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Impact of Credit Risk on Momentum & Contrarian Strategies: Evidence from South Asian Markets

Ahmed Imran Hunjra[1], Tahar Tayachi[2],*,   Rashid Mehmood[3], Sidra Malik[4] and Zoya Malik[5]

[1] University Institute of Management Sciences-PMAS-Arid Agriculture University Rawalpindi, Pakistan; ahmedhunjra@gmail.com

[2] Chair of Finance Department, Effat University, Saudi Arabia, ttayachi@effatuniversity.edu.sa

[3] University Institute of Management Sciences-PMAS-Arid Agriculture University Rawalpindi, Pakistan; rashidm1005@gmail.com

[4] University Institute of Management Sciences, PMAS- Arid Agriculture University Rawalpindi, Pakistan, sidramalik14@yahoo.com

[5] University Institute of Management Sciences, PMAS- Arid Agriculture University Rawalpindi, Pakistan, zoyamalik1237@gmail.com

* Correspondence: ttayachi@effatuniversity.edu.sa

Abstract: We examine the profitability of the momentum and contrarian strategies in three South Asian markets i.e. Bangladesh, India and Pakistan. We also analyze, whether credit risk influences momentum and contrarian return for these markets from 2008 to 2014. We use Distance-to-default (DD) of Kealhofer, McQuown and Vasicek (KMV) model as a measure of credit risk. We calculate the credit risk and form the momentum and contrarian strategies of the firms on the basis of high, medium and low risk. We find that in all three markets, the momentum and contrarian returns are significant for medium and high credit risk portfolios and no momentum and contrarian returns for low credit risk portfolios.

Keywords: momentum returns; contrarian returns; credit risk; stock market; KMV model

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1. Introduction

The most popular phrase among the investing community is buying low and selling high. Every investor needs to decide the level of risk of stocks and industries for diversifying their portfolio investment for the purpose of minimizing risks considering expected return (Tran 2019). Many investors employ value investment strategies in order to improve the performance of their investments' portfolio. Long investors value those firms which are underpriced and short the one overpriced. It is also well documented that stock prices follow a random walk behavior suggesting there is no information available in past price movement in order to predict the trend of movement in future prices (Fama 1965). Nevertheless, there are certain stock market anomalies that refute the efficient market hypothesis. Momentum and contrarian effect are one of the anomalies that have been used to earn profit. Jagadesesh and Titman (1993) are the first who study the momentum effect, define as selling losers and buying winners, to earn profits. Chan et al. (1999) identify that when there is an announcement regarding the earnings of a firm, the market tends to underreacts to this announcement suggesting that investor react slowly to this type of new information, resulting in price momentum. Hong and Stein (1999) present a behavioral model where momentum is a result of interaction between momentum traders and arbitrage traders. Another concept of moment effect explains that it is a tendency of an asset that performs well (low) in past to over (under) perform in future (Zaremba 2019).

Another well-known anomaly is "contrarian effect". This anomaly is a long-term phenomena defined as "the tendency of an asset that has been performing well (poorly) in the past to under (over)

perform in the future. In a contrarian strategy, investors can obtain extra returns by short selling the stocks that underperformed the market in the past and buying the stocks that outperformed in the past. Researchers have documented the profitability of a contrarian strategy in various periods and markets (Bissoondoyal-Bheenick 2014). DeBondt and Thaler (1985) argue that with time past losers become underpriced and past winners overpriced because of the overreaction of investor to both the bad and good news.

Researchers have established momentum and contrarian strategies for credit risk. Sasaki and Miyazaki (2011) find a positive relationship between the contrarian return and credit risk (used credit rating as a proxy) in the Japanese stock market. Stock markets decline during recessions due to which value premium also declines (Siegel 1994). When there is recession it means there is a significant economic decline for atleast 6 months, as result the premium value of share also reduces so investors are unable to generate excess return (Siegel 1994). Chordia and Shivakumar (2002) and Avramove et al. (2007) find that when there is economic expansion then investor can generate extra returns by using momentum strategy. Sasaki and Miyazaki (2011) find a relation between contrarian strategy and the business cycle. They suggest that when there is economic recession it is not possible to generate excess returns by using contrarian strategy and when there is economic expansion it is possible to generate excess return through contrarian strategy.

We face different level of credit risk in different phases of business cycle. Sasaki and Miyazaki (2011) find that excess return can be generated in economic expansion and no excess return can be generated during economic recession through contrarian strategy. However, we find that whether there is a relationship between momentum & contrarian strategy and credit risk in emerging markets. In this paper we examine the relation between momentum, contrarian and credit risk using data from emerging markets, including Bangladesh, India and Pakistan. We use expected default probability from the KMV model as a proxy for credit risk, we show that momentum and contrarian exist in low/medium/high credit risky firms.

