Presence of Contrarian Profits in the Jordan Stock Market

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Abstract

Since the late 1980's academicians have confirmed the presence of various forms of return regularities in stock returns. Two most well-known return regularities are contrarian and momentum profits. This paper – using monthly data for the period 2000 through 2016 – examines the presence of both contrarian profits and their sources in the Jordan stock market. The paper uses the methodology of Lo and MacKinlay (1990) and Jegadeesh and Titman (1995) to examine the presence of contrarian returns as well as the sources of such returns. Unlike other emerging markets where strong contrarian profits are found, Jordan market shows relatively weaker presence of contrarian profits. Moreover, time-series pattern – which is related to specific factors, is considered the main source of contrarian profits.

1. Introduction

Contrarian profits can be attributed to initial overreaction and subsequent correction of stock prices. The presence of momentum profits can be the outcome of investors' initial under-reaction to relevant information, causing slow adjustment of stock prices. Since these two types of profits are just opposite in sign, we can use the same strategy to detect their presence. DeBondt and Thaler (1985, 1987) for the first time show the presence of contrarian profits at long-term investment horizons.

Predictable behavior is harmful for an emerging market such as Jordan because only institutional investors and few smart individual investors are able to take advantage of such opportunities. In such a case, the ultimate sufferers are none but the uninformed, small investors as they follow the smart money and make a slow entry. In general, academicians believe that uninformed small investors are the dominant participants in an emerging market. Obviously, the general well-being of small investors is of utmost importance for the future development of a fledgling (emerging) market.

The main objective of our paper is to examine the presence of contrarian or momentum profits in the Amman Stock Exchange and their possible sources for the period January 2000 through December 2016. For this purpose, we use the methodology of Jegadeesh and Titman (1995) to decompose the contrarian/momentum profits into three elements – compensation for the change in cross-sectional risk, lead-lag relationship between firms with respect to a common risk factor such as market returns, and time-series pattern of stock returns attributable to firm's own risk.

Most of the previous papers during the past twenty years have primarily attempted to find the existence of momentum/contrarian profits in mature markets. Academicians finding by the early of 1990s indicates low correlation between emerging and developed market returns are of high importance to investors. This segregation between developed market returns and emerging and frontier markets creates opportunities for portfolio managers to diversify their portfolios more efficiently.

As far as Jordan stock market is concerned, academicians mainly examine its efficiency issues, volatility, and integration with other markets. However, there are only few studies on the presence of contrarian or momentum profits in the Jordan stock market. Gharaibeh (2015b) reports significant momentum profits for large-size portfolios and absence of such profits for the overall market. In fact, Gharaibeh reports negative winner-loser

portfolio returns for the overall market (i.e., contrarian profits). Gharaibeh (2016) uses 23 sectoral indices of Amman Stock Exchange and find the evidence of momentum profits at 6-, 9- and 12-month investment horizons.

Against this backdrop, our paper contributes to the literature in two ways. Firstly, previous studies have used traditional methodology of Jegadeesh and Titman (1993) to estimate momentum or contrarian returns, but we use Lo and MacKinlay (1990) and estimate such profits through the construction of risk-less portfolios. Clearly, these methodologies are markedly different. Secondly, this paper also investigates the sources of momentum or contrarian profits, which have not yet been examined previously for Jordan stock market. The knowledge on the sources of contrarian profits certainly tells academicians and investors about how to improve the market to bring more informational efficiency.

