Momentum and Price Momentum Components: Evidence from 23 Jordanian Indices

By Omar K. Gharaibeh

Al Albayt University

Abstract- The aim of this paper is to investigate whether there is the momentum effect across 23 indices-level anomaly in Amman Stock Exchange (ASE). This study also compares and contrasts the momentum strategy with both early-stage and late-stage momentum strategies. By using a sample of 23 Jordanian indices for the period from 2005 to 2015, this paper provide economically large momentum profits over the past 6, 9 and 12 months tend to outperform in the future. In addition, this study provides convincing evidence that late-stage momentum strategy consistently generates stronger profits than does the traditional momentum strategy. Although the CAPM model can explain the momentum profits, late-stage momentum strategy cannot completely explained by the CAPM model.

Keywords: momentum strategy, early-stage strategy, late-stage strategy, amman stock exchange (ADX), CAPM model.

GJMBR-C Classification: JEL Code: O16

MOMENTUMANDPRICEMOMENTUMCOMPONENTSEVIDENCEFROM23JORDANIANINDICES

Strictly as per the compliance and regulations of:

Momentum and Price Momentum Components: Evidence from 23 Jordanian Indices

Omar K. Gharaibeh

Abstract- The aim of this paper is to investigate whether there is the momentum effect across 23 indices-level anomaly in Amman Stock Exchange (ASE). This study also compares and contrasts the momentum strategy with both early-stage and late-stage momentum strategies. By using a sample of 23 Jordanian indices for the period from 2005 to 2015, this paper provide economically large momentum profits over the past 6, 9 and 12 months tend to outperform in the future. In addition, this study provides convincing evidence that late-stage momentum strategy consistently generates stronger profits than does the traditional momentum strategy. Although the CAPM model can explain the momentum profits, late-stage momentum strategy cannot completely explained by the CAPM model.

Keywords: momentum strategy, early-stage strategy, late-stage strategy, amman stock exchange (ADX), CAPM model.

I. Introduction

Momentum effect is still a debatable topic for the researchers and challenges the efficient market hypothesis (EMH). Following the landmark paper by Jegadeesh and Titman (1993), momentum strategies buy portfolios that have securities with high short-term past returns (winners) and sell portfolios that have securities with low short-term past returns (losers). Jegadeesh and Titman (1993) reveal that for portfolios of US stocks constructed on the returns of the past six to twelve months, winners continues to have high future returns whereas losers continues to have low future returns.

This paper investigates the Kot and Chan (2006) and Bornholt and Malin (2013) rationale with Jordanian indices. The current study divide momentum portfolios into two elements (early-stage and late-stage) in a approach parallel to Chan and Kot (2006) Bornholt and Malin (2013). The early-stage strategy is based on buying short-term winner securities that are relatively long-term losers and selling short-term loser securities that are relatively long-term winners. For the late-stage strategy, it is derived from buying short-term winner securities that are relatively long-term winners and selling short-term loser securities that are relatively long-term losers. Applying these previous momentum, early-stage and late-stage momentum strategies, this paper provide evidence of existence of momentum strategy at the level of Jordanian indices. In addition, the current

study shows that the late-stage momentum strategy is superior the momentum and the early-stage strategies even after risk adjustment.

The remainder of the paper is organized as follows: next section reviews the literature in regard to the momentum effect, while Section 3 describes the data and the methodology used to create the various single and double sorted momentum strategies. Section 4 presents the main empirical results, as well as post-formation and risk-adjustment results. Section 5 provides conclusion.

II. Literature Review

In Istanbul Stock Exchange, Bildik and Gulay (2002) investigate the momentum and contrarian effects on expected returns from 1991 to 2000. Jegadeesh and Titman (1993) methodology has been used to measure these effects. They support the overreaction hypothesis that stocks that have past losers outperform the stocks that have past winners and partly with the behavioral hypothesis. They reveal that Istanbul Stock Exchange is considered weak-form efficiency because future returns and reversals in prices can be predicted by past return data.

Cooper and Hameed (2004) measure overreaction theories to explain the short-run momentum in stock returns documented by Jagadeesh and Titman (1993) and the long-run reversal in stock returns documented by De Bondt and Thaler (1985). To mitigate microstructure impacts related with low-price stocks, they exclude stocks with a price of less than one dollar each month. Three holding period were computed to test-period profits. Market state has been defined by depending on the market's three-year return. The market's three-year return was ranked by descending order from the highest to the lowest, then these returns were sorted into two groups correspondingly. The first group, which represents the highest returns, defined as "UP" and the second group which represents the lowest returns defined as "DOWN". They reconfirm the finding of Daniel, Hirshleifer and Subrahmanyam (1998) and Hong and Stein (1999) that short run momentum portfolio is profitable just in subsequent periods of UP market states. In addition, they re-assert that the profits to momentum are reversed in the long-run and this result is consistent with the overreaction theories of Swaminathan and Lee (2000) and Jegadeesh and Titman (2001).

