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THE MOMENTUM EFFECT: ANOMALY OR ILLUSION

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ABSTRACT

This paper tests the effectiveness of the momentum strategy for different time horizons between April 2013 and March 2020 and its sources in the Tunisian stock market. The findings display that, employing the methodology of Jegadeesh and Titman (1993), momentum strategy for all time horizons are positive and statistically significant. In the explanation section of the momentum effect, it is found that the momentum is not an illustration of the January effect and that both models (Capital Asset Pricing Model and the model of Fama and French (1993)) are unable to fully capture the profit of momentum strategy. However, we find that trading costs in the form of quoted spread eliminate the statistical significance of the momentum return. Therefore, an investor can't make a profit by exploiting the momentum strategy in the Tunisian context.

Keywords: Momentum strategy, January effect, Capital Asset Pricing Model, Model of Fama and French (1993), Trading costs.

INTRODUCTION

Extensive research has reported several price anomalies in a wide variety of markets. The most common of these anomalies is the momentum effect. This phenomenon was first proposed by Jegadeesh and Titman (1993). He documented, using US data between 1965 and 1989, that stock with the highest (lowest) returns over the previous three to twelve months continue to acquire the highest (lowest) returns over the following three to twelve months.

To exploit the momentum effect, Jegadeesh and Titman (1993) constructed a series of investment strategies by buying stock with the best returns during the past three to twelve months and selling stock with the lowest returns during the past three to twelve months. These investment strategies were held over the following three to twelve months.

The effectiveness of momentum strategies reported by Jegadeesh and Titman (1993) in the US market is a contradiction to the neoclassic efficient market hypothesis. The efficient market hypothesis assumes that market price completely mirrors all available news at any instant and that investors are rational. Then, it is impossible to make predictions on the evolution of the price.

The results found by Jegadeesh and Titman (1993) laid open a series of questions. Is the momentum phenomenon present in equity markets other than the American market? Can investors exploit this phenomenon? Are returns to the momentum strategies omitted by the Capital Asset Pricing Model (CAPM) and Fama and French model (1993)? In this current investigation, we examine empirically the profitability of momentum strategy over various time horizons between April 2013 and March 2020 and its sources. In the context of the Tunisian equity market, there are only two published works that examined empirically the profitability of momentum strategies and assess if the momentum profits are justified by the risk hypothesis (Zoghlami (2011); Boussaidi and Dridi (2020)). However, there is no study investigating the impact of the trading costs on momentum returns and examining for possible seasonality in the returns of momentum strategies.

The rest of this article follows: Section two reviews previous researches on the momentum phenomenon. Section three provides explanations of the momentum returns. Section four reports the data and section five methodologies are used. Section six presents the findings and section seven summarizes the conclusions.

PREVIOUS RESEARCHES ON THE MOMENTUM EFFECT

Since the innovator study of Jegadeesh and Titman (1993), numerous works reported evidence in favor of the momentum phenomenon in the US market. For example, Geczy and Samonov (2016) found using US data between 1801 and 2012, a significant momentum phenomenon gain of 0.4% per month. Outside the US market, Rouwenhorst (1998) studied international data of 12 European markets between 1978 and 1995. He documented that a momentum portfolio generates significant excess returns using different junctions of three, six, nine, and twelve-month formation and holding periods. Hou and Mcknight (2004) found that the momentum strategy is profitable between 1988 and 2000 in the Canadian market. Antoniou et al. (2007) examined a sample of 2556 firms traded on the London stock market in the period 1993-2002. They found evidence of a significant momentum effect. Glaser and Weber (2006), employing a sample of 446 firms traded on the German market, declared the existence of momentum phenomenon over the period 1988-2001.

