Evidence of the Momentum Effect in the Morocco Stock Market: 1995-2014

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Abstract

This paper investigated whether there is a momentum effect at the Morocco firm level. Using Morocco Stock Exchange data from 1995 to 2014, the paper demonstrated strong evidence of momentum effect. The return momentum effect in Morocco firm portfolios was large, where that the 6 momentum strategy with a six-month holding period generated a significant return of 0.51 percent per month on average. The results of this study also confirmed that the momentum strategy is still profitable and statistically significant when applied to sub period sample. The momentum profits for the Morocco market cannot be explained by Fama and French three-factor model.

Key Words: *Morocco Stock Exchange (MSE), Momentum Effect, Fama–French Three-Factor Model.*

Introduction

The existence of the profitability of momentum strategies is well documented in the literature and has attracted the attention of many academics. The empirical literature on momentum strategies has showed that buy the best performance stocks and sell the worst-performing ones during intermediate horizon past performance 3, 6, 9 and 12 months and hold the portfolio for the following 3, 6, 9 and 12 months can be used to predict future returns and it provides significant profits at firm, industry and international index level.[1]

Nagel (2001) shows a momentum effect in the UK market that is cannot be explained by the Fama and French model. Hurn and Pavlov (2003) find evidence of short to medium momentum effects in the Australia market. These effects are declined by the risk adjustment only over the short term. Using daily, weekly and monthly data for 18 developed countries, Patro and Wu (2004) examine the momentum strategies. They demonstrate statistical and significant profits.

Using monthly index returns of 17 countries, Huang (2006) measures the source of momentum profits. Huang (2006) shows that the "up" market play crucial role in generating the momentum profits. Naranjo and Porter (2007) investigate the existence of momentum profits in both developed and emerging markets. Their findings provide strong evidence of momentum effect in both markets and find that momentum strategies that vary inter-countries show a lower risk and higher returns.

Recently, using international indices in both developed and emerging markets, Bornholt and Malin (2011) investigate whether each index's recent   volatility considerations can be employed to enhance the

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[1] Jegadeesh and Titman (1993), Rouwenhorst (1998), Moskowitz and Grinblatt (1999), Chan, Hameed, and Tong (2000), Griffin, Ji, and Martin (2003), Balvers and Wu (2006).

profitability of the standard momentum approach. Double-sorting procedure has been used in their paper. Bornholt and Malin (2011) find that the momentum/volatility strategy provide only small enhancements over pure momentum in the case of developed markets, whilst the new strategy performed surprisingly well when applied to emerging markets. Recent high volatility winners were superior to recent low volatility losers on an average annualized basis by 17.4%. On the other hand, the long portfolio of the pure momentum strategy was superior to the short portfolio by 9.1%. Furthermore, for the case of emerging market, they showed that high volatility winners achieve an average annualized return of 28.3%, and an alpha of 21.1%.

Wang and Wu (2011) present a new effort to discover momentum sources through the risk adjustment of momentum portfolios. Whilst most previous studies follow a new equilibrium model to adjust for risk, Wang and Wu (2011) concentrate on the most extensively used linear three-factor model by proposing an alternative risk adjustment procedure. They challenge the main idea in the literature that indicates momentum profits are drawn by firm-specific components of stock returns. This leading view infers that the winning portfolios are no riskier than the losing portfolios and that the risk-adjusted momentum returns continue to be significant. Wang and Wu (2011) show that it is not useful to employ the conventional procedure of risk adjustment by running the full-sample time-series regression of momentum portfolio return on the Fama-French three-factor model to capture the risk-adjusted momentum returns, since this procedure does not take into consideration the dynamic nature of the factor loading of momentum portfolios. They found that approximately 40% of momentum profits drawn by individual stocks can be explained by the three-factor model after adjusting risk related to the Fama-French three factors for momentum portfolio.