Author: Department of Finance and Banking, Al al-Bayt University, Jordan. e-mail: omar_k_gharaibeh@yahoo.com

In Jordan market, Al-Mwalla (2012) finds strong evidence of the size and value effects in Amman stock Exchange (ASE) over the period from 1999 to 2010. Al-Mwalla (2012) demonstrates that these factors, size and value effects provide better explanation to the variation in the stocks rate of return. However, Al-Mwalla (2012) shows that momentum effect does not produce clear relationship between portfolios ranked according to the size and value, as well as it does not add much explanatory power to the variation in the stocks rate of return. Using Amman Stock Exchange monthly data from 2002 to 2010, Al-Mwalla, Al-Qudah, and Karasneh (2012) confirm the evidence of size and value effect documented by Al-Mwalla (2012). Furthermore, Al-Mwalla, Al-Qudah, and Karasneh (2012) show evidence of momentum, distress and leverage effects in Amman stock market. However, they find that the Momentum, distress and leverage risk factors did not enhance the explanatory power for the three-factor model.

Bornholt and Malin (2013) investigate the presence of momentum at the level of international market indices. They provide a strong evidence of momentum profits and this result is consistent with Kot and Chan's (2006) result. Bornholt and Malin (2013) show that past long-term returns can be used to enhance the performance of momentum strategy. They split the momentum strategy into two parts based on past long-term performance. Bornholt and Malin (2013) show that Early-stage momentum strategy provide larger profits than the momentum strategy and this strategy do not reverse in the first five years post-formation. On the other hand, late-stage momentum strategy generates weaker profits and tends to reverse quickly.

Using monthly data from National Stock Exchange (NSE) during the period from April 1995 to March 2015, Park and Kim (2014) investigates source of momentum profits in regard to macroeconomic and firm specific variables. They show that idiosyncratic volatility in the shorter run horizon and dividend yield in the longer run are play an important role as a firm specific factors in determine momentum returns in the Indian market. They find that when the market upturns period, macroeconomic factors considered demonstrate a persistent influence on momentum profits in Indian stock market. On the other hand, they show that momentum when the market downturn period is not affected by macroeconomic effect.

More recently, Gharaibeh (2015) examine whether there is presence of size and momentum effects across Jordan firms during the period from 2005 to 2014. Gharaibeh (2015) show that there is a strong evidence of size effect while there is no momentum effect at the level of Jordanian firms. This result is inconsistent with Al-Mwalla, Al-Qudah, and Karasneh's (2012) who find evidence on momentum effect in Amman stock market. On the other hand, Gharaibeh

(2015) reveal strong evidence of momentum effect in large-sized portfolio. That is, there is a momentum effect only across large size firms in Jordan and this result supports the finding of O'Brien, et al.(2010).

In a study of emerging market indices, Gharaibeh (2016) examines the existences of momentum profits in the Arabic market indices for the period of January 1989 through August 2013. Splitting momentum portfolios into two components depending on past long-term performance produces early and late-stage momentum strategies; Gharaibeh (2016) confirms that the momentum profits are statistically or economically significant in 10 Arabic market indices over all formation periods. The late-stage momentum strategy consistently generates more profits than momentum strategy.

Chowdhury (2016) examines the existence of time-series and cross-sectional momentum profits in the Saudi Arabia stock market. Chowdhury (2016) confirm the existence of time-series momentum and cross-sectional contrarian profits in this market. Wang, Wang and Liu (2016) find that Taiwan stocks have significant short-term momentum.

III. Data and Methodology

Monthly returns are derived from 23 Jordanian indices downloaded from Amman Stock Exchange website. The timeframe for the study extends from February 2005 to September 2015. Table 1 lists all of the indices in the sample, the average monthly return and standard deviation of each index. The both early-stage and late-stage momentum strategies proposed in this paper double-sorts index using a measure of momentum as the first sort variable and a measure of contrarian as the second sort variable. Since momentum studies generally employ past six-month returns to classify securities into portfolios, the current study adopt this procedure for the first sort variable. For simplicity, the current study uses compounding of monthly returns over the past 36, 48 and 60 months as the second sort variable.

Table 1 details descriptive statistics of the23 Jordanian indices over the period February 2015 through September 2014, demonstrating average monthly returns, standard deviation, Skewness and Kurtosis for each index. Table 1 shows big difference in the mean and standard deviation of average returns. Food and Beverage as well as Tobacco and Cigarettes have the biggest monthly average (over 2% per month). On the other hand, the Paper and Cardboard Industries has the lowest average at -2.11. The Jordanian indices generate an average monthly return of 15% and an average standard deviation of 13%.