2. Literature Review

Ever since DeBondt and Thaler (1985) reported the presence of contrarian profits in the long-term investment horizon in the 1980's, academicians have spent significant time to detect more about such anomalies. Corroborate the existence of contrarian profits in stock markets. Some of later research initiatives focus on the reasons for this anomaly. Jegadeesh and Titman (1995) provide the evidence that the overreaction to firm-specific information is the possible reason for contrarian profits. Some studies focus on the presence of contrarian profits in the short-term investment horizons. Interestingly, Jegadeesh and Titman (1993) show the presence of risk-adjusted momentum profits in the U.S. market for relatively short investment horizons. Lee and Swaminathan (2000) show that high-turnover stocks provide more momentum profits than low-turnover ones. Hong *et al.* (2000) find that small firms are more prone to momentum due to the lack of analysts following them. Griffin *et al.* (2003) show the presence of strong momentum profits, which exists regardless of states. Some studies show that momentum profits only occur in the "up" market (Cooper *et al.*, 2004; Daniel *et al.*, 1998; Huang, 2006). The findings of momentum and contrarian profits in emerging and frontier stock markets are limited. Some of the studies on these markets deserve to be discussed here. Rouwenhorst (1999) and Naranjo and Porter (2007) report the presence of momentum profits in emerging stock markets. McInish *et al.* (2008) finds based on past returns that short-term tra strategies are not useful for most of the Pacific Basin markets.

For Chinese stock market, Li *et al.* (2010) also confirm the presence of short-term contrarian profits in the Chinese stock market. Hameed and Ting (2000) show that contrarian profits are positively related to trade; that is, actively traded firms provide more such profits than thinly traded firms do. Galariotis (2004) finds the existence of contrarian profits particularly in the short-term in the Athens Stock Exchange returns. De Groot *et al.* (2010) report momentum return of about 1% per month for stocks of 24 frontier stock markets. Cakici *et al.* (2013) consider 18 emerging stock markets and their findings show the presence of momentum profits in all but four Eastern European countries.

There are only a handful of research studies on the contrarian or momentum phenomenon in the Arab stock markets. Gharaibeh (2015a) examines the presence of short-term contrarian profits in the Kuwait Stock Exchange and the results of the study indicate strong evidence for contrarian profits. Chowdhury (2016) confirms that the cross-sectional contrarian profits have stronger impact than the time-series momentum profits for the Saudi Arabian stock markets. Gharaibeh (2015b) investigates whether there is size and momentum effect across Jordan firms and reports a significant momentum for large-size portfolios.

3. Data and Methodology

3.1 Data

Monthly stock price and market capitalization data on Jordan stocks are collected from the Amman Stock Exchange. The Arab emerging stock markets is a relatively becomes important phenomenon. However, the available data related to the stock markets are not of good quality. Therefore, we include only those stocks that have survived for the whole study period from January 2000 through December 2016 that consists of 70 firms. Returns are calculated as the log difference of stock prices in two consecutive months multiplied by 100.

3.2 Methodology

3.2.1 Portfolio Construction

In order to construct riskless (zero weight) portfolios, we use the weighted relative strength scheme (WRSS) and we use data related to same periods of same duration. That is, if the formation period is six months then the holding period is also six months, and so on.

Under this portfolio strategy, an investor buys (sells) the stocks with positive (negative) return during the formation period. Positive (negative) returns imply that returns of a stock are higher (lower) than the market returns during the formation period. A stock with positive (negative) return during the formation period is called winners (losers). By construction, the stocks with stronger positive (negative) returns in the formation period have larger positive (negative) weights in the portfolios. In other words, an individual stock's weight in the

portfolio affects by the size of the return. Each stock during the period can be assigned with the following weight

$$w_{i,t} = \frac{1}{N}\left(r_{i,t-1} - \overline{r}_{t-1}\right), \tag{1}$$

where N indicates the number of stocks in the portfolio, $r_{i,t-1}$ is the return of stock i, and $\overline{r}_{t-1}$ is the equal-weighted market return – all at time t-1. Thus the individual weights add up to zero; in other words, this is a zero-cost (or riskless) portfolio. The momentum/ contrarian profit, π_t, at time t is given by

$$\pi_t = \frac{1}{N}\sum_{i=1}^{N} r_{i,t}\left(r_{i,t-1} - \overline{r}_{t-1}\right). \tag{2}$$

We can construct portfolios based on the performance of the past j months where j =1, 2, 4, 6, 8 and 12. We call it formation period. The same portfolio is tracked during the next 1, 2, 4, 6, 8 and 12 months. The holding period is the proper description to this duration. Thus, trading strategies affect by six strategies in the short-run and in the medium-run investment horizons as well. After a portfolio is constructed, the cumulative return of the same during the holding period is clculated. The portfolio momentum/contrarian profits for holding period k = 1, 2, 4, 6, 8 and 12 months are given by

$$\pi_{j,t}(k) = \sum_{i=1}^{N_j} w_{i,t}\, r_{i,t+k}, \tag{3}$$

where J indicates L (loser), W (winner), and C (contrarian) portfolios, $w_{i,t}$ is the weight of individual stocks in the portfolio, and N_j is the number of stocks in the portfolio during the formation period. The weight of individual stocks is fixed during the holding period.