More Recently, looking at the Middle East region, in particular the Jordan firm market, Gharaibeh (2015) finds that although the momentum strategy does not work in Jordan firm market returns, the large-sized momentum strategy is profitable and statistically significant. In sum, given to the previous studies, none of these studies have investigated the presence of momentum effect at the Morocco firms market. This paper is motivated by the lack of Morocco research to date into the predictability of Morocco firm returns. The aim of this paper is to investigate whether there is a momentum effect at the level of Morocco firms market. The remainder of this paper is organized as follows. Section 2 describes the source of the data and discusses the empirical methodology in terms of portfolio formation employed in this study. Section 3 provides the main empirical findings for both raw and risk-adjusted returns, as well as robustness check. Section 4 concludes this study.

Data and Methodology

The basic units of observation are the monthly returns for 71 Morocco firms and for the Morocco Stock Exchange market. The time frame of the study is from January 1995 to April 2014. Additionally, this paper uses firm size and the firm book-to-market ratio for the 71 Morocco firms for the same period. The monthly returns of the market are the monthly returns of the Morocco Stock Exchange (MSE) market of Morgan Stanley Capital International (MSCI) Morocco Index downloaded from Datastream. In addition, the paper employ the one to twelve-month Treasury bill rates as the risk-free rate reported at the beginning of each month for the period from January 1995 to April 2014. All data is downloaded from data stream except of risk-free rate drawn from Morocco Central Bank. The current study begins from January 1995 since the Datastream has a less comprehensive coverage of MSE stocks prior to January 1995. The last sample is composed of 233 monthly returns on each firm, on the market index and the risk-free asset, together with observations on the firm size and firm book-to-market ratio of each firm.

This paper computes portfolio returns for holding periods for 3, 6, 9 and 12 months. The current study adopts Balvers and Wu's (2006) approach by allowing a 1-month gap between the end of the sorting period and the beginning of the holding period. Following Jegadeesh and Titman (1993), overlapping portfolio method has been employed.

Momentum Strategy

Portfolios are sorted based on past *J*-month returns (*J* = 3, 6, 9 or 12-month), every month the Winner portfolio comprises the 25% of firms that have the highest past *J*-month returns, and the Loser portfolio comprises the 25% of firms that have the lowest past *J*-month returns. The momentum arbitrage portfolio is the Winner minus Loser portfolio.

Table 1 reports summary statistics over the period January 1995 to April 2014 for the 71 Morocco firms, showing average monthly returns, standard deviation, last two columns reports Skewness and Kurtosis for each firms. There is a large difference in the mean and standard deviation of average returns. Investors holding group, Oulmes firm has the largest monthly average (over 2% per month), while Stroc has the lowest average at-2.92. The 71 Morocco firms have an average monthly return of 0.33% and an average standard deviation of 9.51%.

This table details the descriptive statistics for 71 Morocco firms utilized in this research. The first column is the name of the firm. This is followed by the average monthly percent returns, the standard deviation of monthly percent returns, the 'Skew' is the skewness, and the 'Kurt' is the kurtosis for each firm over the period December 1994 to April 2014.

Table 1 Descriptive Statistics.