The study compares and contrasts the momentum strategy with both early-stage and late-stage momentum strategies applied to 23 Jordanian indices.

Section 3.1 and 3.2 details momentum strategy as well as the early-stage and late-stage momentum strategies used in the current study.

a)   *Momentum strategy*

The momentum portfolios are constructed as follows. At the beginning of each month t, the 23 Jordanian indices in Table 1 have been ranked based on their past J-month returns (J = 3, 6, 9 and 12 months). For a given J, the short-term winner (SW) portfolio consists of the 25% of indices that contain the highest past J-month returns while the short-term loser (SL) portfolio consists of the 25% of indices that contain the lowest past J month returns. The momentum strategy (SW-SL) buys the short-term winner portfolio and sells the short-term loser portfolio. Portfolios are held for K-month holding periods, where K = 1, 3, 6, 9 and 12 months.

Following Balvers and Wu (2006), the current study make a 1-month gap between the end of the J-month formation period and the beginning of the K-month holding period. A gap of one month is consistent with previous studies such as Jegadeesh and Titman (1993). Jegadeesh and Titman (1993) showed that skipping the first one month after the end of the formation period improves the performance of the momentum strategy and produces stronger results because this procedure eliminate any short-term reversals being compensated by the short-term continuation of returns.

b)   *Late-Stage and Early-Stage Momentum Strategies*

The early-stage and late-stage strategies are a double dependent sort approach, and are explained as follows. The first sort is identical the momentum strategy sort. The 23 Jordanian indices are ranked at the beginning of each month based on their most recent past J-month returns. For a specified J, the short-term winner portfolio (SW) comprise of the 25% of indices with the highest past J-month returns, while the short-term loser portfolio (SL) consist of the 25% of indices with the lowest past J-month returns. The 23 Jordanian indices in the SW and SL portfolios are further ranked in the second stage depend on their element indices long-term past J2-month returns (J2 = 36, 48, or 60 months). This represents that these J2- month returns are from the last J2 months of the J-month formation period. For a given J and J2, the SWLW portfolio includes the 50% of SW indices with the largest long-term past J2-month returns. Similarly, the SLLL portfolio comprises of the 50% of SL indices with the lowest long-term past J2-month month returns. For the early stage, the same process is used. The SWLL portfolio comprises of the 50% of SW indices with the lowest long-term past J2-month returns. Likewise, the SLLW portfolio comprises of the 50% of SL indices with the largest long-term past J2-month month returns.

This method means that out of the total of 23 Jordanian indices, the short-term winner and short-term loser portfolios of the momentum strategy each include 5 indices, whilst the late-stage momentum strategy SWLW and SLLL portfolios each include 2 indices. The late-stage momentum strategy (SWLW-SLLL) that is buying short-term winners with relatively good long-term past returns (SWLW) and selling short-term losers with relatively poor long-term returns (SLLL). The early-stage momentum strategy (SWLL-SLLW) is based on buying the short-term winners with relatively worst past long-term returns (SWLL) and selling the past short-term losers with relatively excellent long-term returns (SLLW). By construction, early-stage indices appear to have experienced a recent price contrarian, while late-stage indices appear to have experienced price momentum over a long period. Early-stage indices are 'early' in a price contrarian, while late-stage indices are 'late' in a price momentum. Figure 1 shows a graphical representation of the two strategies.

An improvement of dividing the short-term winner and loser portfolios into only two sub-portfolios is that our late stage and early stage portfolios together include all the elements of the corresponding traditional momentum portfolios. In particular, the traditional momentum winner (loser) portfolio is just the combination of our late stage winner (loser) and the early stage winner (loser) portfolios.

All portfolios the momentum strategy, the late-stage and early-stage momentum strategies are held for a K-month holding period, where K = 1, 3, 6, 9 or 12-month. A 1-month gap is used at the beginning of the holding period for the momentum strategy, as well as both the late-stage and early-stage momentum strategies in this study follows the method of previous studies to boost the power of our tests. This paper follows Jegadeesh and Titman's (1993) overlapping portfolio approach for the holding period returns of all strategies to avoid overlapping returns, and to enhance test power. For expositional convenience, the 6-month holding period case (K = 6) will be the main focus of this paper comments about the empirical results in the next section.

39

Table 1: Descriptive Statistics of 23 Jordanian indices.

Table 1 reports the descriptive statistics for 23 Jordanian indices. The first column is the index names. This is followed by the average monthly percent returns, the standard deviation of monthly percent returns, the Skewtize and Kurtosis of each index over the period February 2005 to September 2015.

