Finance Research Letters 31 (2019) 26–31

Contents lists available at ScienceDirect

Finance Research Letters

journal homepage: www.elsevier.com/locate/frl

Momentum and the Halloween Indicator: Evidence of a new seasonal pattern in momentum returns

Ajay Bhootra

California State University, Fullerton, Mihaylo College of Business and Economics, P.O. Box 6848, Fullerton, CA 92834, United States

ARTICLE INFO

Keywords:
Halloween Indicator
Momentum
Stock Return Seasonality

ABSTRACT

We report that momentum loser and winner portfolios earn much higher returns over November to April (winter) compared with May to October (summer). Specifically, the average monthly loser (winner) portfolio return is −0.46% (0.77%) over summer, and 1.72% (2.50%) over winter. This seasonal pattern is consistent with the relatively superior performance of the broader equity market over winter months (the "Halloween Indicator"). A modified momentum strategy designed to exploit this seasonal pattern has a much higher average return and Sharpe ratio than the conventional momentum strategy.

1. Introduction

Stock price momentum is one of most puzzling stock market anomalies. A strategy long in recent winner stocks and short in recent loser stocks, originally proposed in Jegadeesh and Titman (1993), has been shown to generate robust abnormal returns in several countries around the world (Rouwenhorst, 1998; Griffin et al., 2003). The academic research has uncovered several interesting momentum patterns including its dependence on firm size and analyst coverage (Hong et al., 2000), credit ratings (Avramov et al., 2007), book-to-market ratio (Daniel and Titman, 1999), market states (Cooper et al., 2004; Daniel and Moskowitz, 2016), and investor sentiment (Antoniou et al., 2013). It is also well known that the momentum returns are significantly negative in January (for example, see Ji et al., 2017). This January seasonality has been well-documented since Jegadeesh and Titman (1993)

This paper contributes to the momentum literature by presenting evidence of a new seasonal pattern in momentum profits. The origin of this pattern lies in the well-known Halloween Indicator for the stock market, more commonly known as "Sell in May, and Go Away". In both popular press as well as in academic research, it has been well-documented that the stock markets have relatively poor performance over summer months (May to October) as compared with winter months (November to April). Bouman and Jacobsen (2002) and Jacobsen and Zhang (2018) document this finding for several countries, and report the profitability of trading strategies based on this evidence. In alignment with this broad stock market evidence, we show that both momentum losers and winners have much lower returns during the summer months as compared with the winter months. The difference in returns is striking. Specifically, over the 1963–2017 period, the average monthly return for momentum losers is −0.46% over summer months, and 1.72% over winter months. Similarly, the average monthly return for momentum winners is 0.77% over summer months, and 2.50% over winter months. While the very high January returns to losers strengthen their overall winter performance, we show that losers have relatively high returns in most of the winter months, while earning negative returns in most of the summer months.

Based on this evidence, we investigate the performance of a modified momentum strategy that is long-only in winners during

E-mail address: abhootra@fullerton.edu.

https://doi.org/10.1016/j.frl.2019.04.013
Received 26 October 2018; Received in revised form 13 March 2019; Accepted 6 April 2019
Available online 11 April 2019

winter months, and long winners/short losers during summer months. In comparison to the conventional long-short strategy that earns 1.01% monthly average return in our sample, the modified strategy earns an average monthly return of 1.87%.[1] Further, the Sharpe ratio of the modified strategy is 1.06, which compares favorably with the Sharpe ratio of 0.72 for the long-short strategy, and is much higher than the Sharpe ratio of each of the five Fama-French factors (Fama and French, 2015). We find similar seasonal variation in the 52-week high price based momentum strategy of George and Hwang (2004).

The rest of the paper is organized as follows. Section 2 describes the data and methodology. Section 3 presents the results of our empirical analysis. Section 4 concludes.

2. Data and methodology

Our sample is obtained from Center for Research in Security Prices (CRSP) and comprises of monthly data for US common stocks (share codes 10 and 11) listed on NYSE, AMEX, and NASDAQ over January 1963 to December 2017. To alleviate microstructure concerns, we exclude stocks priced below $5 at the end of portfolio formation month. We also require that at least 24 return observations are available for a stock to be included in the sample.

