclusion that the well-documented global asset growth anomaly in the European stock market has not diminished over time [15][17]. In addition, two parts of asset growth play a complementary role in driving exceptional asset growth in Europe.

By accounting for significant business features and utilizing value-weighted regression, Lam and Wei [10] explore which theory may better explain the asset growth anomalies: the arbitrage limit hypothesis or the investment friction hypothesis. The authors examine and contrast the predictions of the mispricing hypothesis with Shleifer and Vishny's [13] limit-to-arbitrage and Li and Zhang's [11] q-theory with investment frictions on the asset growth-return relationship. Additionally, they evaluate the cross-sectional regression theory proposed by Fama and MacBeth on future stock returns [5]. The authors' conclusion is that the slope of asset growth is generally negative. The findings also demonstrate a strong link between limits-to-arbitrage and investment frictions.

Titman, Wei and Xie [15] analysed the investment and asset growth effect by looking at a massive amount of US stock return data. The authors investigate stock returns for 40 nations between 1982 and 2010, as well as four factors from La Porta and Shleifer are also applied [6]. The writers are able to reach two conclusions by studying the aforementioned data. First, the asset growth impact is particularly pronounced in nations with more developed financial markets in particular. Additionally, they discover no connection between the asset growth impact and other indicators of company management strategy or trading expenses.

By analyzing the cross-sectional relationship between company asset growth and subsequent stock returns, Cooper, Gulen and Schill [3][4] research the effect of firm-level asset investment. They use data from 1963 to 2003 from the Compustat yearly industries files and the CRSP monthly stock return files for all non-financial enterprises. By a series of tests and analyses, J.Cooper, Gulen and J.Schill discover that firm total asset growth plays a important role in forecasting the cross-section of future returns and t-statistics is able to explain of the equity insurance and the effects of repurchase.

Yao et al., [20] examines the influence of asset growth of firms on equity returns by using data from nine Asian stock markets. All the data come from Pacific Basin Capital Market research (PACAP) and DataStream, which combined them to obtain a sample of stock data for all markets from 1987-2007. Besides, they also collect U.S. stock return data from CRSP and U.S. firm financial statement data from Compustat for comparison with Asian data. The authors find a common and negative association between equity returns and asset growth. Their other result is that corporate governance, investor protection, and legal origin have little bearing on the asset growth impact is in Asian economies.

Watanabe et al concentrate on the impact of asset expansion on the global stock market. Firstly, testing financial markets outside America exists for a negative correlation between asset growth and future equity returns. Finding a reasonable economic cause of the asset growth effect is other goal. In terms of method, they use a new evaluation solution based on Wei and Lam [10] and Zhang and Li [11]. The information is obtained from Thomson-Reuters Datastream and Worldscope. Additionally, they compile common equities traded on 54 nation's main stock markets. Last but not least, Watanabe et al. confirm that businesses with rapid asset expansion have lower following stock returns on the global market.

3 Data & Variable

There are three main sources of data for this report. We collect monthly share price and industry code from the Centre for Research in Security Prices (CRSP). Annual accounting data as well as asset growth of company are obtained from COMPUSTATS. Financial equities having a one-digit SIC code between 6000 and 6999 are included. The online Data Library of Kenneth French also gives us access to the time series of the Fama and French three factors. The final matched sample starts from January 1964 and ends in February 2022. In total, we have 3028 firms and 312,095 firm-month observations.

Stock returns is calculated as below in equation (1), whereas the retadj is adjusted stock return after considering the delisting return (dret).

$$\mathrm{retadj} = (1 + \mathrm{ret}) * (1 + \mathrm{dlet}) - 1 \qquad (1)$$

The primary explanatory variable, asset growth (asset_g), is calculated as this year total asset (at) divided by the last year total asset (L.at), then this outcome subtracted one, as shown in equation (2).

$$Asset\_g_t = \frac{at_t}{at_{t-1}} - 1 \qquad (2)$$

4 Methodology

In order to construct asset growth of company, at the end of June for each year, we rank companies based on their asset growth over the previous year, and then divide them cross-section sample into 10 portfolios. Specifically, portfolio 1 includes observations of the companies with the lowest 10% in terms of the cross-section asset growth rate distribution, and portfolio 10 contains observations of the companies with the highest 10% asset growth rate. Then, implementing investment strategy in July of each year, we long firms in portfolio 10 and short firms in portfolio 1. The investment strategy is held for one year and then we repeat this step on every June in a year, until the end of the sample period. Finally, we calculate the firms equally weighted return and value weighted return for this investment strategy, as well as the return for each portfolio.