Index Names	Av. %	S.D. %	Skew	Kurt
Food and Beverages	10.07	83.09	6.60	45.98
Tobacco and Cigarettes	3.82	34.17	7.58	71.63
Printing and Packaging	1.46	15.89	3.06	19.00
Mining and Extraction Industries	0.66	15.09	2.13	13.87
Utilities and Energy	0.45	7.73	0.34	4.97
Textiles, Leathers and Clothing	0.35	12.98	3.08	24.59
Educational Services	0.31	4.26	0.60	3.50
Chemical Industries	-0.06	5.03	0.59	4.21
Engineering and Construction	-0.25	7.57	0.90	11.44
Commercial Services	-0.32	6.98	0.72	2.08
Banks	-0.34	4.10	-0.43	3.32
Pharmaceutical and Medical Industries	-0.37	5.37	0.99	3.99
Health Care Services	-0.37	5.29	-0.04	1.12
Hotels and Tourism	-0.52	3.37	-0.29	1.44
Insurance	-0.84	3.08	-0.01	2.55
Real Estate	-0.87	8.14	0.27	2.47
Technology and Communication	-0.92	6.33	-0.03	2.56
Glass and Ceramic Industries	-1.02	24.04	-0.77	8.89
Transportation	-1.21	6.09	-0.31	0.86
Electrical Industries	-1.21	8.84	0.40	1.92
Diversified Financial Services	-1.45	9.25	0.55	3.45
Media	-1.82	8.25	0.09	0.89
Paper and Cardboard Industries	-2.11	9.79	1.05	5.22
AVERAGE	15%	13%		

IV. Results

Section 4 analyses the results for momentum strategy as well as both early-stage and late-stage momentum strategies in regards to raw and risk-adjusted results.

Table 2: Profitability of Momentum Strategies.

Table 2 reports the average monthly holding period returns in percentages based on short, long and long minus short portfolios of the momentum strategy. Portfolios have been ranked as follows: portfolios at the beginning of each month t have been 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 returns, and the short-term loser equal-weighted portfolio (SL) includes the 25% of portfolios with the lowest returns. The strategy SW-SL buys the short-term winner portfolio and sells the short-term loser portfolio to be 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.

J	Portfolio	Holding Period Returns				
		K=1	K=3	K=6	K=9	K=12
3	SW	-0.14	-0.06	0.33	0.93	0.83
		(-0.22)	(-0.09)	(0.52)	(1.22)	(1.14)
	SL	1.21	0.60	0.30	-0.12	0.09
		(0.89)	(0.68)	(0.47)	(-0.22)	(0.15)
	SW-SL	-1.35	-0.66	0.03	1.05	0.74
		(-0.82)	(-0.55)	(0.03)	(1.58)	(1.16)
6	SW	0.27	0.20	1.22	1.38	1.14
		(0.27)	(0.21)	(1.19)	(1.38)	(1.17)
	SL	-0.78	0.16	-0.38	-0.56	-0.23
		(-1.13)	(0.23)	(-0.55)	(-0.95)	(-0.39)
	SW-SL	1.05	0.04	1.60	1.94	1.37
		(0.99)	(0.03)	(1.36)	(1.9)	(1.41)
9	SW	0.63	0.87	1.10	1.23	1.00
		(0.6)	(0.89)	(1.1)	(1.17)	(1)
	SL	-0.05	-0.44	-0.88	-0.77	-0.54
		(-0.05)	(-0.65)	(-1.39)	(-1.39)	(-0.97)
	SW-SL	0.68	1.31	1.98	2.00	1.54
		(0.44)	(1.08)	(1.87)	(1.91)	(1.5)
12	SW	0.65	0.46	0.78	0.91	0.82
		(0.68)	(0.45)	(0.71)	(0.85)	(0.8)
	SL	0.05	-0.69	-0.80	-0.91	-0.88
		(0.05)	(-1.02)	(-1.44)	(-1.63)	(-1.59)
	SW-SL	0.60	1.15	1.58	1.82	1.70
		(0.43)	(1.04)	(1.46)	(1.78)	(1.83)

a) Momentum results

Table 2 provides the results of the momentum strategies for the 23 Jordanian indices demonstrating the average monthly returns of the long (SW), short (SL), and the arbitrage long-short (SW-SL) momentum portfolios for several (J, K) combinations. Table 2 comprises of the results for formation period lengths of J = 3, 6, 9, and 12-month. The results in Table 2 provides the equal-weighted average monthly portfolio returns in percentages for K-month holding periods (K = 1, 3, 6, 9 and 12 months) in columns 3 through 6.