3.2.2 Sources of Contrarian/Momentum Profits

Jegadessh and Timaan(1995) developed The decomposition method of momentum/contrarian profits which can be expressed as follows

$$\pi^m = \sigma_\mu^2 + \delta\sigma_f^2 + \Omega \tag{4a}$$

$$\pi^c = -\sigma_\mu^2 - \delta\sigma_f^2 - \Omega, \tag{4b}$$

Where π^m and π^c and provide trade-driven momentum and contrarian profits, respectively, and σ_f^2 is the variance of equal-weighted market portfolio returns.

Jegadeesh and Titman (1995) provide the following statistical framework to find the sources of momentum and contrarian profits. They estimate

$$r_{i,t} = \mu + b_{0,i}f_t + b_{1,i}f_{t-k} + \varepsilon_{i,t} \tag{5}$$

Where $r_{i,t}$ is the individual stock return at time t; f_t is the equal-weighted market return (common factor) at time t; is the equal-weighted market return during t-k period; and $b_{0,i}$ and $b_{1,i}$ are the usual estimated regression coefficients. According to this factor we can estimate the components of contrarian/momentum profits as follows:

(i) Cross-sectional risk component:

$$\sigma_\mu^2 = \frac{1}{N}\sum_{i=1}^{N}(\mu_i - \overline{\mu})^2 \;, \tag{6}$$

(ii) Lead-lag effect component:

$$\delta = \frac{1}{N}\sum_{i=1}^{N}(b_{0,i} - \overline{b}_0)(b_{1,i} - \overline{b}_1) \;, \tag{7}$$

(iii) Time-series pattern component:

$$\Omega = \frac{1}{N} \sum_{i=1}^{N} Cov(\varepsilon_{i,t}, \varepsilon_{i,t-1}), \qquad (8)$$

where μ_i is the intercept term; $b_{0,i}$ and $\bar{b}_0$ where is the intercept term; $b_{0,i}$ and $\bar{b}_0$ represent the regression coefficients and cross-sectional mean of regression coefficients, respectively; $b_{1,i}$ and $\bar{b}_1$ are the second regression coefficient and cross-sectional mean of individual coefficients, respectively; and is the residual term for individual regression.

First, we estimate equations (6), (7), and (8). Then, we use equations (4a) and (4b) to decompose the expected contrarian/momentum profits into three components. In case of contrarian profits, the first term in equation (4b) is the cross-sectional variance of expected returns. The second term is the contrarian / momentum profits, which can be attributed to the time lag for firms in reacting to changes in market returns. Finally, the last term is the contribution of price adjustment of a stock to its own information to contrarian/momentum profits.

4. Analysis of Empirical Results

Table 1 presents the returns from WRSS portfolios for 1-1, 2-2, 4-4, 6-6, 8-8 and 12-12 trading strategies for the whole period and the two sub-periods. Initially winner and loser portfolio returns are calculated and then WRSS portfolio returns are constructed. We only report WRSS portfolio returns because winner and loser portfolio returns do not have any economic significance in our study. When the whole study period is considered, there are contrarian profits for trading strategies of equal or longer than j=k=2. Specifically, contrarian profits from j=k=4 and 6 strategies are significant at 5% level. The total period is then divided into two sub-periods – 2000-08 and 2009-16. Sub-period estimations show that contrarian profits mainly occurred during the 2000-08 period. Interestingly, the later period is free from any kind of contrarian or momentum profits. It suggests that the market became more efficient lately. Overall, the medium-term, j=k=6 appears to give the best opportunity for contrarian profits. So, as far as the trading is concerned, a trader should buy (sell) the loser (winner) stocks during the recent-past six months and sell (buy) the winner stocks for the same period and hold the portfolio for six months to benefit from the presence of contrarian profits in the Jordan stock market.