In order to compute momentum portfolio returns, we use the overlapping period approach of Jegadeesh and Titman (1993). At the beginning of each month t, the winner (loser) stocks are identified as stocks in top (bottom) decile of cumulative returns over months t-6 to t-1. The stocks remain in these portfolios over months t to $t + 5$, and the momentum strategy return is the difference in equally-weighted winner and loser portfolio returns.[2]

We further investigate seasonal variation in returns to momentum portfolios obtained based on the 52-week high price (George and Hwang, 2004). Specifically, the portfolios in this strategy are formed on the basis of the ratio of current price to 52-week high price, with the winners (losers) being the stocks in the top (bottom) decile of the ratio. We use the CRSP price adjustment factor to account for stocks splits and dividends.

3. Results

3.1. Loser and winner portfolio returns

Table 1 shows the average returns to momentum loser and winner portfolios across calendar months (Panel A), and over summer and winter months (Panel B). The overall average return is 0.63% for the loser portfolio and 1.64% for the winner portfolio, resulting in 1.01% return for the long-short momentum strategy. The CAPM, the Fama-French three-factor (Fama and French, 1993), and the Fama-French five-factor alphas (Fama and French, 2015) are also statistically significant for the loser, the winner, and the winner-loser momentum portfolios.[3]

There is a significant variation in the monthly returns to loser and winner portfolios. Compared to summer months, the loser portfolio earns relatively large returns in winter months. While the outsized return to the momentum loser portfolio in January is well-documented, the loser portfolio also earns more than 1% returns in all other winter months with the exception of February. On the other hand, the loser portfolio exhibits dismal performance in summer months, earning negative returns in 4 of the 6 months. While the overall loser portfolio average monthly return is 0.63%, the return difference between summer and winter months is remarkable. The average return is only -0.46% per month over summer, and 1.72% over winter months. Thus, the winter average monthly returns are higher by a statistically significant 2.18%.[4]

We observe a similar pattern for the winner portfolio as well. The winners earn an average monthly return of 1.64%. However, the return over summer months is 0.77%, while the return over winter months is 2.50%, resulting in a statistically significant return difference of 1.72%. Much like the loser portfolio, the winner portfolio earns large returns in each of the winter months, and has much lower summer returns, with October being the worst month. Overall, the long-short momentum strategy earns an average returns 1.01% per month. The return over summer months is 1.23%, while the return over winter months is 0.78%. However, unlike the loser and winter portfolios, the return difference of -0.45% for the long-short portfolio is not statistically significant.

It is noteworthy that in addition to the market factor, some of the other Fama-French factors also exhibit a similar pattern of underperformance during summer months. The Appendix shows the average returns to the five Fama-French factors across calendar months, as well over summer and winter months. For market, size, and book-to-market factors (mktrf, smb, and hml, respectively),

[1] The average return for the modified strategy is 1.67% per month when the risk-free rate is subtracted from the winner portfolio return during winter months.

[2] We examined momentum performance across other formation and holding period (3, 6, and 12 months) combinations, and obtained similar results.

[3] The alphas are obtained from time-series regressions of excess loser portfolio return, excess winner portfolio return, and winner minus loser portfolio return on mktrf (CAPM alpha), mktrf, smb, and hml (three-factor alpha), and mktrf, smb, hml, cma, and rmw (five-factor alpha). The factors are market (mktrf), size (smb), book-to-market (hml), investment (cma), and profitability (rmw). The factor data is obtained from Ken French's data library at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[4] Following Bouman and Jacobsen (2002), the statistical significance of difference in returns over summer and winter months is determined using the following dummy variable regression: $r_t = \mu + \beta S_t + \varepsilon_t$, where r_t is the portfolio return, S_t is a dummy variable that equals 1 for winter months, and 0 otherwise, and ε_t is the error term. The constant,μ, equals the summer return, and coefficient β equals the return difference between winter and summer months.