In addition, we estimate alpha of long-short returns and analyses the returns of 10 portfolios and investment strategies using two asset pricing models, namely the CAPM and the Fama and French three-factor model (FF3). Following the standard literature, if the α_i of the regression formula is not equal to zero, the investment strategy is capable of delivering excess returns.

$$\mathrm{r}_{i,t} - \mathrm{r_f} = \alpha_i + \beta_i \mathrm{MKT}_t + e_{i,t} \tag{3}$$

$$\mathrm{r}_{i,t} - \mathrm{r_f} = \alpha_i + \beta_i \mathrm{MKT}_t + \mathrm{s}_i \mathrm{SMB}_t + \mathrm{h}_i \mathrm{HML}_t + e_{i,t} \tag{4}$$

5 Empirical Results

The summary statistics for the variables considered in this investigation are shown in Table 1. It includes the number of observation (count), sample average (Mean), standard deviation (Std), minimum (Min), the 25th percentile (25%), median (50%), the 75th percentile (75%), maximum (Max) values of variables. As shown in Table 1, firm adjusted return has an average of 0.0117885, but the standard deviation is 0.1182311. The high standard deviation of adjusted return indicates that stock fluctuates greatly. Additionally, for the asset growth, the average value is 0.143318, the standard deviation is 0.6728149, the minimum value is -0.9996136, and the maximum value is 60.32394. In addition, negative values indicates that not all firms experience growth in assets and that some firms face a reduction in assets.

Table 1.Summary statistics

Variable	N	Mean	SD	Min	p25	p50	p75	Max
retadj	403136	0.0117885	0.1182311	-0.888889	-0.039216	0.0058605	0.056604	6.407407
asset_g	344706	0.143318	0.6728149	-0.9996136	0.0174395	0.0804878	0.1728233	60.32394
ret	403136	0.011803	0.1181772	-0.888889	-0.039216	0.005848	0.0565655	6.407407
MktRF	403136	0.0065567	0.0447571	-0.2324	-0.0196	0.0111	0.035	0.161
SMB	403136	0.0010231	0.0317716	-0.1729	-0.0176	0.001	0.0185	0.2148
HML	403136	0.0024665	0.0303047	-0.1392	-0.0146	0.0011	0.0173	0.1274
RF	403136	0.0033046	0.0024598	0	0.0011	0.0037	0.0046	0.0135

Table 2 reports the return of the 10 portfolios and our long-short investment strategy (last column), wherein the top panel reports the equally weighted return while the lower panel reports the value weighted return. The equally weighted return is monotonically increasing from portfolio 1 to 10, and their t-value are all significantly larger than 1.96. Similar pattern is also observed when we use the value weighted return series. Therefore, we can conclude that the higher asset growth firms, the higher portfolio return. Furthermore, our investment strategy also illustrates a non-zero return with significant t-statistic, as of 0.131 with a t-value of 7.609.

Table 2. Summary Statistics: Average Returns

	Equally weighted return										
	1	2	3	4	5	6	7	8	9	10	10-1
Avg return	0.010	0.066	0.085	0.094	0.098	0.103	0.113	0.105	0.130	0.153	0.131
t	3.320	27.088	39.613	46.118	47.820	50.365	54.136	49.216	58.382	60.366	7.609
	Value weighted return										
	1	2	3	4	5	6	7	8	9	10	10-1
Avg return	1.056	0.947	1.163	1.157	1.063	0.917	1.139	1.118	1.426	1.469	0.286
t	37.005	36.792	46.982	49.046	47.015	39.783	50.174	49.787	62.801	54.135	2.108

Table 3 reports the return based on the CAPM for the ten equally weighted and value-weighted portfolios that constructed based the asset growth rate. The upper and lower panels, which use the CAPM model's equally weighted return and value-weighted return, respectively, report the risk-adjusted return. The t-statistics shown in each panel's second row. The last column of this table also shows the long-short investment strategy's average return. For the equally weighted return, the average monthly CAPM alpha of portfolio 1 and portfolio 10 are -4.5% and 66.8%, t-statistics are -19.408 and 38.509. For the value weighted return, the average monthly CAPM alpha of portfolio 1 and portfolio 10 are 6.4% and 99.1%, t-statistics are 44.814 and 47.793. For long-short investment strategy, we observe the risk-adjusted return based on the CAPM model are 0.133 and 0.292 respectively. The t-statistics for these two sequences are 7.620 and 2.140. All two t-statistics are greater than 1.64, manifesting that the risk-adjusted return based on the CAPM model has excess return, at 5% significant level.

