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Abstract

This paper documents strong evidence for the robust profitability of the momentum strategies inter and intra five Arabo-Mediterranean stocks' markets. Between 1998 and 2007 we find that the related stocks' returns exhibit a strong continuation pattern during a period of about one year. Even after controlling for the country effect, the neutral-country momentum strategies still yield significantly positive payoffs of about 1.88 percent per month. Nevertheless and although the paper gives evidences that the market and the SMB factors account for the profitability of neutral-country momentum strategies' payoffs, still some significant parts of the excess returns persist puzzling to the conventional asset pricing models.

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Introduction

Momentum is one of the strongest and most puzzling asset pricing anomalies. Jegadeesh and Titman (1993) show that past 3 to 12 months Winners stocks continue to outperform past Losers over the same terms. Momentum is puzzling because it suggests that prices are not even weak-form efficient. For it to be rational, risk would have to increase after positive returns. Empirically Jegadeesh and Titman find that risk adjustment tends to accentuate rather explain momentum. Moreover, Fama and French (1996) show that many patterns documented in American stocks returns were consistent with a multifactor model of returns, but their model fail to explain the medium-term momentum.

Since this continuation pattern has uncovered using substantially the same database of U.S' stocks, it can therefore not be excluded that this apparent and troubling anomaly is simply the outcome of an elaborate data snooping process. Nevertheless many other researches document similar continuation pattern using many other different stocks' markets sample. For example, Rouwenhorst (1998) document a momentum effect at medium horizon in 12 different European countries; Foerster and al (1995) provide evidence on momentum strategies in the Canadian stocks' market; Griffin, Ji and Martin (2003) found the same stocks' returns pattern within a sample of 40 different emerging stocks' markets related to 40 countries worldwide....

This study is further an attempt to address this concern by studying medium-term return pattern in the emerging markets context. This paper focuses on international individual stocks returns continuations inter and intra some emerging markets using a sample of 540 stocks from five Arabo-Mediterranean countries from 1998 to 2007.

Such study may be useful for two reasons. First it permits to examine whether the momentum effect which seems common to many developed stocks' markets is also present in the little and emerging Arabo-Mediterranean stocks' markets. If the momentum effect is asserted to be a general and common pattern in stocks returns and none of the conventional risk factor may account for it, then we should think either of a serious misspecification of commonly used asset pricing models or a general tendency of markets to underreact to information. Second and upon the Chui, Titman and Wei (2000; 2006) results' arguing that momentum strategies usually do not produce significant profits in emerging stock markets, using as sample the Asian stocks markets, it may be interesting to check this intriguing evidence in another different set of emerging stocks' markets.

The main revealing findings of the paper are first and by contrast to Chui, Titman and Wei (2000; 2006), the past diversified Arabo-Mediterranean Winners stocks' portfolio continue to outperform the past medium-term Losers by about 2percent per month. This momentum in returns is not limited to a particular market, but it is present in four of the five markets in the sample. The outperformance lasts for about one year. Second and by contrast to the US and European Experience, we give evidence that the market and the size factors may account for the Arabo-Mediterranean momentum strategies' profits. Nevertheless these abnormal profits cannot be totally attributed to the conventional risk factors; since it remain some significant piece that beyond any risk based explanation. The remaining significant puzzling part of the momentum strategies' payoffs, let us suggesting that the momentum strategies profitability and since it seems concerning all the stocks' markets regardless of their respective level of development and the number of listed securities neither their respective

transaction volumes is driven by some common factors that are equally present in all the stocks' markets. We suspect especially that the human behavior of investors as the searched common factor between all the developed and emerging stocks' markets.

The remainder of the paper is organized as follows. Section 2 describes the sample and documents the profitability of medium-term international momentum strategies. Section 3 shows that momentum is not restricted to stocks of a particular country category. Section 4 examines whether the returns to momentum strategies can be explained by the conventional asset pricing models. Section 5 concludes the paper.

Arabo-Mediterranean momentum strategies' returns

The sample consists of monthly returns in local currency for 540 firms from five Arabo-Mediterranean countries from 1998 to 2007: Morocco (77 firms), Tunisia (50 firms), Egypt (200 firms), Jordan (200 firms) and Lebanon (13 firms). All returns are converted to US dollar using exchange rate taken from Financial Times.