Morocco Firm Names	Average %	S.D. %	Skew	Kurt
OULMES	2.93	22.99	7.63	80.03
AUTO NEJMA	1.79	14.57	4.31	34.91
MAROC LEASING	1.73	22.74	8.09	92.8
CIE.MINIERE DE TOUISSIT	1.71	10.86	-0.02	1.48
AUTOHALL	1.64	11.09	3.31	30.13
BANQUE CENTE.POPULAIRE	1.61	6.35	1.09	2.59
CENTRALE LAITIERE	1.55	7.9	0.49	1.56
SC.METG.D'IMITER	1.51	10.94	0.93	4.06
BALIMA	1.51	10.58	4.59	40.73
DOUJA PROM ADDOHA	1.34	13.15	2.45	9.63
TASLIF	1.32	12.7	5.59	51.35
AFRIQUIA GAZ	1.22	8.47	1.37	3.46
SOTHEMA	1.22	6.8	0.51	1.5
WAFA ASSURANCE	1.21	8.62	2.07	8.4
BMCE BANK	1.15	6.68	1.46	5.67
MANAGEM	1.14	11.73	0.65	1.85
LAFARGE CIMENTS	1.12	7.7	1.04	4
EQDOM	1.12	8.2	1.75	9.42
BQ.MAROC.DU COM.ETDL.	1.04	6.89	1.36	5.5
DARI COUSPATE	1.02	7.06	1.45	3.75
ATTIJARIWAFA BANK	1.01	5.51	0.92	3.62
SONASID	1.01	9.66	0.59	2.75
HOLCIM MAROC	0.98	8.16	1.15	5.72
REBAB	0.97	13.76	1.27	20.45
AGMA LAHLOU-TAZI	0.94	8.75	6.32	64.83
CIMENT DU MAROC	0.92	8.04	1.09	3.65
AXA CREDIT	0.92	12.56	4.18	31.56
BRASSERIES DU MAROC	0.86	8.61	0.7	1.66
UNIMER	0.85	6.4	0.51	2.4
COSUMAR	0.67	6.79	0.22	0.62
ZELLIDJA	0.65	11.46	1.48	5.21
COLORADO	0.63	10.08	1.62	6.21
CDM CREDIT DU MAROC	0.61	7.69	2.24	12.3

MAGHREBAIL	0.53	8.27	0.51	2.01
ALUMINIUM DU MAROC	0.46	7.01	0.26	0.63
LESIEUR CRISTAL	0.41	7.44	0.5	2.92
LABEL VIE	0.4	4.29	0.96	3.12
LYDEC	0.36	7.1	0.49	-0.4
ITISSALAT AL MAGHRIB (MAROC	0.31	5.36	0.3	2.54
CARTIER SAADA	0.27	6.86	1.55	6.61
CR.IMMOBIL.ET HOTELIER	0.24	11.05	1.69	6.66
CTM	0.23	7.27	0.65	2.36
PROMOPHARM	0.16	8.46	0.29	0.84
DIAC SALAF	0.14	16.55	3.13	15.29
NEXANS MAROC	0.12	10.31	0.29	7.94
RISMA	0.08	9.86	2.73	11.98
SAMIR	0.06	8.61	2.26	16.68
TIMAR	0.01	6.71	0.21	-0.22
IB MAROC.COM	0.01	13.08	0.48	4.47
MICRODATA	-0.04	8.76	-0.1	1.1
DELATTRE LEVIVIER	-0.13	10.36	0.27	2.15
MAGHREB OXYGENE	-0.23	10.47	1.89	9.78
REALIS MECANIQUES	-0.23	7.61	1.05	2.06
JET ALU	-0.28	9.59	0.04	0.74
SALAFIN	-0.39	5	-0.01	1.16
INVOLYS	-0.41	10.87	1.81	4.47
MED PAPER	-0.46	18.4	3.78	23.5
DELTA HOLDING	-0.61	8.08	-0.19	1.66
SAHAM ASSURANCE	-0.63	3.83	0.24	0.26
HIGHTECH PAYEMENT SYS.	-0.64	11.89	2.06	9.5
STOKVIS NORD AFRIQ	-0.8	5.74	0.93	2.79
DISWAY	-0.91	7.85	0.8	1.01
ALNC.DVPPT.IMMOBILIER	-0.92	8.45	-0.02	3.81
ATLANTA	-1.11	7.62	0.21	0.54
COMPAGNIE GL.IMMOBILIERE	-1.11	7.84	1.19	4.91
SNEP	-1.34	12.88	1.5	4.48
S M MONETIQUE	-1.59	7.62	0.14	0.89
M2M GROUP	-1.69	7.54	0.39	-0.14
FENIE BROSSETTE	-1.8	8.67	0.34	1.02
MEDIACO MAROC	-1.98	10.96	-0.13	1.89
STROC	-2.92	13.12	0.61	0.22
Average	**0.33**	**9.51**		

Results

Section 3.1 provides the findings of the momentum strategy for Morocco market. Section 3.2 presents sub-periods analysis of the momentum strategy to examine the robustness of the results. This study then conducts in section 3.3 the risk-adjustment regression.