Table 1. Market Portfolio Returns for Short and Medium Term Strategies

	$j=1, k=1$	$j=2, k=2$	$j=4, k=4$	$j=6, k=6$	$j=8, k=8$	$j=12, k=12$
Period and Portfolio	Mean Ret. (*t*-stat.)	Mean Ret. (*t*-stat.)	Mean Ret. (*t*-stat.)	Mean Ret. (*t*-stat.)	Mean Ret. (*t*-stat.)	Mean Ret. (*t*-stat.)
Period 2000-2016						
Winner+Loser	-8.73 (-1.64)	-8.89 (-1.80)*	-11.71 (-2.06)**	-16.03 (-2.55)**	-39.05 (-1.92)*	-38.77 (-1.78)*
Period 2000-2008						
Winner+Loser	-1.34 (-0.40)	-5.21 (-1.09)	-11.12 (-1.68)*	-16.54 (-2.05)**	-57.95 (-1.49)	-59.78 (-1.41)
Period 2009-2016						
Winner+Loser	-16.86 (-1.59)	-12.67 (-1.39)	-13.10 (-1.36)	-15.29 (-1.51)	-15.64 (-1.48)	-14.58 (-1.23)

t- statistics are reported in parentheses. * and ** indicate that coefficients are different from zero at 10% and 5% level of significance, respectively. We use equations (1), (2) and(3) to construct Winner, Loser, and Winner+Loser portfolios. We construct the portfolios based on the performance during the formation period of 1, 2, 4, 6, 8 and 12 months. The performance of the portfolio is evaluated/ tracked during the holding period of 1, 2, 4, 6, 8 and 12 months. Duration of formation and holding periods must match with each other. Thus there are six trading strategies that involve short- to medium-run trading horizons. Cumulative holding-period returns are calculated based on the weight derived from the formation period, holding period length and participating stock returns.

Table 2 provides the contrarian profits of portfolios sorted by turnover and size. Panel A/ Table 2 clearly shows that contrarian profits are significant for small and medium turnover portfolios. For the low turnover portfolio, the presence of contrarian profits is particularly strong for j=k=4 and higher. Interestingly, there are no contrarian profits for high-turnover portfolios. The probable reason is the fact that high turnover firms provide better quality information through more trades and hence there is less occurrence of pricing errors compared to other two turnover-based portfolios. Panel B shows that contrarian profits are also related to the size of firms. For j=k=4, 6, 8 and 12 strategy and small-size portfolio, there are significant profits at least at 10% level. Medium-size portfolios also provide significant contrarian profits at the investment horizon of eight and 12 months. Just like the high turnover portfolio, large size portfolios provide no contrarian profits. However, this finding is very consistent because both large firms and high turnover firms are expected to possess better information dissemination capability. Hence these stocks reflect relevant information more transparently and promptly, resulting in less opportunity for profit-seeking trading activities.

Table 2. Returns for Short and Medium Strategies for Portfolios Sorted by Turnover and Size

Portfolio	j=1, k=1 Mean Ret. (t-stat.)	j=2, k=2 Mean Ret. (t-stat.)	j=4, k=4 Mean Ret. (t-stat.)	j=6, k=6 Mean Ret. (t-stat.)	j=8, k=8 Mean Ret. (t-stat.)	j=12, k=12 Mean Ret. (t-stat.)
Panel A: Portfolios Sorted by Turnover						
Winner+Loser for	-3.33	-6.73	-14.34	-17.28	-36.53	-36.44
Low Turnover	(-0.96)	(-1.56)	(-2.44)**	(-2.65)**	(-1.70)*	(-1.86)*
Winner+Loser for	-5.19	-7.86	-9.24	-13.75	-21.47	-19.84
Medium Turnover	(-1.25)	(-1.22)	(-1.42)	(-1.77)*	(-2.44)**	(-1.41)
Winner+Loser for	-17.59	-8.67	-6.77	-11.67	-53.53	-60.09
High Turnover	(-1.20)	(-0.73)	(-0.50)	(-0.79)	(-1.41)	(-1.43)
Panel B: Portfolios Sorted by Size						
Winner+Loser for	-3.92	-9.88	-12.84	-17.29	-32.20	-41.25
Small Size	(-0.77)	(-1.29)	(-1.56)	(-1.93)*	(-1.94)*	(-2.00)**
Winner+Loser for	1.66	-2.70	-9.33	-12.86	-21.44	-24.21
Medium Size	(0.59)	(-0.61)	(-1.24)	(-1.53)	(-2.28)**	(-2.35)**
Winner+Loser for	-22.06	-14.22	-12.17	-14.51	-53.30	-45.17
Large Size	(-1.51)	(-1.24)	(-0.94)	(-1.00)	(-1.48)	(-1.12)