The momentum strategies are constructed as in Jegadeesh and Titman (1993). At the end of each month, all stocks with a return history of at least 12 months are ranked into deciles based on their past J-month return (J equals 3, 6, 9 or 12). The first decile regroups the lowest past performance or the Losers portfolio and the tenth decile regroups the highest past performance or the Winners portfolio. These portfolios are equally weighted at formation, and held for K overlapping subsequent months (K equals 3, 6, 9 or 12 months) during which time they are not re-balanced. That is in any given month t, the strategies hold a series of portfolios that are selected in the current month as well as in the previous K-1 months, where K is the holding period. The paper follows Jegadeesh and Titman (1993) who report the monthly average return of K strategies, each starting one month apart. This is equivalent to a composite portfolio in which, each month 1/K of the holdings, are revised. For example, toward the end of month t, the J=6, K=3 portfolio of Winners consists of three parts: a position carried over from an investment of one USD at the end of month t-3 in the 10percent firms with highest prior six-month performance as of t-3, and two similar positions resulting from a unit USD invested in the top performing firms at the end of month t-2 and t-1. At the end of month t, the first of these holding positions will be liquidated and replaced with a unit USD investment in the stocks with highest six-month performance as of time t. In each month t, the strategy J/K buys the past J – month Winners portfolio and sells the past J-month

Losers portfolio, holding this position for K months. In addition, the strategy closes out the position initiated in month t-K. Hence, under this trading strategy we revise the weights on 1/K of the stocks in the entire portfolio in any given month and carry over the rest from the previous month.

In addition, we examine a second set of 16 strategies that skip a month between the portfolio formation period and the holding period. By skipping a month, we avoid some of the bid-ask spread, price pressure and lagged reaction effects that underlie the evidence documented in Jegadeesh (1990) and Lehman (1990).

Table 1 presents the average monthly returns of relative strength portfolios. Especially it gives the different payoffs of the Buy and Sell portfolios as well as the zero-cost, Winners minus Losers portfolio between 1998 and 2007, for the 32 strategies described above.

The portfolio in Panel A are formed at the end of the performance ranking period. But panel B reports the average returns if the portfolio formation is delayed relative to the ranking period by one month. Panel A and panel B, both show that for each couple of ranking and holding periods (J months; K months) the equally-weighted portfolio formed from the stocks in the bottom decile of previous J months is usually less successful than the top decile portfolio, letting all the explored 32 momentum strategies profitable. Moreover the Arabo-Mediterranean strategies seem stronger and more profitable than those documented in the US and European stocks' markets, since they yields on average 2.52percent per month (2.406¹ percent per month with delayed holding period compared to about of 0.95percent in the US Jegadeesh and Titman (1993) and 1.16percent the European (Rouwenhorst (1998) experiences).

Hence this paper gives evidences against the Chui, Titman, and Wei (1998; 2006)' findings that argue that momentum strategies usually do not produce significant profits in emerging stock markets

Similar to all previous finding (Jegadeesh and Titman (1993; 1999); Rouwenhorst (1998)), the most successful Arabo-Mediterranean zero-cost strategy also selects stocks based on their returns over the previous 12 months and then holds the portfolio for 3 months. This strategy yields 3.57 percent per month (shown in panel A)

¹ We notice that the strategies that skip one month between the holding and the ranking periods yields less profits. This may be because of the relative dispel of the glorious ex-Winners portfolios within this skipped month.

We notice moreover that the excess return from buying Winners and selling Losers increases with the length of the return interval used for ranking (J). Irrespective of the interval used for ranking average returns tend to fall for longer holding periods. For each of the ranking and holding periods, however, past Winners outperformed past Losers on average by about more than 2 percent per month. All excess returns in Panel A are significant at the 5percent level.

The remainder of the paper will concentrate on portfolio on the basis of six-month ranked returns, formed one month after the ranking period and held for six months. Because by skipping a month we avoid all potential bias that may be induced by the bid-ask spread.

Table 2 presents the average monthly returns for the 10 decile portfolios of this strategy. On average, higher past six-month returns is usually associated with stronger future six month performance. The table shows effectively that the average performance of the decile portfolios is monotonically increasing in previous six-month returns. An F-test strongly rejects the equality of average returns of the relative strength portfolios.

Momentum strategies within countries

The momentum strategies considered in the previous section, combine stocks from five national markets. More than 75percent of the 540 stocks in the sample are from Egypt (200) and Jordan (200). This raises two questions about the source and the pervasiveness of the continuation effect. First, the continuation effect may be confined to only a subset of the five markets: either the two largest markets which contribute the majority of sample firms, or alternatively the smaller markets which contain relatively many small and thinly traded stocks. Second, no restrictions have been placed on the geographical composition of the momentum strategies and the country weights vary over time. The continuation effect may therefore in part be due to country momentum. It is interesting therefore to see to what extent the continuation effect holds in individual countries and to what extent country-neutral relative strength portfolios exhibit momentum.