Table 1
Momentum portfolio returns. Panel A of the Table reports the average returns to loser, winner, and winner minus loser momentum portfolios for each calendar month, the overall average return, and the corresponding CAPM, Fama-French three-factor, and Fama-French five-factor alphas. Panel B reports the average monthly returns over summer (May–October) and winter (November–April) months, and the difference between winter and summer returns. The momentum strategy is based on 6-month formation/6-month holding period. The portfolios are equally-weighted and returns are computed using overlapping period approach of Jegadeesh and Titman (1993). The sample covers the period from 1963 to 2017. The *t*-statistics are in bold italics.

Panel A: Momentum portfolio returns across calendar months

Month	Loser portfolio	Winner portfolio	Winner - Loser
January	4.93	3.25	−1.68
February	0.22	1.90	1.69
March	1.06	1.99	0.93
April	1.59	1.84	0.25
May	0.45	1.07	0.63
June	−1.15	1.58	2.74
July	−0.80	0.37	1.17
August	0.08	0.68	0.61
September	−0.61	0.87	1.48
October	−0.72	0.06	0.78
November	1.30	2.72	1.41
December	1.21	3.28	2.07
Average return	0.63	1.64	1.01
			5.34
CAPM alpha	−0.51	0.56	1.08
	−3.05	***3.79***	***5.69***
Three-factor alpha	−0.69	0.53	1.22
	−5.38	***6.09***	***6.49***
Five-factor alpha	−0.48	0.63	1.11
	−3.79	***7.25***	***5.79***

Panel B: Summer (May–October) and winter (November–April) returns

	Loser portfolio	Winner portfolio	Winner - Loser
Summer return	−0.46	0.77	1.23
Winter return	1.72	2.50	0.78
Winter–Summer	2.18	1.72	−0.45
	3.74	***3.28***	***−1.18***

we find that the returns during winter months are significantly higher than those during summer months. The investment factor (cma) also has higher return during winter, although the difference is not statistically significant at the 10% level. The profitability factor (rmw), on the other hand, is the only one of the five factors that earns higher return during summer, albeit the difference is not statistically significant. Given that this seasonal pattern for factors is similar to that of momentum winners and losers, we do not expect a large difference in factor model based alphas of losers and winners across summer and winter months. We do, however, find that difference is CAPM alphas is statistically significant for both winners and losers, and while the three-factor and five-factor alphas are higher for winter months, for both winners and losers, the differences are not statistically significant.[5]

3.2. A modified momentum strategy

Based on the foregoing evidence, we investigate the performance of a modified momentum strategy that takes a long position in winner stocks during the winter months, and is long in winners and short in losers during the summer months. Table 2 reports the performance of this strategy, along with a comparison to the performance of conventional long-short strategy and the Fama-French factors. On average, the monthly excess return to the long portfolio in winter, and long-short portfolio in summer is 1.67%; the strategy return is 1.87% when risk-free rate is not subtracted. This performance far exceeds the return to the factors, and is much higher than that of the conventional long-short momentum strategy that earns an average monthly return of 1.01%. Although the modified strategy has slightly higher standard deviation compared with the long-short momentum strategy, the strategy has a much higher Sharpe ratio of 1.06 compared with that of long-short strategy and the Fama-French factors.

As shown in Panel B, the strategy earns a CAPM alpha of 1.39%, a three-factor alpha of 1.40%, and a five-facor alpha of 1.50%, all exceeding the alphas to the long-short strategy reported in Table 1. We also note that since the modified strategy takes short positions only during one half of the year, it also reduces the transaction costs associated with shorting stocks.

[5] The alpha differences are also obtained using dummy variable regressions. The CAPM alpha difference between winter and summer is 0.81% (*t*-statistic = 2.41) for the loser portfolio, and 0.60% (*t*-statistic = 2.00) for the winner portfolio.