t- statistics are reported in parentheses. * and ** indicate that coefficients are different from zero at 10% and 5% level of significance, respectively. We use equations (1), (2) and (3) to construct Winner, Loser, and Winner+Loser portfolios. We construct the portfolios based on the performance during the formation period of 1, 2, 4, 6, 8 and 12 months. The performance of the portfolio is evaluated/tracked during the same holding period of 1, 2, 4, 6, 8 and 12 months . Duration of formation and holding periods must match with each other. Thus there are six trading strategies affect short-run and medium-run trading horizons. Cumulative holding-period returns are calculated based on the weight derived from the formation period, holding period length and participating stock returns.

Table 3 provides the sources for contrarian profits for the whole period as well as the 2000-08 and 2009-16 sub-periods. The main reason for this table is to find how the contribution of each source to contrarian profits changed over time. Since we have already observed contrarian profits for the whole period for j=k=4 and 6 (Table 1), we put main emphasis on same investment horizons in Table 3. Results in Panel A show that the main source is the time-series pattern in stock returns, which implies that firm-specific information is the most important source of contrarian profits in the Amman Stock Exchange. Specifically, at the larger horizon of four and six months, the contribution of time-series component has magnified. This is an expected result because the Jordan market is largely influenced by the activities of less-informed individual investors. When results for two sub-periods are compared, we observe a high contrast of findings. For the 2000-08 period, the contribution of time-series pattern is much stronger compared to the 2009-16 period. This is also supported by the findings in Table 1, which shows that contrarian profits were more evident during the earlier period.

The contribution of lead-lag effect is very low in the recent period. This finding suggests that Jordan's firms have become less inclined to follow other firms (especially, large ones). This also implies that the market has become more efficient in terms of processing the common information available in the market. In all the cases, results show the lesser importance of market factor (cross-sectional risk) to create contrarian profits.

Table 3. Sources of Momentum/Contrarian Profits for Full- and Sub-periods

Components of profit	j=1, k=1	j=2, k=2	j=4, k=4	j=6, k=6
Panel A: Period 2000-16				
Cross-sectional risk	0.34	1.34	5.54	11.66
Lead-lag effect	-3.22	-2.08	-17.07	-44.58
Time-series pattern	-5.62	185.79	541.52	831.15
Panel B: Period 2000-08				
Cross-sectional risk	0.78	3.92	17.76	46.50
Lead-lag effect	-7.25	-4.72	-33.83	-74.96
Time-series pattern	5.36	271.18	773.02	1162.94
Panel C: Period 2009-16				
Cross-sectional risk	1.01	3.99	19.42	52.33
Lead-lag effect	-3.12	-0.68	-0.92	-2.02
Time-series pattern	-11.40	84.31	238.45	369.22

This table shows the contribution of sources of momentum contrarian profits where **t**he total period is divided into two approximately 8-year sub-periods. Moreover, it shows how the role of each component on changes over time. A one-factor (contemporaneous and lagged market return) model –as shown by equation (5) – is used in this regard. To estimate the relevant parameters, we use equal-weighted market portfolio return as the proxy for the common factor. The sources of momentum/contrarian profits (i.e., cross-sectional risk, lead-lag effect, and time-series pattern) correspond to equations (6), (7), and (8), respectively.

