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Characteristic-Balanced Momentum

Yiran Shi[*], *Xianchen Zhu*
School of Economic and Management in Nanjing University of Science and Technology, China
*Corresponding author:Yiran Shi, master,E-mail:syrbao_1992@163.com

Abstract

Conventional momentum strategies tend to focus on high beta, small-cap stocks, and the risk exposure of the Fama-French factors is higher than common stocks. So in recent years, some literatures,like Blitz D, Huij J, Martens M.[1],have pointed out that the Conventional momentum strategy will have a loss or momentum crash when the market states reverse. In this paper, we take the American market as the research object, and the momentum strategy is supposed to be formed by three characteristic, which are values of size, Book-to-market and beta. This strategy is named as Characteristic-balanced Momentum. And it is found that the return of characteristic-balanced momentum strategy has stronger stability and lower risk exposure to the above three factors.

Keywords:*characteristic-balanced momentum,high beta,risk exposure,momentum crash,conventional momentum*

1 Introduction

According to the efficient market theory, all the relevant information from the security market can be fully and promptly reflected in the stock price.Therefore, stock returns cannot be analyzed and predicted by historical data and public information.However, a large number of empirical studies at home and abroad show that the returns of the securities often exist some predictability.This kind of predictable phenomenon, known as the financial anomaly, is contrary to the traditional financial theory. One of the most typical anomaly is the momentum effect.Momentum effect is a continuation of stock returns, which is the good performance stock returns in the past is still good performance in the future,so as to the bad performance stock.

The conventional momentum strategy was first proposed by Jegadeesh and Titman[2],they extracted stock data from the CRSP database and considered all domestic primary stocks listed on the New York(NYSE) and American(AMEX) stock markets.They pointed out that the stock returns in the short term will continue its past performance,therefore the strategies they consider select stocks based on their returns over the past 1, 2, 3, or 4 quarters and they also consider holding periods that vary from 1 to 4 quarters.If stock prices either overreact or underreact to information, then profitable trading strategies that select stocks based on their past returns will exist.But some studies，like Ho H C, Chuang H.[3],Daniel K, Moskowitz T

J.[4],have found that conventional momentum strategies returns disappear gradually in recent years, especially in market states reversed, momentum profit or even negative, namely the momentum crash, so it easily influence by the economic cycle.The stocks selected by conventional momentum strategy are mostly concentrated in small-cap stocks, so the cost of transaction has a great impact for the strategy benefit, also.Finally, the conventional momentum strategy can get a positive profit in the first year after the formation period, but the return will be reversed afterwards and turn to negative.

Fama and French[5] evaluated the joint roles of beta, Size, Leverage, Book-to-market equity and E/P in the cross-section of average returns on NYSE, AMEX and NASDAQ stocks.They concluded that the relationship between the size,bm and the stock returns is significant and they proved that the market beta could not explain the variance of the average return rate of the cross section stock. The capital asset pricing model, which has long been the upsurge of academic and practical circles, has been overthrown.

2 Study design and descriptive statistics

2.1 Sample data

This article selects all the common stocks listed in NYSE, AMEX and NASDAQ from January 1965 to October 2015 as the sample data.The data used in this paper are:the monthly Fama-French three factors, the monthly risk-free interest rate, the monthly stock returns.Among them, stock monthly return, stock price, number of shares outstanding and other related stock data from the center for research in security prices (CRSP).The company's book value data is taken from COMPUSTAT, and the common factor data comes from French (2010).Common factor data includes market premium factors (RMRF), size factor (SMB), value factor (HML).

2.2 Variable measure

Book-to-market ratio:This paper follows the standard of Lewellen[6] to construct the book-to-market ratio.In order to ensure that the information of the accounting data is preferred to the information of the stock data,we will be the end of the t-1 annual accounting data on the accounting data in t May to t+1 April monthly return data, in order to avoid look-ahead bias.

Company size:This variable is defined as the share price multiplied by the number of shares outstanding.Size equal to market value of equity at the end of the prior month.

Market beta:This paper uses the CAPM model to estimate the market beta,as follow: $\mathrm{r}_{\mathrm{i,t}} = \alpha_i + \beta_i RMRF_t + \varepsilon_{i,t}$.For each month,market beta estimated from monthly returns from month -36 to month -1.Requires that stock returns at least have 24 months of value in the 36 months, and have the value in thirty-sixth months.