Except for the J = 3 case of holding period K =1 and 3, the momentum findings for the Jordanian indices in Table 2 indicate that the long portfolio outperforms the short portfolio for each holding period, with the highest return of 2.00 per cent per month (t-value 1.91) for the nine-month holding period. In general, there are large but statistically insignificant momentum profits, Given that this initial evidence may be strengthened by employing the early-stage and late-stage approach, the next section shows the results of the early-stage and late-stage momentum strategy with 36, 48 and 60-month formation periods. This length for the formation periods is selected because J = 36, 48 and 60 months are expected to be successful for the traditional momentum strategy.

b) Early and Late-stage momentum results

Table 3 reports the results for the early-stage momentum strategy with 6-month formation periods (J = 6). The early-stage momentum results in Table 3 indicate that the strategy profits (SWLL-SLLW) are statistically insignificant over all (J/J2, K) combinations. For example, the J/J2 = 6/60 case with a six-month holding period (K = 6), the long portfolio of recent short-term winners that are past long-term losers earns an average return of 1.52 % per month. In contrast, the short portfolio of recent short-term losers that are past long -term winners generates an average return of only 0.43% per month. Accordingly, the early-stage strategy (SWLL-SLLW) provides insignificant profit of 1.09% per month (t-stat 0.49). In general, a comparison of Table 3 with Table 2 demonstrates that the early-stage momentum strategy is inferior to the corresponding J = 6 traditional momentum strategy for all holding periods

Table 3: Profitability of Early-Stage Momentum Strategy

This table provides the average monthly holding returns of the long, short and arbitrage portfolios of the early stage momentum strategy for the Arabic markets. early-stage portfolios are taken from the 6-month formation period pure momentum strategy (J = 6) short-term winner (SW) and short-term loser (SL) portfolios. The formation of the SW and SL portfolio is clarified in Table 2. At the beginning of each month t, Jordanian indices within the current SW and SL portfolios are further classified based on their J2-month return from the last J2-months of the 6-month formation period for J2 = 36, 48 or 60. The 50% of SW Jordanian indices with the worst long-term performance J2-month returns define the SWLL equal-weighted portfolio (short-term winner that are long-term losers) for that month. Similarly, the 50% of SL Jordanian indices with the best long-term performance J2-month returns define the SLLW portfolio (short-term losers that are long-term winners). The late-stage momentum strategy SWLL-SLLW is held for K =1, 3, 6, 9 and 12 months. Annual event-time returns (Year 1, 2, 3, 4 and 5) are the average annual returns for a portfolio for the first five years following the portfolio formation date. The t-statistics are presented in parentheses. Holding period t-statistics are simple t statistics, while the annual event-time t-statistics are based on the Newey and West (1987) correction for autocorrelation up to lag 11.

J1	J2	Portfolio	Holding Period Returns				
			K=1	K=3	K=6	K=9	K=12
6	36	SWLL	0.46	-0.84	1.91	1.18	0.82
			(0.41)	(-0.9)	(0.79)	(0.68)	(0.59)
		SLLW	-0.56	1.35	0.61	0.21	0.98
			(-0.71)	(1.11)	(0.61)	(0.28)	(0.93)
		SWLL-SLLW	1.01	-2.19	1.30	0.97	-0.16
			(0.71)	(-1.22)	(0.53)	(0.52)	(-0.09)
6	48	SWLL	-0.05	-0.92	1.52	1.25	0.60
			(-0.04)	(-0.78)	(0.74)	(0.83)	(0.46)
		SLLW	-0.72	1.56	0.43	0.18	1.28
			(-0.82)	(1.09)	(0.38)	(0.23)	(1.03)
		SWLL-SLLW	0.67	-2.48	1.09	1.07	-0.69
			(0.39)	(-1.13)	(0.49)	(0.61)	(-0.35)
6	60	SWLL	0.07	-0.88	2.03	1.78	1.01
			(0.08)	(-0.82)	(0.83)	(1.02)	(0.7)
		SLLW	-1.23	1.60	0.93	0.71	1.92
			(-1.44)	(0.98)	(0.7)	(0.76)	(1.25)
		SWLL-SLLW	1.31	-2.48	1.10	1.06	-0.90
			(0.88)	(-1.07)	(0.42)	(0.53)	(-0.4)

Table 4 contains the results for the late-stage momentum strategy. The results in Table 4 show substantial differences from the result in Table 3. The late-stage strategy (SWLW-SLLL) earns positive and mostly statistically significant profits for all holding periods, and each of these profits is larger than the corresponding J = 6 pure momentum profits in Table 2. For example, consider the J/J2 = 6/60 case with a six-month holding period (K = 6), the difference between the average monthly returns of the SWLW portfolio and

the SLLL portfolio is large 6.33% per month (t-stat 2.36), which is statistically significant. Briefly, the holding period returns in Table 4 provide strong evidence of late-stage momentum effect at the Jordanian index level.