Table 3. Empirical Results: Alpha Statistics based CAPM

	Equally weighted return										
	1	2	3	4	5	6	7	8	9	10	10-1
α	-0.045	0.587	0.022	0.509	0.045	0.758	0.056	0.783	0.059	0.668	0.133
t	-19.408	26.202	11.994	25.296	29.096	38.450	38.321	41.047	40.560	38.509	7.620
	Value weighted return										
	1	2	3	4	5	6	7	8	9	10	10-1
α	0.064	0.534	0.072	0.711	0.064	0.721	0.086	1.026	0.101	0.991	0.292

t	44.814	29.736	50.070	43.457	43.220	42.660	57.921	59.973	60.985	47.793	2.140

Table 4 reports the return based on the risk-adjusted return based on the three-factor model proposed by Fama and French (1993) for the ten equally weighted and value-weighted portfolios that constructed based the asset growth rate. The top panel reports the risk-adjusted return based on the Fama and French (1993) three-factor model of equally weighted return. And the lower panel shows the equally weighted return of the same as condition. The t-statistics shown in each panel's second row. The last column of this table also shows the long-short investment strategy's average return. For the equally weighted return, the average monthly FF3 alpha of portfolio 1 and portfolio 10 are -7.0% and 52.6%, t-statistics are -37.702 and 36.140. It is worth noting that in portfolios 1 and 3, their excess return is less than 0, which means they are companies with a smaller asset growth rate. At the same time, it can be concluded that the greater the risk exposure of asset growth rate, the higher the excess return of the company. For the value weighted return, the average monthly FF3 alpha of portfolio 1 and portfolio 10 are 4.5% and 85.1%, t-statistics are 40.691 and 43.430. As well as, we can observe that with the increase of asset growth rate, portfolio returns regularly fluctuate up and down.

Table 4. Empirical Results: Alpha Statistics based FF3

Equally weighted return											
	1	2	3	4	5	6	7	8	9	10	10-1
α	-0.070	0.403	-0.002	0.311	0.023	0.580	0.037	0.614	0.039	0.526	0.146
t	-37.702	19.700	-1.536	18.472	20.161	33.909	33.159	38.838	35.648	36.140	8.650
Value weighted return											
	1	2	3	4	5	6	7	8	9	10	10-1
α	0.045	0.377	0.053	0.581	0.046	0.615	0.068	0.916	0.083	0.851	0.331
t	40.691	24.439	47.901	40.593	39.161	38.907	58.030	59.256	62.018	43.430	2.410

The return of 10-1 investment strategy is added into the Fama and French (1993) three-factor model as a pricing factor. The results are reported in Table 5. The coefficient of equally weighted return and value weighted return can be obtained from the third and fourth columns in the figure and are graded with three stars, implying a 1% significance level and the result is statistically significant. Furthermore, we can also observe that coefficient is negative, which means that a negative correlation between asset growth and future equity returns. The results of Li, Becker, and Rosenfeld and the slope of asset growth, which were also confirmed by Lam and Wei, are consistent with this negative association [10].

Table 5. Asset growth risk factor based FF3

	(1)Retadj	(2)retadj	(3)retadj	(4)retadj
RF	-0.271***(-2.72)	0.202**(2.06)	0.359***(3.64)	0.205**(2.09)
MktRF	0.779***(195.20)	0.820***(200.21)	0.816***(198.80)	0.819***(199.98)
SMB		0.454***(78.11)	0.437***(73.94)	0.453***(77.95)
HML		0.707***(116.04)	0.685***(109.97)	0.703***(114.76)
Ewret10-1			-0.00770***(-16.62)	
Vwret10-1				-0.000321***(-7.64)
_cons	0.00759***(20.13)	0.00355***(9.57)	0.00429***(11.49)	0.00368***(9.90)

N	402777	402777	402775	402775
r2	0.0876	0.124	0.124	0.124
ar2				

6 Conclusion

This essay attempts to study the correlation between asset growth rate and equity returns. We use the long-short investment strategy, holding stocks with high asset growth rate and short-selling stocks with low asset growth rate. In addition to the straightforward returns, we also calculate the risk-adjusted returns of this long-short strategy using the CAPM and the Fama and French (1993) three-factor model (FF3). The results show that investment strategy formed on asset growth rate generates positive returns to investors, stocks with higher asset growth rate can actually obtain higher returns than stocks with lower asset growth rate. Referring to the risk adjusted returns, it is fluctuating but remains significantly from zero.

In order to analyze the pricing power of the asset growth risk factor, the asset growth rate is then included as a new pricing component in the Fama-French three-factor model. The findings show that the asset growth rate component significantly reduces stock returns, which adequately describes the performance of the investment portfolio. Finally, this outcome is in line with Yao et al., [20] and Watanabe et al [18], which is helpful for others to conduct further research and exploration.

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