Besides examining momentum effect within countries has two other main advantages. First it permits to avoid biases introduced by the presence of relative large stocks' market in the sample² (we

² Heston and Rouwenhorst (1994) and Griffin and Karolyi (1996) argue that the large country-specific factors account in the international stocks' returns.

remind that the sample is not homogenous in size). Especially any eventual relative large country-specific shocks that may occur in the large stocks' markets of the sample can potentially induce some biases in the international diversification of the momentum strategies. For example, a strong performance of Egyptian stocks relative to other markets will subsequently cause the Winners portfolio to be over-weighted in Egyptian relative to the Arabo-Mediterranean equally-weighted index. Similarly, the Losers portfolio will be tilted towards stocks from markets with poor past performance. Second such study permits us to evaluate two alternative explanations for the continuation pattern in stocks' returns.

One possible explanation for return continuation is that country-specific market performance persists (Asness et al. (1996) and Richards (1996)). However, if return continuation is primarily due to country momentum, controlling for the geographical composition of relative strength portfolios should significantly reduce the average payoffs to buying Winners and selling Losers. If on the other hand medium-term persistence reflects idiosyncratic firm performance, return continuation will remain present in country-neutral relative strength portfolios as well.

Country-neutral momentum strategies are formed by ranking stocks into deciles based on past performance relative only to stocks from the same local market. The 10 percent of stocks from each country with lowest past six-month return are assigned to the Losers portfolio, the top 10 percent to the Winners portfolio. Except for integer constraints, the resulting decile portfolios are well-diversified in the sense that they have the same country allocation, and are country-neutral relative to the equally-weighted index of the five countries in the sample. The results are given in table 3.

Table 3 shows that controlling for country' composition reduces considerably the average excess returns of Winners over Losers (W-L) from 2.31 to 1.88 percent per month. Nevertheless and even reduced after controlling for country composition, the Arabo-Mediterranean momentum strategies' profits persist significantly positive. This suggests that country momentum seem accounting at least partially for the momentum strategies' profits.

The remainder of Panel A gives the W-L excess returns by country. Winners have outperformed Losers in all the countries, except for Lebanon stocks' market where the momentum strategies payoffs are not enough significant (0.08 percent per month (1.65)). This weak result may be due to the few number of listed' stocks (13 firms). The

strongest continuation effect occurred in Jordan, followed by Egypt and Morocco.

The standard deviations of the individual country excess returns are about two to three times larger than the standard deviation of the internationally diversified momentum strategy. This implies that a large portion of the W-L excess return variance is country-specific and can be diversified internationally.

The conclusion from table 3 is that return continuation is not due to country momentum. It is pervasive, and not restricted to a few individual markets.

Risk adjusted returns

After controlling for country, we examine in this section the risk adjusted returns of the neutral-country momentum strategies payoffs. First we adjust for the beta-risk. Then we adjust for the three common risk factors of Fama and French (1993).

Adjustment for beta-risk.

Panel A of Table 4 confirms that the excess return on the neutral-country momentum strategies cannot be accounted for by a simple adjustment for beta-risk, because the betas of the Winners and Losers portfolios are very similar³. Moreover the beta-risk is not sufficient measure not only for the momentum strategies' excess returns, but also for the Winners and Losers portfolios, since their respective alphas' coefficients are both significant and positive.

But and by contrast to the US evidences that document a negative beta-risk associated to the momentum strategies (Jegadeesh (1999)), we find that the Arabo-Mediterranean momentum strategies are associated with a positive but not enough significantly different from 0 at level of 5 percent (but it is at level of 10 percent).

Such evidence let us suspecting that the beta-risk may offer some partial explanation for the momentum strategies, especially that adjusted momentum strategies' profits fall to 1.16 percent per month and doesn't increase as shows the US experience. Nevertheless the beta-risk adjusted momentum strategies returns remains significantly different from 0 ($t=2.52$). That is and similar to US and European experience, the Arabo-Mediterranean stocks' market exhibit also at least partially a

³ Also Rouwenhorst (1998) using a sample of 12 European stocks markets documents also that the beta-risk of the Winners portfolios are similar to the Losers.

puzzling continuation pattern in stocks' returns that are robust to the beta-risk based story.