Table 4: Profitability of Late-Stage Momentum Strategy

This table provides the average monthly holding returns of the long, short and arbitrage portfolios of the late stage momentum strategy for the Jordanian indices. Late-stage portfolios are taken from the 6-month formation period pure momentum strategy (J = 6) short-term winner (SW) and short-term loser (SL) portfolios. The formation of the SW and SL portfolio is clarified in Table 2. At the beginning of each month t, Jordanian indices within the current SW and SL portfolios are further classified based on their J2-month return from the last J2-months of the 6-month formation period for J2 = 36, 48 or 60. The 50% of SW Jordanian indices with the best long-term performance J2-month returns define the SWLW equal-weighted portfolio (short-term winner that are long-term winners) for that month. Similarly, the 50% of SL Jordanian indices with the worst long-term performance J2-month returns define the SLLL portfolio (short-term losers that are long-term losers). The late-stage momentum strategy SWLW-SLLL is held for K =1, 3, 6, 9 and 12 months. Annual event-time returns (Year 1, 2, 3, 4 and 5) are the average annual returns for a portfolio for the first five years following the portfolio formation date. The t-statistics are presented in parentheses. Holding period t-statistics are simple t statistics, while the annual event-time t-statistics are based on the Newey-West (1987) correction for autocorrelation up to lag 11. All the returns shown in Table 2 and in the next tables are in percentages.

J1	J2	Portfolio	Holding Period Returns				
			K=1	K=3	K=6	K=9	K=12
6	36	SWLW	0.78	1.41	2.29	2.86	2.68
			(0.43)	(0.76)	(1.15)	(1.42)	(1.35)
		SLLL	-1.73	-1.65	-1.97	-1.91	-1.64
			(-1.14)	(-1.11)	(-1.32)	(-1.36)	(-1.23)
		SWLW-SLLL	2.51	3.06	4.26	4.77	4.32
			(1.47)	(1.87)	(2.4)	(2.77)	(2.66)
6	48	SWLW	1.80	2.18	3.56	3.68	3.47
			(0.86)	(1)	(1.56)	(1.57)	(1.5)
		SLLL	-1.58	-1.97	-2.06	-1.70	-1.52
			(-0.87)	(-1.13)	(-1.17)	(-1.01)	(-0.95)
		SWLW-SLLL	3.39	4.16	5.62	5.38	4.99
			(1.68)	(2.19)	(2.52)	(2.5)	(2.53)
6	60	SWLW	2.57	3.14	4.63	4.84	4.36
			(0.95)	(1.17)	(1.65)	(1.64)	(1.46)
		SLLL	-1.53	-1.40	-1.69	-1.43	-1.15
			(-0.73)	(-0.67)	(-0.81)	(-0.72)	(-0.6)
		SWLW-SLLL	4.10	4.54	6.33	6.27	5.52
			(1.61)	(1.95)	(2.36)	(2.39)	(2.23)

The post-formation behaviors of the momentum and both early-stage and late-stage strategies' profits are also demonstrated in Figure 1. Figure 1 illustrates the post-formation cumulative returns of the traditional momentum strategy (SW-SL) with J = 6, the early-stage strategy (SWLL-SLLW) with J/J2 = 6/60, and the late-stage strategy (SWLW-SLLL) with J/J2 = 6/60 for the 60 months following the end of the formation period. Given the three previous strategies, we note that the late-stage momentum strategy graph offers the highest cumulative profits towards the end of the 60 months. Traditional momentum strategy provides a profit, but it is considered few compared with the late-stage momentum strategy. In contrast, the early-stage momentum strategy provides negative cumulative returns.