Additional validation of the effectiveness of the momentum strategy was again documented in emerging markets by numerous works. Rowenhorst (1999) investigated a sample of 1750 firms in 20 emerging markets between 1982 and 1997 and detected a beneficial 6-month/ 6- month momentum strategy in seventeen of the twenty emerging markets. Rastogi et al. (2009) found that the strategy of purchasing previous stock winners and vending previous stock losers yields excess returns in the Indian equity market over the period 1996-2008. Khosroazad and Chitsazan (2016), considering a sample of 40 companies traded in the Iranian market, reported evidence of momentum phenomenon between 2004 and 2014. The existence of the momentum phenomenon was also given by Adrianus and Soekarno (2018) in the Indonesian equity market employing daily data of all traded companies during the period of February 2013 through December 2015. In the Tunisian stock market, Zoghlami (2011) employed various Junctions of three, six, nine, and twelve-month formation and holding periods. He found that all momentum strategies studied are profitable over the period 1998-2004. Boussaidi and Dridi (2020) also revealed that the number of beneficial momentum strategies is fourteen out of sixteen strategies over the period 1999-2016.

EXPLANATIONS OF THE MOMENTUM RETURNS

Various reasons have been proposed to explain the presence of the momentum phenomenon. For the risk hypothesis, Sehgal and Balakrishnan (2008) found that the three factors model of Fama and French (1993) succeeds to justify the momentum profitability in the Bombay equity market for the period 1990 -2003. Galariotis (2010) also documented that momentum profitability is completely gained control by the three factors model of Fama and French (1993) in the Australian stock market. Other authors noted that the risk hypothesis is inept to justify the momentum effect. Rouwenhorst (1998) reported that the size and market factors fail to give explanations for the effectiveness of the momentum strategy. Zoghlami (2011) also found that the three factors model of Fama and French (1993) are unable to justify the momentum profitability in the Tunisian market for the period 1998-2004. Fan et al (2015) documented that the three factors model of Fama and French (1993) is inept to fully capture the momentum profitability in most of the 43 stock markets studied between 1981 and 2009.

Several authors like Jegadeesh and Titman (1993, 2001); Chordia and Shivakumar (2006), and Ji et al.(2017) argued that the momentum effect is an illustration of the January anomaly. They found that in January momentum returns tend to be lower than momentum returns in other calendar months. In other words, the winner portfolio significantly outperforms the loser portfolio in all months except January. They explained their results by the tax-loss-selling hypothesis and the window-dressing hypothesis.

Other authors found that trading costs can fully explain the momentum profit. In the Canadian market, Cleary and Inglis (1998) reported that after considering trading costs, momentum strategies generate negative returns in the period 1980-1998. Lesmond et al. (2004) and Boujelbene et al. (2008) also documented that momentum returns are fragile to trading costs in the US and the French markets respectively.

For the under-reaction hypothesis, Doukas and Mcknight (2005) examined a sample of 3084 equities from 13 markets of the European continent in the period 1988-2001. They reported that the under-reaction of stock prices to new information is capable to explain the profitability of 6- month/ 6- month momentum strategy. In the Tunisian context, Boussaidi and Dridi (2020) also found that the momentum effect is justified by the under-reaction hypothesis. They revealed that favorable (unfavorable) earnings news is succeeded by positive (negative) excess returns during twelve months after the declaration time.

DATA

The data applied in our investigation consist of the daily closing prices, market-capitalizations, and book values of all securities traded on the Tunisian stock market and have full data during April 2013 and March 2020 (60 stocks). These data were obtained from www.bvmt.com.tn and the monthly money market rate (TMM) was obtained from the central bank of Tunisia. TMM is applied to calculate the return on a risk-free asset.

The daily closing prices are used to calculate the monthly return of the stock. The latter is computed as the difference in the natural log of the mean closing price of security between month t and t-1. The return of the market on month t is determined by dividing the sum of the returns of all stocks by the number of firms listed on month t.

METHODOLOGIES

Formation of the Portfolios

To investigate if the momentum phenomenon exists in the Tunisian stock market, we refer to a pioneering methodology widely employed. This methodology has been introduced by Jegadeesh and Titman (1993). According to this method, all securities are ordered in ascending order based on their previous returns over the formation period and assigned to three equally weighted portfolios. Each portfolio contains 20 stocks. In the Tunisian stock market, the number of traded companies is very small compared to the US market. Then, we choose to construct terciles instead of deciles portfolios. The tercile of securities with the lowest returns over the formation period (J) is called the loser portfolio (L). However, the tercile of securities with the highest returns over the formation period is called the winner portfolio (W). These portfolios are then held over the holding period (K).