Momentum Strategy

Table 2 reports the average monthly holding period returns for the short, long and short-long portfolios of the momentum strategy when applied to the sample of 71 Morocco firms. Columns 3 through 6 list the equal-weighted average monthly returns in percentages for the K-month holding periods (K = 3, 6, 9 and 12 months).

The results in Table 2 reveal a strong evidence of momentum strategy at morocco firm level. Table 2 shows significant momentum SW-SL profits for all *J* month and all *K* except *J* =12 case in *K*=12. For the 6-month formation period case with a six-month holding period (*K*= 6), for example, past short-term winner generate an average of 1.14% per month whereas past short-term losers produce an average of only 0.63% per month over the same period. The resulting SW-SL difference of 0.51% per month is statistically significant (*t*-stat 2.97).

The post-formation behaviour of the momentum strategies' profits is illustrated in Figure 1. Figure 1 depicts the post-formation cumulative returns of the momentum strategy (SW-SL), with (*J* = 6) using non-overlapping portfolios (*K* = 1) for the 60 months following the end of the formation period. It is evident that the momentum of short-term past performance shows achieving profits by the end of the first 12 post-formation months.

Figure 1 also shows that the momentum strategies' profits reverse after 24 months following the end of the formation period. This implies that there is a long-term contrarian effect at the Morocco firms' level.

Table 2 Profitability of the Momentum Strategy.

J	Portfolio	Holding period Returns			
		K=3	K=6	K=9	K=12
3	SW	1.37%	1.28%	1.32%	1.27%
		(4.08)	(3.91)	(3.99)	(3.95)
	SL	0.48%	0.65%	0.71%	0.79%
		(1.48)	(2.01)	(2.19)	(2.36)
	SW-SL	0.89%	0.63%	0.61%	0.48%
		(3.15)	(2.71)	(2.75)	(2.28)
6	SW	1.11%	1.14%	1.14%	1.06%
		(3.31)	(3.57)	(3.51)	(3.38)
	SL	0.50%	0.63%	0.72%	0.74%
		(1.65)	(2.03)	(2.31)	(2.28)
	SW-SL	0.61%	0.51%	0.42%	0.31%
		(2.57)	(2.97)	(2.76)	(2.39)
9	SW	1.10%	1.17%	1.09%	1.03%
		(3.27)	(3.62)	(3.34)	(3.27)
	SL	0.47%	0.65%	0.69%	0.73%
		(1.54)	(2.05)	(2.17)	(2.21)
	SW-SL	0.63%	0.52%	0.40%	0.30%
		(2.67)	(3.03)	(2.6)	(2.27)
12	SW	1.39%	1.45%	1.32%	1.28%
		(4.11)	(4.06)	(3.73)	(3.65)
	SL	0.76%	0.72%	0.72%	0.74%
		(1.91)	(1.83)	(1.83)	(1.86)
	SW-SL	0.64%	0.73%	0.60%	0.53%
		(1.83)	(2.06)	(1.73)	(1.54)

This table reports the average monthly holding period returns in percentages of the short, long and short-long portfolios of the momentum strategy. Portfolios are constructed as follows: At the beginning of each month *t*, the 71 firms are ranked based on their past *J*-month formation period returns for *J* = 3, 6, 9 and 12 months. The short-term winner equal-weighted portfolio (SW) contains the 25% of portfolios with the

largest *J*-month returns and the short-term loser equal-weighted portfolio (SL) contains the 25% of portfolios with the lowest *J*-month returns. The pure contrarian strategy (SW-SL) portfolios are held for *K* = 3, 6, 9 or 12 months. The *t*-statistics are based on the Newey-West (1987) correction for autocorrelation up to lag 11.