This graph illustrates the cumulative returns of the momentum (SW-SL), Late-stage momentum 6/60 (SWLW-SLLL) and Early-stage momentum (SWLL-SLLW) strategies for the 60 months following the end of the formation period.
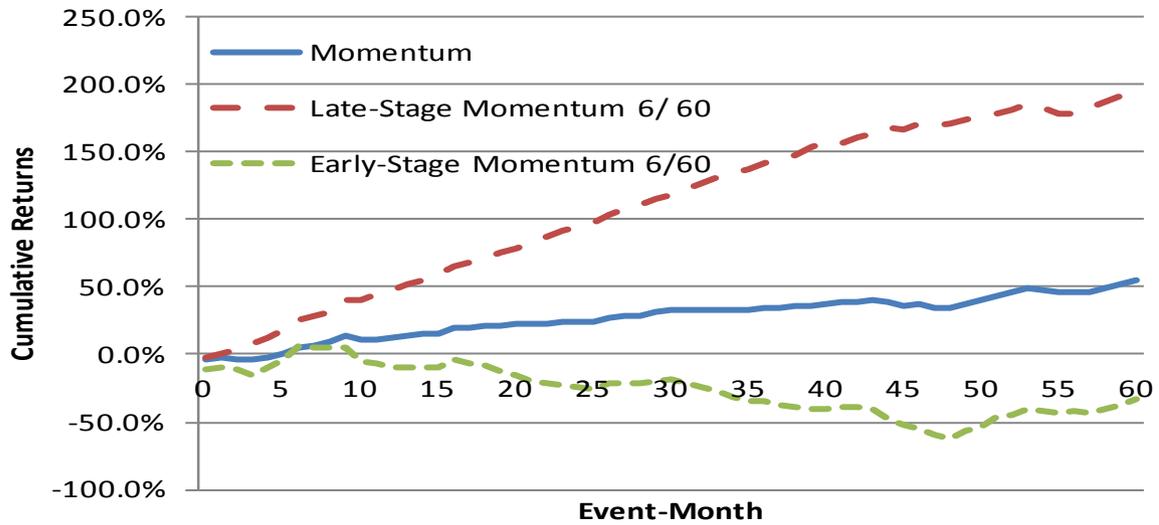
Figure 1: Cumulative Returns of Strategies

c) Risk adjustments

To decide whether the profits of these strategies could be explained by a reward for bearing risk, the profits of the traditional and both early and late-stage momentum strategies are risk-adjusted using the CAPM model. The CAPM model regression model comprises of the market factor:

$$ R_{pt} - R_{\text{ft}} = \alpha_p + \beta_p (R_{mt} - R_{\text{ft}}) + \varepsilon_{pt} \, , \qquad (1) $$

Where the dependent factor $R_{pt} - R_{\text{ft}}$ is the monthly excess return of the strategy portfolio p, R_{pt} is the monthly return of portfolio p at time t, and R_{ft} refers to the monthly risk-free rate at time t, represented by the one-month Jordanian T-Bill return. The independent variable or factor is: $R_{mt} - R_{\text{ft}}$ is the value-weighted index's monthly excess market return for month t.

The monthly return values for the one-month T-Bill risk-free rate extending the full sample period from February 2005 to September 2015 are downloaded from Amman Stock Exchange website. The coefficient β_p is the regression loading in line with the factor of the model, while the intercept (or simply alpha) point to the risk-adjusted abnormal returns of the portfolios over the evaluation period. If alpha is statistically significantly different from zero, then this is considered evidence of abnormal profits. The t-values in line with the regression coefficients are corrected for heteroskedasticity using White's (1980) test.

Table 5 shows the estimated regression coefficient of the CAPM model and the matching White-corrected t-values for the long, short and long-short portfolios for the momentum strategy (J = 6), the early-

stage momentum (J/J2 = 6/60) and the late-stage momentum (J/J2 = 6/60) strategies with six-month holding periods (K = 6) in Panels A, B and C, respectively. Column 2 of Table 5 details the monthly alphas of the CAPM model, while the last column lists the adjusted R^2.

The alpha of both the traditional momentum and early-stage momentum strategies either of long-short SW–SL or SWLL-SLLW portfolios in Panel A and B are small (0.011% and 0.012% per month) and statistically insignificant (t-stat 1.03 and 0.81), respectively. In contrast, the late-stage alpha in Panel C is weakly significant. The late-stage momentum SWLW-SLLL alpha in the 6/60 case is a weekly significant 0.046% per month (t stat 1.65).

In general, the late-stage result in Panels C of Table 5 reveals that there is late-stage momentum in index returns that cannot be explained by the CAPM model. It is not surprising that the traditional momentum and early-stage momentum risk-adjusted results are weak since the traditional momentum and early-stage momentum strategies raw profits are considerably smaller than the corresponding late-stage raw profits. Interestingly, the late-stage momentum approach has yet to be applied to individual stocks. The results in this paper raise the possibility that the CAPM model may have difficulty explaining the results of such a study.

Table 5: Risk adjusted Momentum, Early-stage and Late-stage profits

This table reports the CAPM model regression results for the monthly returns of the momentum (SW-SL) in Panel A, Early-stage momentum (SWLL-SLLW) in Panel B and Late-stage momentum 6/60 (SWLW-SLLL) portfolios in Panel C for J = 6 and K = 6. These portfolios are described in Table 2. The CAPM regression model is as follows:

$$R_{pt} = \alpha_p + \beta_p R_{mt} + \varepsilon_{pt} \, ,$$

Where Rpt is the portfolio's return and Rmt is the return on the market. The t-statistics given in parentheses are corrected for heteroskedasticity using White's (1980) test.