In our investigation, we consider three formation periods and three holding periods. J= 3, 6, 12 months and K= 3,6,12 months. The combination of the two periods gives nine momentum strategies. The return of the momentum portfolio is determined by the difference between the return of the winner portfolio and the return of the loser portfolio.

Performance of Portfolios

Traditionally, the study of the significance of the alpha coefficient in the CAPM and the three factors model of Fama and French (1993) allows us to assess the performance of the portfolios. These two models are respectively written in this fashion:

$$R_{P,t} - R_{f,t} = \alpha_P + \beta_P\left(R_{m,t} - R_{f,t}\right) + e_{P,t} \quad (1)$$

$$R_{P,t} - R_{f,t} = \alpha_P + \beta_P\left(R_{m,t} - R_{f,t}\right) + s_P SMB_t + h_P HML_t + e_{P,t} \quad (2)$$

Where $R_{P,t}$is the return of the momentum portfolio; $R_{f,t}$is the risk-free-rate; $R_{m,t} - R_{f,t}$is the market return above the risk-free rate. The SMB_t and $HML_t$are consecutively the size and book to market factors of the Fama and French model (1993); α_P, β_P, s_P and h_P are the coefficients to estimate, and $e_{P,t}$is an error term. If the coefficient α_P in the CAPM and the three factors model of Fama and French (1993) are significant, we can conclude that these models are inapt to capture the momentum profitability.

We used the methodology of Fama and French (1993) to calculate the two risk premiums SMB and HML. At the end of March of each year, companies are ordered according to the end of the previous year's market capitalization and two groups are constructed: group number one contains the smallest companies and noted (S) and group number two contains the biggest companies and noted (B). Moreover, We construct independently three groups of companies found at the end of the preceding year book to market ratio (B/M): the first group contains companies with the lowest B/M (30%) and noted (L), the second group contains companies with the medium B/M (40%) and noted (M) and the third group contains companies with the highest B/M (30%) and noted (H). The junction of these two successive partitions gives six portfolios (S/L, S/M, S/H, B/L, B/M, and B/H). The S/L portfolio comprises companies that are both in the small size group and in the low (B/M) group. The B/H portfolio comprises companies which are both in the big size group and in the high (B/M) group and so on.

SMB_t is the mean return on the three small portfolios (S/L, S/M, S/H) minus the mean return on the three big portfolios (B/L, B/M, B/H), for each month.

$$SMB_t = \frac{1}{3}\left(R_{S/L,t} + R_{S/M,t} + R_{S/H,t}\right) - \frac{1}{3}\left(R_{B/L,t} + R_{B/M,t} + R_{B/H,t}\right) \quad (3)$$

HML_t is the mean return on the two value portfolios (S/H, B/H) minus the mean return on the two growth portfolios (S/L, B/L), for each month.

$$HML_t = \frac{1}{2}\left(R_{B/H,t} + R_{S/H,t}\right) - \frac{1}{2}\left(R_{B/L,t} + R_{S/L,t}\right) \quad (4)$$

Momentum Return and Trading Costs

To measure trading costs in the Tunisian stock market, we use the quoted spread estimates. This measure is employed by several authors that study the profitability of momentum strategies after considering trading costs (Cleary and Inglis (1998), Lesmond et al. (2004), and Boujelbene et al. (2008)). The quoted spread determines the cost of completing a round trip purchase – sell. The quoted half- spread measures the costs for a unique trade purchase or sells.

The quoted spread is given by:

$$S_{i,t}^{Q} = \frac{A_{i,t} - B_{i,t}}{(A_{i,t} + B_{i,t})/2} \quad (5)$$

Where $S_{i,t}^{Q}$ corresponds to the quoted spread for security i at time t. $A_{i,t}$ represents the ask price for security i at time t, and $B_{i,t}$ is the bid price for security i in time t.