This graph presents the cumulative returns of the momentum strategy (SW-SL) for the 60 months following the end of the formation period.
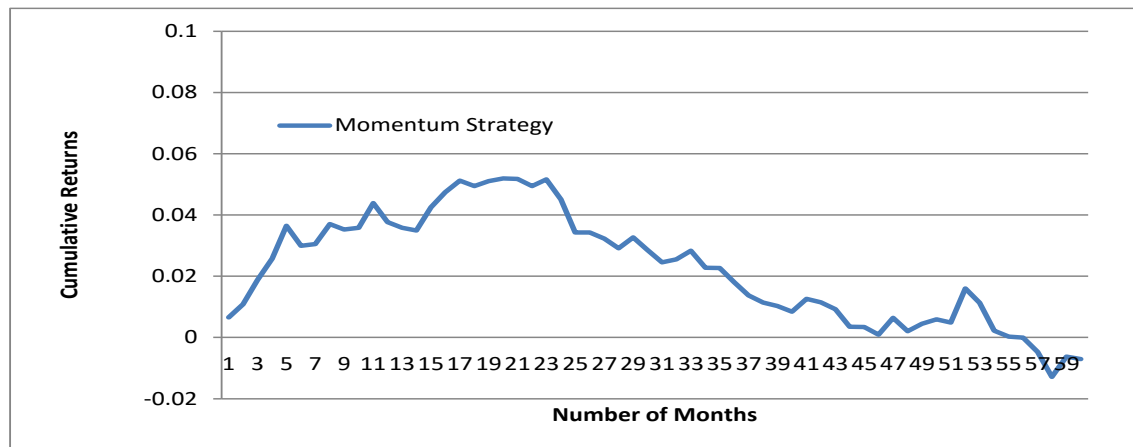

Figure 1 Cumulative Returns of Momentum Strategy.

This table presents in Panel A and B the average monthly holding period returns in percentages for the first and second sub period of momentum portfolio (J = 6, K = 6) for the period June 1995 to April 2005 and the period May 2005 to April 2014 respectively. The way these portfolios are formed is described in Table 2 (for the momentum strategy). Holding period *t*-statistic is simple *t*-statistic.

Table 3 Profitability of the Momentum Strategy in Sub-Periods.

J	Portfolio	Holding period Returns			
		K=3	K=6	K=9	K=12
Panel A: Sub-period 1 (June 1995 to April 2005)					
6	SW	1.55%	1.58%	1.49%	1.36%
		(3.01)	(3.22)	(3)	(2.96)
	SL	0.88%	1.01%	1.11%	1.26%
		(2.02)	(2.25)	(2.49)	(2.7)
	SW-SL	0.67%	0.57%	0.38%	0.10%
		(1.79)	(2.03)	(1.48)	(0.44)
Panel B:Sub-period 2 (May 2005 to April 2014)					
6	SW	0.53%	0.46%	0.47%	0.48%
		(1.39)	(1.32)	(1.29)	(1.25)
	SL	0.00%	0.05%	0.20%	0.14%
		(-0.01)	(0.12)	(0.5)	(0.33)
	SW-SL	0.53%	0.41%	0.27%	0.34%
		(2.22)	(2.33)	(1.67)	(2.37)

Sub-Period Analysis

As a robustness check, the performance of the momentum strategies was divided in two sub-periods. This division will be examined as follows. The first sub-period extends from June 1995 to April 2005 and the second sub-period covers the period from May 2005 to April 2014. These sub-periods divide the sample into approximately equal halves (after accounting for the 3, 6, 9 and 12 months used for the initial 6-month formation periods).

Table 3 reports the momentum results for the first sub-period in Panel A and for the second sub-period in Panel B. To conserve space, the results presented are for the strategies with 6-month formation period ($J = 6$ months for the momentum strategy). It is clear that both momentum strategies based on sub periods generate relatively large profits similar to momentum strategy based on full period for all holding periods. Comparing the momentum strategy in the first sub period, the 6 momentum strategy profits is significant at the 5% level for $K = 6$ whereas the 6 momentum strategy profits are only significant at the 10% level for $K = 3$. For example, the 6 momentum strategy with a six-month holding period ($K = 6$) produces a statistically significant profit of 0.57% per month (*t*-stat 2.03). In contrast, for the same period based on the full sample period the 6 momentum strategy generates a statistically significant profit of 0.51% per month (*t*-stat 2.97).