2.3 Empirical model

In this paper, we use the conventional momentum strategy and the characteristic-balanced momentum strategy to investigate the momentum effect of the stock,respectively, then analyze and compare the two momentum strategies from different angles. Due to a large number of literatures show that conventional momentum strategies of risks exposure to Fama-French three factors is large, we adjust the momentum strategy with characteristic values, through control the value of size and book-to-market ratio, to reduce this risk.Specific practices are as follows:

Step one:The stock samples are grouped according to the characteristic values of size, BM and beta. First of all,rank on the stock by size value, then divided into three equal investment portfolios.Second, in accordance with the BM value,divide the stocks into three investment portfolio in each size portfolio.In thisway,the 3*3 portfolios are obtained by dependent grouping.Then in these nine portfolios, repeat the step of size and BM according to beta, and finally get 3*3*3 portfolios. Regrouping stock samples each Month.

Step two: Use the method of Jegadeesh and Titman (1993) to analyze the 27 portfolios. In each portfolio, rank on the stock returns in the past 6 months and 12 months excluding the most recent month, respectively. The combinationof 10% of the highest return for the winner portfolio, the combination of 10%of minimum return for the loser portfolio, in each formation stage, buy the winner and sell the loser, and holds 1, 3, 6, 12 months. Portfolios format once amonth.

Step three:In each of the 27 investment portfolios, winners return minus loser return and we get the momentum investment return that controlled of characteristic values of the size, BM and beta .

3 Empirical Analysis

Table 1 presents the performance analysis of characteristic-balanced momentum strategy returns and compares it with the performance of the conventional momentum strategy.The stocks are ranked in ascending order on the basis of 6-month and 12-month lagged returns excluding the most recent month and an equally weighted portfolio of stocks in the lowest past return decile is the sell portfolio and an equally weighted portfolio of the stocks in the highest return decile is the buy portfolio.The average monthly returns of these portfolios and standard deviation,t-ratio and sharp ratio are presented in this table.Panel A shows the results for the characteristic-balanced momentum and the panel B shows the results for the conventional momentum.

From panel A we can see,the returns of all the zero-cost portfolios (i.e., the returns per dollar long in this portfolio) are positive. All these returns are statistically significant except for the 12-month/12-month strategy.The most successful zero-cost strategy selects stocks based on their returns over the previous 12 months and then holds the portfolio for 1 months. This strategy yields 1.123% per month.As in panel B,we can see that the profit of the conventional momentum strategy is almost half of the characteristic-balanced momentum strategy,and only in these three cases(J=6, K=3 and J=6, K=6 and J=12, K=1), the return is statistically significant, other cases of returns are not significant.Especially, when the formation period is 12-month and the holding period is 12-month, the return is reversed.Therefore, from the point of view of the benefit of the strategy, the characteristic-balanced momentum strategy is better than the conventional momentum strategy.From the standard deviation, we can see that the standard deviation of the characteristic-balanced momentum strategy is less than the conventional momentum strategy, which indicates that the characteristic-balanced momentum strategy has more stability.To analyze the sharp ratio, sharp ratio indicates that the portfolio per unit of total risk, will produce much excess returns.From the table, we can see that the sharp ratio of the characteristic-balanced momentum strategy is more than two times as much as that of the conventional momentum strategy.This means that when these two strategies are at the same risk,characteristic-balanced momentum strategy is more than two times as much as the conventional momentum strategy.Therefore, from the perspective of risk considerations, the characteristic-balanced momentum strategy is also superior to the conventional momentum strategy.

Table 1- Performance analysis of the two momentum strategies

Panel A Characteristic-balanced momentum					
j	k	mean	std	t	sharp
6	1	0.845***	3.639	5.54	0.232
6	3	0.691***	3.519	4.674	0.196
6	6	0.648***	3.258	4.725	0.199
6	12	0.331***	2.544	3.074	0.13
12	1	1.123***	4.094	6.506	0.274
12	3	0.779***	3.921	4.707	0.199
12	6	0.455***	3.604	2.985	0.126
12	12	0.087	3.148	0.649	0.028
Panel B Conventional momentum					
j	k	mean	std	t	sharp
6	1	0.421	7.296	1.42	0.058
6	3	0.490*	6.931	1.736	0.071
6	6	0.436*	6.325	1.688	0.069
6	12	0.165	4.795	0.839	0.034
12	1	0.673**	7.831	2.101	0.086
12	3	0.494	7.409	1.626	0.067
12	6	0.225	6.833	0.803	0.033
12	12	-0.256	5.887	-1.052	-0.043

*,**and***respectively expressed in the 10%, 5% and 1% confidence level statistical significant.