Adjustment for the market, the SMB and the HML factors

To examine to what extend the momentum strategies' profits are related to the three common risk factors of Fama and French (1996), we conducted a regression of the excess country-neutral relative strength portfolio on an international version of the three-factor model of Fama and French (1996). The results are given in table 4, panel B. Panel B reports some revealing results that are opposite to those documented in the US and European stocks markets. Especially we find that the neutral-country Arabo-Mediterranean momentum strategies' payoffs loads positively and significantly on the both market and size factors (the coefficients are respectively 0.0042 (1.97) and 0.0053 (2.05)). That is and by contrast to the European and US experience, the Winners portfolios seem significantly more sensitive to the market shocks and behave more likely small stocks. So we may suspect that the Winners portfolios are on average smaller, more risky and more volatile than the Losers. With such positive and significant loading coefficients, some part of the puzzling Arabo-Mediterranean momentum strategies seem to be resolved by some risk-based explanations.

Besides, and especially the positive loading coefficient on the market factor lets us tilted toward the Cooper, Guteirrez and Hameed (2004) who argue that the momentum effect is related to the market state, especially it is more stronger in down markets. Since the down markets are eventually more frequent in the arabo-mediterranean stocks' markets that are relatively frail, we are in favor of the Cooper, Guteirrez and Hameed (2004) thesis.

Concerning the HML factor, the results are again different from the US experience but are not conclusive, since the Winners and Losers portfolios show similar loading coefficients letting the HML factor not accounting for momentum strategies payoffs. Nevertheless, we notice that both the Winners and Losers stocks load on positive but not significant loading coefficients. That's mean that the Winners and Losers portfolios are both well book to market diversified portfolios and don't show significant differences relating to their cross-sectional book to market ratios.

Finally and although the significantly positive loading of the momentum strategies payoffs on the market and size factors, the related alpha' coefficient is still positive and significant. That some significant part of the Arabo-mediterranean momentum strategies' profits remains puzzling and robust to the conventional asset pricing models.

The overall conclusion from Table 4 is that a risk adjustment for the international market, SMB and HML risk factors, reduces significantly the Arabo-Mediterranean momentum strategies payoffs (adjusted for risk the strategy produces 0.81 percent compared to 1.88% without adjustment) but it fails to explain them totally.

Conclusions

This paper documents significant return continuation inter and intra a sample of five Arabo-Mediterranean stocks' markets during the period 1998 to 2007. Although controlling for the country effect reduces the abnormal momentum strategies' payoffs, the neutral-country momentum strategies are still related to strong and abnormal payoffs of about 1.88 percent per month.

These relative strength strategies load significantly and positively on the size and the market risk-factors. But the market and size factors explain only some part of the puzzling returns since the alpha coefficient persist positive and significant. The remaining puzzling payoffs are therefore inconsistent with the joint hypotheses of market efficiency and commonly used asset pricing models.

Although the Arabo-Mediterranean evidence is remarkably different from the findings for the U.S (Jegadeesh and Titman (1993)) and for the European (Rouwenhorst (1998)), the evidence given in this paper makes it unlikely that the U.S. experience was simply due to chance. Moreover the potential reason of the momentum effect should be due to some common factors to all the stocks' markets (US, European, Asian, Arabs either developed or emerging stocks' markets). Especially we are suspecting the human character of the stocks' markets hosts which are effectively common to any stocks' market as conducting the medium term continuation pattern in stocks' returns.

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Appendix

Table 1: Returns of Relative Strength Portfolios

At the end of each month all stocks are ranked in ascending order based on previous J -month performance. The stocks in the bottom decile (lowest previous performance) are assigned to the Losers portfolio, those in the top decile to the Winners portfolio. The portfolios are initially equally-weighted and held for K months. The table gives the average monthly buy-and-hold returns on these portfolios between 1998 and 2007. In Panel A the portfolios are formed immediately after ranking, in Panel B the portfolio formation occurs one month after the ranking takes place.

Table 2: Returns of Relative Strength Decile Portfolios

At the end of each month all stocks are ranked in ascending order based on previous six-month performance. The stocks in the bottom decile (lowest previous performance) are assigned to the Losers portfolio, those in the top decile to the Winners portfolio. The portfolios are initially equally-weighted and held for six months.

The average return is the average monthly returns of the 10 portfolios between 1998 and 2007. The Winners-Losers average return is the buy and hold momentum strategy average monthly return of the 6/6 momentum strategies. The F -statistic tests for equality of average returns of the 10 relative strength portfolios.

Table 3: Returns of Relative Strength Portfolios that Control for Country

At the end of each month all stocks are ranked in ascending order based on previous six-month performance relative to other stocks in its country. The bottom decile of stocks is assigned to the Losers (L) portfolio, the top decile to the Winners (W) portfolio. The portfolios are initially equally-weighted and held for six months. The table gives the average monthly buy-and-hold return and the mean standard deviation of an internationally diversified relative strength portfolio and its components between 1998 and 2007.