The momentum results for the second sub-period reported in Panel B of Table 3 tell the same story. In Panel B, the 6 momentum profits are significant at the 5% level for $K= 3$ 6 and 9 holding periods. For example, the 6 momentum strategy with a six-month holding period ($K = 6$) provides statistical significant profits of 0.41% per month (*t*-stat 2.33), while the momentum strategy based on the full sample period with a six-month holding period ($K = 6$) generates a significant profit of 0.51% per month (*t*-stat 2.97).

To check whether the full sample period evidence can be explained by the Fama-French three-factor model, regression results for the momentum strategy with $J = 6$ is shown in Table 4 for the six-month holding period cases ($K = 6$). The three-factor model is described in the previous section.

Risk Adjustments Analysis

An important issue in this paper is the extent to which any profits continue risk-adjustment. This is addressed by applying the one-factor CAPM and three-factor time-series regression models employed by Sharpe and Lintner and Sharpe (1965; 1964) and Fama and French (1993).

The first model employed for risk adjustment is the CAPM model.

$$R_{pt} - R_{ft} = a_p + b_{Rm-Rft}(Rm - Rf_t) + e_i. \tag{1}$$

The second model employed for risk adjustment is the Fama and French three-factor model. The three-factor model includes a market factor, a small minus big and a value minus growth factors as follows:

$$R_{pt} - R_{rft} = a_p + b_{Rm-Rft}(Rm - Rf_t) + b_{smb}SMB_t + b_{hml}HML_t + e_i \tag{2}$$

Where the dependent variable $R_{pt} - R_{ft}$ is the monthly excess return of the firm of the value weighted portfolio p of interest, R_{pt} is the firm monthly return of portfolio p at time t, and R_{ft} represents the monthly risk-free rate at time t represented by the one-month Jordan T-bill return. The independent variables or factors for the two models as follows: $(Rm - Rf_t)$ is the monthly excess market return for

month t, SMB_t and HML_t are the monthly Fama-French size and book-to-market factors at time t, respectively.

The monthly market returns MSCI are downloaded from the datastream. One-month T-bill risk-free rate covering the full sample period from January 1995 to April 2014 are downloaded from Morocco Central Bank Library. The three-factor model covers the period from the period from January 1995 to April 2014. The coefficients b_{Rm-Rft}, b_{smb} and b_{hml} are the regression loadings corresponding to the factors of the models, while the intercept α_p (or simply alpha) represents the risk-adjusted abnormal returns of the portfolios over the evaluation period. If alpha is statistically significant, then this is evidence of abnormal profits. The t-values corresponding to the regression coefficients are corrected for heteroskedasticity using the White's (1980) test.

This table presents the CAPM and Three-factor regression results for monthly returns of the K=6 holding period for the large size firms momentum strategy. SW represents the portfolio composed of the 10% of firms that have the highest past six-month returns grouped in the Winner portfolio, while SL represents the portfolio composed of the 10% of firms that have the lowest past six-month returns grouped in the Loser portfolio. The arbitrage portfolio SW-SL is to be held for one, three, six, nine or 12 months. The CAPM regression is as follows: $R_{pt} - R_{ft} = a_p + b_{Rm-Rft}(Rm - Rf_t) + e_i$, where $R_{pt} - R_{ft}$ is the portfolio's excess return, b_{Rm-Rf} is the market factor represented by the return on the MSCI Jordan market index. The three-factor regression is as follows: $R_{pt} - R_{rft} = a_p + b_{Rm-Rft} + b_{smb}SMB_t + b_{hml}HML_t + e_i$, where $R_{pt} - R_{ft}$ is the portfolio's excess return, $R_{mt} - R_{ft}$ is the market factor represented by the return on the MSCI Jordan market index, and SMB_t and HML_t are the Fama-French size and book-to-market factors. The monthly return for each holding period comes from using Jegadeesh and Titman's (1993) overlapping portfolio methodology. T-statistics presented in parenthesis are corrected for heteroskedasticity employing the White (2000) test.