Next we consider the post-formation returns over the period January 1965 to October 2015 for the return differential between the top and bottom deciles.We look at the momentum strategies' returns relative to the Fama and French factors.To estimate alphas and betas,we employ a framework to account for the dynamic factor exposures of momentum strategies:

$$r_{i,t} = \alpha_i + \beta_{1,i} RMRF_t + \beta_{2,i} SMB_t + \beta_{3,i} HML_t + \varepsilon_{i,t} \qquad (1)$$

In this table we show the betas to the Fama and French market(RMRF),size(SMB) and value(HML) factors of conventional momentum and characteristic-balanced momentum strategies.We extract stock data from the CRSP database and consider all primary stocks listed on the New York(NYSE),American(AMEX) ,and Nasdaq stock markets in our study.Our sample period covers the period January 1965 to October 2015.Panel A shows the results for the characteristic-balanced momentum and the panel B shows the results for the conventional momentum.Alpah and betas are estimated using the regression model in Eq.(1).T-statistics are in parentheses.

Table 2 –The risk exposure of momentum strategies on Fama-French factors

Panel A Characteristic-balanced momentum					
j	k	intercept	RMRF	SMB	HML
6	1	0.892***	-0.0003	-0.081	-0.102*
6	3	0.775***	-0.076**	-0.062	-0.112**
6	6	0.725***	-0.071**	-0.077*	-0.095*
6	12	0.429***	-0.056**	-0.138***	-0.154***
12	1	1.157***	0.08**	-0.157***	-0.152**
12	3	0.88***	-0.037	-0.148***	-0.192***
12	6	0.581***	-0.056	-0.188***	-0.217***
12	12	0.251*	-0.067**	-0.253***	-0.262***
Panel B Conventional momentum					
j	k	intercept	RMRF	SMB	HML
6	1	1.029***	-0.248***	-0.065	0.012
6	3	0.861***	-0.214***	-0.064	0.024
6	6	0.811***	-0.182***	-0.084	0.013
6	12	0.485***	-0.139***	-0.132***	-0.090*
12	1	1.277***	-0.232***	-0.148*	-0.071
12	3	0.999***	-0.204***	-0.164**	-0.094
12	6	0.693***	-0.189***	-0.190***	-0.154**
12	12	0.219	-0.151***	-0.274***	-0.208***

*,**and***respectively expressed in the 10%, 5% and 1% confidence level statistical significant.

The results in panel A of table 2 indicate that the characteristic-balanced momentum exhibits smaller market factor exposures, almost close to zero. This means that no matter how the market conditions change, the characteristic-balanced momentum strategies will not change too much. Contrary, compared with the characteristic-balanced momentum strategies, conventional momentum strategy's market beta absolute value is about 0.2,and statistically significant, greater than the characteristic-balanced momentum strategy. For the 6-month formation period and one-month holding period, for example, the market beta is -0.003 for characteristic-balanced momentum, versus -0.25 for conventional momentum. A large portion of conventional momentum strategy's return due to the continuation of market return, therefore, when the market returns reverse, the conventional momentum strategy will be reversed, this is the momentum crash.

4 Conclusion

The results of this study are as follows. First, as the conventional momentum strategy is exposed to the risk of market factors, the return of the conventional momentum strategy will reverse when the market returns reverse. Secondly, the longer holding period, the greater chance of conventional momentum strategies reverse. Thirdly, the monthly return of characteristic-balanced momentum strategy is higher than the conventional momentum strategy, and the return is more than two times of the conventional momentum strategy in the case of the same risk. Finally, the characteristic-balanced momentum strategy has little risk of exposure to market factors, less affected by market factors, so the return is more stable and no reversal in the long term.

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