EMPIRICAL RESULTS

Profitability of Momentum Strategies

Returns results for all 9 momentum strategies between April 2013 and March 2020 can be shown in table 1. All strategies studied generate positive and statistically significant returns. The most profitable 6-month/ 6-month momentum strategy experiences a return of 0.91% per month. However, the least profitable 12-month/12-month momentum strategy produced a return of 0.59% per month. From table (1), we can also see that the returns of momentum portfolio seem to be directed by the short positions in winners as the returns of loser portfolios are positive across all ranking and holding periods.As displayed in the table (1), the returns of momentum portfolios are affected by the duration of the holding period. More specifically, for the ranking period of 3 months, the return of momentum portfolio diminishes from 0.80% to 0.63% as the holding period rises. Our findings are consistent with that found by Zoghlami(2011) in the Tunisian market.

Table1. Returns of winner, loser, and momentum portfolios

Ranking period	Portfolios	Holding period		
		K=3	K=6	K=12
J=3	Winner	0.0162***	0.0157***	0.0134***
		(3.90)	(5.35)	(6.54)
	Loser	0.0082**	0.0079***	0.0071***
		(2.31)	(2.81)	(3.16)
	Momentum	0.0080 **	0.0078***	0.0063***
		(2.24)	(3.44)	(3.91)
J=6	Winner	0.0174***	0.0183***	0.0142***
		(4.01)	(5.43)	(6.48)
	Loser	0.0084**	0.0092***	0.0070***
		(2.28)	(3.08)	(3.11)
	Momentum	0.0090***	0.0091***	0.0072***
		(3.68)	(3.66)	(3.99)
J=12	Winner	0.0175***	0.0153***	0.0114***
		(3.46)	(3.99)	(5.19)
	Loser	0.0087**	0.0071**	0.0055**
		(2.10)	(2.08)	(2.24)
	Momentum	0.0088**	0.0082***	0.0059***
		(2.34)	(3.01)	(3.2)

Note: T-statistics are in parentheses, with two, and three asterisks denoting significance at the 5% and 1% levels consecutively.

Evidence of Abnormal Returns

Parameters estimates of the CAPM and the model of Fama and French (1993) for the momentum, winner, and loser portfolios of the most profitable 6-month/6-month strategy are presented in table (2). The abnormal returns (alpha coefficients) of the momentum portfolio in these two models are positive and statistically significant at one percent level. Then, the CAPM and the model of Fama and French (1993) cannot capture the momentum return. Our results are consistent with those found by Zoghlami (2011) in the Tunisian equity market and Fan et al. (2015) in most of the 34 stock markets studied.

Table (2) also displays that for the most beneficial 6-month/6-month strategy, the beta(a measure of the systematic risk) of the winner portfolio is more than the beta of the loser portfolio in the CAPM and the three factors model of Fama and French (1993). These two betas are positive and statistically significant at the 1% level. This indicates that for the market factor; the winner portfolio is riskier than the loser portfolio. For the 6-month/6-month strategy, the positive difference in the beta is statistically significant. Therefore, market risk can justify the exceed performance of the winner portfolio. For the size factor, the factor loading on SMB_t for the winner portfolio is negative and significant at one percent level. While the factor loading on SMB_t for the loser portfolio is positive and statistically significant at 1% level. This signifies that the winning companies are bigger than the losing companies. The negative divergence in the size risk exposure is statistically significant. Consequently, the size risk can justified the exceed performance of the winner portfolio. For the book market factor, the factor loading HML_t for the

momentum portfolio is not statistically significant. This means that the risk associated with the book to market factor cannot explain the momentum return.