Table 2
Modified momentum strategy performance. The modified momentum strategy takes long position in winner portfolio during winter months (November–April), and is long in winner and short in loser portfolio during summer months (May–October). Panel A of the Table reports the average monthly return, monthly standard deviation, and annualized Sharpe ratio for the Fama-French market, size, book-to-market, investment, and profitability (mktrf, smb, hml, cma, rmw, respectively) factors, the conventional long-short momentum strategy, and the modified momentum strategy. The momentum strategy is based on 6-month formation/6-month holding period. The portfolios are equally-weighted and returns are computed using overlapping period approach of Jegadeesh and Titman (1993). The return to the modified momentum strategy is obtained by averaging the excess return to winner portfolio in winter months, and the return to winner-loser portfolio in summer months. Panel B reports the CAPM, Fama-French three-factor, and Fama-French five-factor alphas for the modified momentum strategy. The sample covers the period from 1963 to 2017. The *t*-statistics are in bold italics.

Panel A: Return, standard deviation, and Sharpe ratio comparison

Factor/Strategy	Average return	Standard deviation	Sharpe ratio (Annualized)
mktrf	0.53	4.39	0.42
smb	0.25	3.03	0.29
hml	0.35	2.81	0.43
cma	0.29	2.00	0.50
rmw	0.26	2.17	0.41
long-short momentum	1.01	4.83	0.72
modified momentum	1.67	5.47	1.06

Panel B: Modified momentum alphas

CAPM alpha	1.39
	7.14
Three-factor alpha	1.40
	7.62
Five-factor alpha	1.50
	7.96

Table 3
The 52-week high momentum portfolio returns. Panel A of the Table reports the average returns to loser, winner, and winner minus loser momentum portfolios for each calendar month, the overall average return, and the corresponding CAPM, Fama-French three-factor, and Fama-French five-factor alphas. Panel B reports the average monthly returns over summer (May–October) and winter (November–April) months, and the difference between winter and summer returns. The winners (losers) are stocks in the top (bottom) decile of the ratio of current price to 52-week high price. The portfolios are held for 6 months. The portfolios are equally-weighted and returns are computed using overlapping period approach of Jegadeesh and Titman (1993). The sample covers the period from 1963 to 2017. The *t*-statistics are in bold italics.

Panel A: Momentum portfolio returns across calendar months

Month	Loser portfolio	Winner portfolio	Winner–Loser
January	5.35	1.80	−3.55
February	−0.13	1.76	1.89
March	0.56	1.85	1.29
April	1.02	1.57	0.54
May	0.11	0.98	0.86
June	−1.25	1.31	2.56
July	−1.34	0.71	2.05
August	−0.27	0.65	0.91
September	−1.07	0.84	1.91
October	−1.55	0.48	2.03
November	0.97	2.12	1.16
December	0.73	2.78	2.05
Average Return	0.26	1.40	1.14
			5.12
CAPM alpha	−0.95	0.55	1.50
	−4.94	***6.69***	***7.71***
3-factor alpha	−1.09	0.47	1.56
	−7.70	***8.25***	***8.49***
5-factor alpha	−0.76	0.39	1.15
	−5.65	***6.92***	***6.56***

Panel B: Summer (May–October) and winter (November–April) returns

Summer return	−0.89	0.83	1.72
Winter return	1.42	1.98	0.56
Winter–Summer	2.31	1.15	−1.16
	3.59	***3.43***	***−2.58***

3.3. Momentum strategy based on the 52-week high price

The 52-week high price based momentum strategy of George and Hwang (2004) takes a long (short) position in stocks trading near (far from) their 52-week high prices. This strategy earns significant abnormal returns over subsequent time horizons of up to 12 months.

Consistent with the findings of George and Hwang (2004), Panel A of Table 3 shows that the 52-week high winners outperform the losers by a statistically significant 1.14% per month. The alphas based on market, three-factor, and five-factor models are even higher and also statistically significant. Similar to the past return based strategy, there is a significant variation in returns to winner and loser portfolios across the calendar months. Panel B shows that the loser portfolio earns an average monthly return of −0.89% in summer, and 1.42% in winter, resulting a statistically significant return difference of 2.31%. The winner portfolio earns 0.83% over summer and 1.98% over winter, resulting in a statistically significant return difference of 1.15%. Unlike the Jegadeesh and Titman momentum strategy, in this case, the return difference for the long-short momentum strategy is also significant, with returns being higher in summer by 1.16% per month, on average.