Table 4 shows the contribution of sources of contrarian and momentum profits for the portfolios based on turnover and size. Panel A shows that the firm-specific information is the main role which has impact on contrarian profits. Surprisingly, the role of firm-specific information is the strongest for high turnover firms. These firms should be less susceptible to such information because higher trade should make these firms more transparent to the investors, and firm-specific mis-pricing should be low compared to low turnover stocks. However, it does not have any impact on overall findings because we have observed in Table 2 that there are no contrarian profits for high turnover portfolios. Since there are contrarian profits, the contribution to such profits is of no importance. Jordan's market is dominated by mostly individual investors who are less able to process information and thus they create noise when they trade. The absence of professional analysts in an emerging market such as Jordan also contributes to the present level of noise in the market.

Table 4. Sources of Momentum/Contrarian Profits for Portfolios Sorted by Turnover and Size

Components of profit	Firm Charac.	$j=1, k=1$	$j=2, k=2$	$j=4, k=4$	$j=6, k=6$
Panel A: Firms Sorted by Turnover					
Cross-sectional risk	Low	0.26	1.13	4.70	9.71
Lead-lag effect		-2.27	-4.31	-32.79	-59.87
Time-series pattern		-1.58	136.30	385.81	578.57
Cross-sectional risk	Medium	0.47	1.87	7.53	16.58
Lead-lag effect		-3.20	-4.53	-1.69	-27.53
Time-series pattern		-1.24	134.70	396.63	614.74
Cross-sectional risk	High	0.24	1.14	4.47	10.05
Lead-lag effect		-2.74	-0.29	-12.66	-49.53
Time-series pattern		-13.00	251.08	742.93	1188.39
Panel A: Firms Sorted by Size					
Cross-sectional risk	Small	-0.18	0.80	3.36	8.68
Lead-lag effect		-1.20	-1.21	-1.58	-23.96
Time-series pattern		-1.07	143.09	419.27	659.98
Cross-sectional risk	Medium	0.31	1.30	5.26	11.58
Lead-lag effect		-2.41	-4.18	-28.50	-30.20
Time-series pattern		1.53	166.60	485.41	792.27
Cross-sectional risk	Large	0.05	2.08	8.27	19.22
Lead-lag effect		-4.08	-5.43	-18.28	-54.47
Time-series pattern		-18.92	203.09	598.10	1009.86

This table shows the contribution of sources of momentum-contrarian profits where the total period is divided into two approximately 8-year sub-periods. Moreover, it shows how the contribution of each component changes over time. A one-factor (contemporaneous and lagged market return) model – as shown by equation (5) – is used in this regard. To estimate the relevant parameters, we use equal-weighted market portfolio return as the proxy for the common factor return. The sources of momentum/contrarian profits (i.e., cross-sectional risk, lead-lag effect, and time-series pattern) correspond to equations (6), (7), and (8), respectively.

Although contrarian profits are present in the returns of WRSS portfolios, these profits could be related to market risk factors. Hence, we have checked the robustness of the results. The robustness check involves the three Fama-French factors: market returns, HML (high minus low) returns and SMB (small minus big) returns. Although results are not provided here, constant terms are still significantly negative. Moreover, regression models have very low R^2, indicating that Fama-French regression can hardly explain the returns of WRSS portfolios. Therefore, although the presence of contrarian profits in the Jordan stock market is not that strong the profits are robust to market risk factors.

5. Conclusion

The purpose of this study is to examine the presence, sources of contrarian, and momentum profits in the Amman Stock Exchange for the period January 2004 through December 2016. We use Lo and MacKinlay (1990) methodology to construct risk-less portfolio in order to find the presence of contrarian profits.

Results show that there is opportunity for medium-term contrarian investment strategies, even after market risk is adjusted for. However, there are no contrarian profits for large and high turnover stocks. It appears that these firms are able to disseminate information more efficiently, which reflects in stock prices, and hence contrarian profits are not present. On the other hand, small and low turnover firms provide opportunity for contrarian profits. Absence of contrarian profits during the past eight years suggests that the market has become more efficient over time. Finally, the firm-specific factor is found to be the main contributor to contrarian profits. The contribution of this factor has gone down significantly during the past eight years. Thus the market is now better able to react to firm-specific information more efficiently.

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