Portfolio	CAPM Model		
	α	β_{rm}	$Adj\,\mathrm{R}^2$
Panel A: Momentum (July 2006- September 2015)			
SW-SL	0.011	-0.064	-0.60
	(1.03)	(-0.64)	
Panel B: Early-stage momentum (January 2011-September 2015)			
SWLL-SLLW	0.012	-0.168	-1.66
	(0.81)	(-0.5)	
Panel C: Late-stage momentum (January 2011-September 2015)			
SWLW-SLLL	0.046	1.066	1.19
	(1.65)	(1.17)	

V. CONCLUSION

This paper examines the momentum profit across 23 Jordanian indices during the recent period from 2006-2015. The current study divides momentum portfolios into two elements early-stage and late-stage. The results of the study show that the momentum profit is existence at the level of Jordanian indices. In addition, the most important finding is that late-stage momentum strategy consistently provides larger profits than does the traditional momentum strategy. In momentum and early-stage momentum strategies, the CAPM model can explain their returns, while the CAPM cannot explain completely late-stage momentum profits.

There are significant implications for the practitioners, investors and academic researchers. Both practitioners and investors can follow momentum and late-stage momentum strategies to achieve abnormal profits at the level of Jordanian indices. Examination of momentum persistence and late-stage momentum strategies across Jordanian indices may be a good idea for the researchers who are interested in studying emerging markets. The presence of momentum profit and late-stage momentum strategies examination may be carried out in other emerging market context especially, Arabic markets.

REFERENCES RÉFÉRENCES REFERENCIAS

1. Al-Mwalla, M. (2012). Can book-to-market, size and momentum be extra risk factors that explain the stocks rate of return?: Evidence from emerging market. Journal of Finance, Accounting and Management, 3(2), 42.

2. Al-Mwalla, M., Al-Qudah, K. A., & Karasneh, M. (2012). Additional Risk Factors that can be used to Explain more Anomalies: Evidence from Emerging Market. International Research Journal of Finance and Economics (99).

3. Balvers, R. J., & Wu, Y. (2006). Momentum and mean reversion across national equity markets. Journal of Empirical Finance, 13(1), 24-48.

4. Bildik, R., & Gulay, G. (2002). The Winners and Losers Effect: Evidence from the Istanbul Stock Exchange.

5. Bornholt, G. N., & Malin, M. (2013). Strong and weak momentum components: Evidence from international market indices. Available at SSRN 2315993.

6. Chowdhury, S. S. H. (2016). Time-series and Cross-sectional Momentum in the Saudi Arabia Stock Market Returns. Available at SSRN.

7. Cooper, M. J., JR, R. C. G., & Hameed, A. (2004). Market states and momentum. The Journal of Finance, 59(3), 1345-1365.

8. Daniel, K., Hirshleifer, D., & Subrahmanyam, A. (1998). Investor psychology and security market under-and overreactions. The Journal of Finance, 53(6), 1839-1885.

9. De Bondt, W. F. M., & Thaler, R. (1985). Does the stock market overreact? Journal of finance, 40(3), 793-805.

10. Gharaibeh, O. K. (2015). Interaction of Size and Momentum Effects in Jordan Firms: 2005-2014. International Review of Management and Business Research, 4(1).

11. Gharaibeh, O. k. (2016). Srong and Weak Price Momentum Components: Evidence from 10 Arabic Market Indices International Journal of Academic Research in Accounting, Finance and Management Sciences, 6(4).
12. Hong, H., & Stein, J. C. (1999). A unified theory of underreaction, momentum trading, and overreaction in asset markets. The Journal of Finance, 54(6), 2143-2184.
13. Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. Journal of Finance, 48(1), 65-91.
14. Jegadeesh, N., & Titman, S. (2001). Profitability of momentum strategies: An evaluation of alternative explanations. The Journal of Finance, 56(2), 699-720.
15. Kot, H. W., & Chan, K. (2006). Can contrarian strategies improve momentum profits. Journal of Investment Management, 4(1).
16. Newey, W. K., & West, K. D. (1987). Hypothesis testing with efficient method of moments estimation. International Economic Review, 777-787.
17. O'Brien, M. A., Brailsford, T., & Gaunt, C. (2010). Interaction of size, book-to-market and momentum effects in Australia. Accounting & Finance, 50(1), 197-219.
18. Park, K. I., & Kim, D. (2014). Sources of momentum profits in international stock markets. Accounting & Finance, 54(2), 567-589.
19. Swaminathan, B., & Lee, C. (2000). Do stock prices overreact to earnings news. Cornell Johnson School of Management Working Paper.
20. Wang, M.-C., Wang, H.-C., & Liu, Y.-C. A. (2016). Short-Term Momentum and Investing Strategies in Daily Returns: Evidence from Taiwan Advances in Investment Analysis and Portfolio Management (7), 121-141.
21. White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica: Journal of the Econometric Society, 48, 817-838.