4. Conclusion

There is a large and significant seasonal variation in the average returns to both loser and winner momentum portfolios, with returns being significantly higher over November-April compared with May–October months. This new finding is in alignment with the widely known evidence of stock market's relatively superior performance over winter months. A trading strategy designed to exploit this seasonal pattern, taking only long position in winners in winter, and long in winners and short in losers in summer, earns much higher return and Sharpe ratio than the conventional long-short momentum strategy.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.frl.2019.04.013.

Appendix: Factor returns

Table A1.

Table A1
The Table reports the average returns to the Fama-French market, size, book-to-market, investment, and profitability (mktrf, smb, hml, cma, rmw, respectively) factors for each calendar month, the overall average return, the return over summer (May–October) and winter (November–April) months, and the difference in winter and summer returns. The sample covers the period from 1963–2017. The *t*-statistics are in bold italics.

Month	mktrf	smb	hml	cma	rmw
January	0.94	1.86	1.24	0.59	−0.98
February	0.35	0.75	0.56	0.74	0.07
March	0.91	0.40	0.84	0.47	0.47
April	1.10	−0.03	0.72	0.22	0.63
May	0.28	0.01	−0.17	−0.10	0.41
June	−0.11	0.64	−0.16	−0.11	0.37
July	0.09	−0.40	0.74	0.48	0.58
August	0.10	−0.12	0.64	0.37	0.06
September	−0.53	0.48	0.10	0.30	0.41
October	0.61	−1.43	−0.38	0.14	0.50
November	1.29	0.22	−0.19	0.19	0.34
December	1.35	0.66	0.23	0.14	0.20
Average return	0.53	0.25	0.35	0.29	0.26
Summer return	0.07	−0.14	0.13	0.18	0.39
Winter return	0.99	0.64	0.57	0.39	0.12
Winter–Summer	0.92	0.78	0.44	0.21	−0.27
	2.69	***3.32***	***1.97***	***1.32***	***−1.57***

References

Antoniou, C., Doukas, J.A., Subrahmanyam, A., 2013. Cognitive dissonance, sentiment, and momentum. J. Financial Quant. Anal. 48, 245–275.
Avramov, D., Chordia, T., Jostova, G., Philipov, A., 2007. Momentum and credit rating. J. Finance 62, 2503–2520.
Bouman, S., Jacobsen, B., 2002. The Halloween indicator, “sell in May and go away”: another puzzle. Am. Econ. Rev. 92, 1618–1635.
Cooper, M., Gutierrez, R., Hameed, A., 2004. Market states and momentum. J. Finance 59, 1345–1365.
Daniel, K., Moskowitz, T.J., 2016. Momentum crashes. J. Financial Econ. 122, 221–247.
Daniel, K., Titman, S., 1999. Market efficiency in an irrational world. Financial Anal. J. 55, 28–40.

Fama, E.F., French, K.R., 1993. Common risk factors in the returns on stocks and bonds. J. Financial Econ. 33, 3–56.
Fama, E.F., French, K.R., 2015. A five-factor asset pricing model. J. Financial Econ. 116, 1–22.
George, T., Hwang, C., 2004. The 52-week high and momentum investing. J. Finance 59, 2145–2176.
Griffin, J.M., Ji, X., Martin, J.S., 2003. Momentum investing and business cycle risk: evidence from pole to pole. J. Finance 58, 2515–2547.
Hong, H., Lim, T., Stein, J.C., 2000. Bad news travels slowly: size, analyst coverage, and the profitability of momentum strategies. J. Finance 55, 265–295.
Jacobsen, B. and Zhang, C.Y., 2018. The Halloween indicator, 'sell in May and go away': everywhere and all the time. Working paper, Available at SSRN: https://ssrn.com/abstract=2154873.
Ji, X., Martin, J.S., Yao, Y., 2017. Macroeconomic risk and seasonality in momentum profits. J. Financial Mark. 36, 76–90.
Jegadeesh, N., Titman, S., 1993. Returns to buying winners and selling losers: implications for stock market efficiency. J. Finance 48, 65–91.
Rouwenhorst, K.G., 1998. International momentum strategies. J. Finance 53, 267–284.