Table **4**: Risk-Adjusted Momentum Profits

Portfolio	CAPM Model			Three-factor model				
	α	b_{Rm-Rf}	**Adj** R^2	α	b_{Rm-Rf}	b_{smb}	b_{hml}	**Adj** R^2
SW	0.928	0.077	0.36%	0.821	0.071	-0.051	0.070	0.08%
	(2.75)	(1.31)		(2.65)	(1.21)	(-0.52)	(0.68)	
SL	-0.141	0.068	0.24%	-0.184	0.056	-0.081	0.001	0.18%
	(-0.44)	(1.25)		(-0.61)	(1.07)	(-0.93)	(0.01)	
SW-SL	1.069	0.01	-0.47%	1.005	0.015	0.030	0.069	0.52%
	(5.37)	(0.3)		(4.78)	(0.45)	(0.47)	(1.45)	

Table 4 presents the estimated regression coefficients with the associated t-statistics and adjusted R-squared values. The annualised regression alphas are also displayed for the winner, loser and winner-loser portfolios for the six formation period with six-month holding periods ($K = 6$). The morocco market result for the CAPM model indicates that the momentum strategy's profitability survives the risk-adjustment process. The alpha of the momentum zero-cost portfolios (SW-SL) remains significant 1.069% per year (t-stat 5.37). The CAPM model result also shows that only the long portfolio contribute to the overall profitability of the strategy, revealing significant risk-adjusted profits of 0.93% per year (t-stat 2.75).

The risk-adjusted momentum result for the Three-factor model provides similar story. The arbitrage portfolio's produces an alpha of 1.005% (t-stat 4.78). This alpha is marginally smaller than the alpha generated by the CAPM model. Given the component portfolios of the momentum strategy, the short

portfolio (SL) has an insignificant alpha of -0.184% (*t*-stat -0.61). In contrast, the long portfolio (SW) has a large alpha of 0.821% (*t*-stat 2.65). Since this alpha is almost close to the momentum strategy's alpha of 1%, investors can successfully capture the momentum alpha with a short winner-only strategy of buying recent winner. Clearly, the results in Table 4 show that there is an inter-firm momentum effect that cannot be explained by both the CAPM and Three-factor models.

In summary, the two large size momentum results in Table 4 reveal that there is an abnormal momentum profit in Morocco firm returns that cannot be explained by the one-factor CAPM and Fama-French three-factor model. Although the three-factor model presents alpha result marginally better than the alpha result of the CAPM model, the results in this paper raise the possibility that both the CAPM and the Fama-French three-factor model may have difficulty explaining the results of such a study.

Conclusion

This paper has examined whether there is a momentum strategy in the Morocco stock market and whether firm-level momentum strategy produce significant abnormal profits. The analysis performed in this paper is motivated by the lack of important research on return predictability implemented at Morocco stock level. The result of this study provided a strong evidence of existence of momentum effect in the Morocco stock market. The return momentum effect in Morocco firm portfolios was large. For example, the 6 momentum strategy with a six-month holding period produces a significant return of 0.51 % per month on average. This finding showed that it is possible to predict the future performance of firms that have extreme winner and loser.

This paper also attempts to investigate the sources associated with the profitability of momentum profits. After using Wang and Wu's (2011) procedure by running the full-sample time-series regression of momentum portfolio return on the Fama-French three-factor model to capture the risk-adjusted momentum returns. The result showed that the returns of the firm-level momentum strategy cannot be explained by the Fama-French three-factor model. This finding is consistent with the Nagel (2001), who showed that the three factor model cannot explain the momentum effect in the UK market. This means that the momentum effect at the firm level needs further investigation in order to understand what is driving the firm momentum effect.

For long-term effect, this paper primarily showed that the Figure 1 implicitly indicates there is a long-term return effect at the Morocco firm level. The current study encourage academic to investigate this phenomenon.

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