Table 4: Risk Adjusted Excess Returns

The table gives the results from regressing the monthly returns of neutral-country Losers and Winners portfolios in excess of risk free asset return. We consider as risk free asset the monthly average rate of the short term treasury bonds related to each one of the five countries considered in the sample. The conventional asset pricing models used are the CAPM (panel A) and the Three-factor model of Fama and French (1996) (panel B).

The monthly market return used is the average monthly returns of the indexes related to each stock's market considered.

The SMB factor is constructed by ranking all stocks in each country in ascending order on market equity. The stocks below the median size in a country end up in the international portfolio of S, the stocks above the median in B.

The HML factor is constructed by ranking all stocks in each country in ascending order on book to market ratios. The stocks below the median book to market ratio in a country end up in the international portfolio of L, the stocks above the median in H.

The relative strength portfolios are formed based on past performance in their respective countries.

R² is the coefficient of determination adjusted for degrees of freedom and t (#) is the coefficient divided by its standard error.

Table 1: Returns of Relative Strength Portfolios									
		Panel A				Panel B			
Ranking period (J)		Holding period (K)				Holding period (K)			
		3	6	9	12	3	6	9	12
3	Losers	0.0102	0.0088	0.0025	-0.0011	0.0109	0.0095	0.0048	-0.0009
	Winners	0.0354	0.0302	0.0221	0.0170	0.0364	0.0300	0.0224	0.0149
	Winners-Losers	0.0252	0.0214	0.0196	0.0181	0.0255	0.0205	0.0176	0.0158
	(t-stat)	(2.15)	(2.13)	(3.4)	(2.11)	(2.32)	(3.1)	(3.25)	(2.6)
6	Losers	0.0132	0.0105	0.0073	0.0014	0.0141	0.0115	0.0091	0.0023
	Winners	0.0416	0.035	0.0295	0.0207	0.0403	0.0346	0.0315	0.0200
	Winners-Losers	0.0284	0.0245	0.0222	0.0193	0.0262	0.0231	0.0224	0.0177
	(t-stat)	(2.01)	(1.99)	(2.13)	(2.20)	(2.10)	(2.18)	(2.15)	(2.11)
9	Losers	0.0156	0.0111	0.0064	-0.0003	0.0180	0.0313	0.0077	0.0005
	Winners	0.0497	0.0413	0.0347	0.0201	0.0488	0.0588	0.0341	0.0212
	Winners-Losers	0.0341	0.0302	0.0283	0.0204	0.0308	0.0275	0.0264	0.0207
	(t-stat)	(2.6)	(2.8)	(3.2)	(3.00)	(2.5)	(2.9)	(3.1)	(2.9)
12	Losers	0.0189	0.0134	0.0090	0.0005	0.0200	0.0155	0.0123	0.0024
	Winners	0.0546	0.0460	0.0385	0.0214	0.0548	0.0487	0.0429	0.0227
	Winners-Losers	0.0357	0.0326	0.0295	0.0209	0.0348	0.0332	0.0306	0.0203
	(t-stat)	(3.01)	(2.9)	(2.8)	(1.99)	(2.1)	(2.05)	(2.12)	(2.64)

Table 2: Returns of Relative Strength Decile Portfolios	
Relative strength decile portfolios	Average returns
Losers	0.0117
P2	0.0132
P3	0.0156
P4	0.0195
P5	0.0213
P6	0.0295
P7	0.0308
P8	0.0312
P9	0.0329
Winners	0.0348
Winners-Losers	0.0231

$$F = 2.58 \text{ (} p\text{-value} < 0.001 \text{)}$$

	Average monthly return	Mean standard deviation
All stocks (country-neutral)	0.0188 (2.05)	0.02481
Morocco	0.0222 (3.52)	0.0598
Tunisia	0.0216 (2.14)	0.0395
Egypt	0.0286 (3.18)	0.0631
Lebanon	0.0008 (1.65)	0.0315
Jordan	0.0295 (3.58)	0.0617

	Panel A		Panel B			
	CAPM regression		Three-factor model regression			
	Alpha	Beta	constant	Market factor	SMB factor	HML factor
Losers portfolios	0.0102 (2.15)	0.0033 (1.99)	0.0022 (1.90)	0.0054 (2.06)	0.0042 (2.00)	0.0001 (1.59)
Winners portfolios	0.0218 (3.27)	0.0045 (2.01)	0.0103 (2.28)	0.0096 (2.34)	0.0095 (2.56)	0.0002 (1.70)
Winners-Losers portfolios	0.0116 (2.52)	0.0012 (1.85)	0.0081 (2.18)	0.0042 (1.97)	0.0053 (2.05)	0.0001 (1.65)