Table 2. Parameters estimates of the CAPM and the three factors model of Fama and French (1993)

	CAPM		Three factors model of Fama and French (1993)			
	α_P	b_P	α_P	b_P	s_P	h_P
Winner	0.0036 (1.50)	1.4765*** (15.72)	0.0045** (2.14)	1.5137*** (13.45)	-0.2416*** (-2.79)	-0.1468 (-1.20)
Loser	-0.0023*** (-2.92)	1.0203*** (12.29)	-0.0033*** (-3.73)	1.0225*** (10.33)	0.2415*** (3.15)	0.0754 (0.70)
Momentum	0.0059** (2.37)	0.4562*** (2.82)	0.0078*** (3.18)	0.4912** (2.58)	-0.4831*** (-3.28)	-0.2222 (-1.06)

Note: T-statistics are in parentheses, with two, and three asterisks denoting significance at the 5% and 1% levels consecutively.

Seasonality in Momentum Return

The momentum return of the most profitable 6-month/6-month strategy in January and all months except January is displayed in table 3. From this table, we note that the January momentum return is bigger than the momentum return outside January. More specifically, the winner portfolio significantly outperforms the loser portfolio exceptionally during January. This result indicates that the momentum phenomenon detected in the Tunisian equity market is not the manifestation of the January effect.

Table 3. Momentum return in January and outside January

January	Outside January
0.0134*** (5.02)	0.0087*** (3.18)

Note: T-statistics are in parentheses, with three asterisks designating significance at 1% level.

Momentum Return and Trading Costs

Table 4 presents the net return for three portfolios (winner, loser, and momentum) of the most profitable 6-month/6-month strategy. From this table, we see that the quoted spread for the loser portfolio is higher than the quoted spread for the winner portfolio. This result means that loser securities are less liquid than the winner securities. Table (4) also displays that the net returns for the winner and loser portfolios are non-negative and statistically significant. However, the net return for the momentum portfolio is not statistically significant. This indicates that trading costs in the form of quoted spread eliminate the statistical significance of the momentum return of the most beneficial 6-month/6-month strategy. Therefore, an investor can't make a profit by exploiting the momentum phenomenon in the Tunisian equity market. Our findings are in line with those found by Cleary and Inglis (1998) in the Canadian market, Lesmond et al. (2004) in the American market, and Boujelbene et al. (2008) in the French market. In summary, the neoclassic efficient market hypothesis was confirmed by our findings.

Table 4. Momentum return and trading costs

	Raw return	Trading cost	Net return
Winner	0.0183*** (5.43)	0.0026*** (28.14)	0.0157*** (4.72)
Loser	0.0092*** (3.08)	0.0032*** (30.12)	0.0060* (1.74)
Momentum	0.0091*** (3.66)	0.0058*** (35.06)	0.0033 (1.49)

Note: T-statistics are in parentheses, with one, and three asterisks denoting significance at the 10% and 1% levels consecutively.

CONCLUSION

This article analyses the profitability of momentum strategy over various time horizons between April 2013 and March 2020.Also, we evaluate whether both models (CAPM and the three factors model of Fama and French (1993)) completely captured the momentum return. Furthermore, we examine possible seasonality in the momentum return, and then, we test if the momentum returns can resist trading costs. Employing the methodology of Jegadeesh and Titman (1993), we document that all momentum strategies are beneficial. They generate positive and statistically significant returns. The most profitable 6-month/ 6-month momentum strategy experiences a return of 0.91% per month. Our findings are in line with Zoghlami (2011) in the Tunisian market. Also, we report that the CAPM and the three factors model of Fama and French (1993) cannot capture momentum return. The abnormal returns (alpha coefficients) of the momentum portfolio in these two models are non-negative and statistically significant at one percent level. Furthermore, we document that the momentum phenomenon detected in the Tunisian market is not the manifestation of the January effect and then, we find that that trading costs in the form of quoted spread eliminate the statistical significance of the momentum return of the most beneficial 6-month/6-month strategy. Therefore, an investor can't make a profit by exploiting the momentum strategy in the Tunisian context. In summary, the neoclassic efficient market hypothesis was confirmed by our results. In our future research, we propose to investigate the under-reaction hypothesis as a behavioral reason for the momentum effect in the Tunisian context.

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