First we analyze the momentum & contrarian strategies in these markets. Secondly, we determine whether investors can generate extra return by using momentum & contrarian strategies or not? Lastly, this study also examines that how returns from momentum & contrarian strategies are affected by certain categories of credit risk (low, medium & high).

The remainder of the paper is structured as follows: We provide a brief literature in Section 2, followed by data and methodology presented in Section 3. Section 4 provides the results and discussion, while Section 5 concludes the paper with suggestions for further studies.

2. Review of Literature

Jagdeesh and Titman (1993) investigate momentum profitability in AMES and NYSE and the time period they covered was 1965 to 1989. They use different formation period and different holding period from three to twelve months in order to form 32 strategies. They consider the strategies with and without a gap of one week between formation and holding period. They found that all of the 32 zero cost momentum portfolios showed the positive returns and all were statistically significant except only one i.e. 3×3 where the formation period is of three months and holding period is also of three months. They found that momentum effect exists in American stock market with average monthly return of one percent. They say that risk and under reaction of prices of stocks are not the factors for explaining these average returns of portfolios. Conrad and Kaul (1998) also study the momentum effect in American stock market but the time period they covered was from 1962 to 1989 and they changed the strategies from three to twelve months to one to thirty-six weeks. They find that except 1×1 where formation period is of one week and holding period is also one week, all other zero cost portfolios show statistically significant positive returns. They made similar conclusion as that of Jagadeesh and Titman (1993) that momentum effect exists in American stock market.

Pyo and Shin (2013) work on the gainfulness of momentum exchanging in the Korean securities exchange. All the more particularly, their point was to direct an examination of the relationship between momentum returns and quirky instability (IVol) to figure out if momentum benefits can be clarified by IVol. Portfolios were shaped in light of their past execution and analyzed the momentum,

or contrarian returns, as the distinction in the middle of winning and losing portfolios. To affirm that the momentum methodology gives abundance gives back, the relationship between momentum returns and IVol was concentrated on. Fama and French (1965) three-factor model was additionally inspected to see whether efficient risk influences the momentum benefits. Firm size, stock cost, and turnover were controlled to decide heartiness. At long last, a time-series relationship between total IVol and momentum return is positive. Hong and Stein (1999) worked on a concept of dubbed news watchers and momentum traders that is contrary to the asset pricing (where investors are rational and have infinite estimation capacity). The author said that when there is news in the market, investor under react to that news because prices are only partially adjusted to the news. They explained that under reaction of news watchers is exploited by the momentum traders. The strategies used by momentum traders, first shift the prices back to their fundamental values but then will results in an over-reaction to the information at the end and when prices reach their fundamental values the reversal occur.

Drew et al. (2007) work on the momentum strategies and predictive power of trading volume in Australian stock market. Portfolios were created according to the Lee and Swaminathan's (2000) approach, and ranking is on the basis of past returns and past volume. They found that in Australian market strong momentum exists from 1988 and 2002. And they reported that in order to provide information about the stocks, momentum is an important factor. The magnitude and consistency of momentum is predictable through trading volume. Shah and Shah (2015) study the momentum effect in Pakistani stock market i.e. Karachi Stock Exchange. They study momentum profits by using monthly return data. They used Jagadeesh and Titman (1993) methodologies for ranking as well as for portfolio construction. They ranked the stocks on the basis of their past returns of formation period into winner and loser portfolios and then hold these portfolios for different holding period ranging from three months to twelve months. They found that by holding the momentum portfolio investor can generate abnormal returns. Same results were obtained when small stocks are excluded and also when different sample period were used. Chordia and Shivakumar (2002) study the relationship between momentum profits and economic variables. They showed that in their sensitivity momentum returns vary systematically to the common macro-economic variables. They found that there is a little impact of stock specific information i.e. historical returns, on the momentum profits, when cross sectional differences in expected returns (with lagged one month ahead macro-economic variable) were taken into account. Their analysis of empirical evidences showed that in expansionary period momentum profits are high whereas they are negative during recession period although the negative relation during recession period is not statistically significant.

Rehman and Mohsin (2012) conduct a study to examine the momentum profitability in Karachi stock exchange. They use sixteen momentum strategies by following equal weighted, full rebalancing and decile techniques. The time period they covered was from 1999 to 2007 and they included 300 listed companied in their sample. They find that out of sixteen strategies only one strategy has positive return of zero cost momentum portfolios and the strategy showed the decreeing trend in loses. As a result they extended their analysis to long period. They find some evidences of momentum effect. These momentum effects remained significant even when the sample was changed. Ansari and Khan (2012) conduct a study to examine the existence of momentum anomaly in Indian stock market. They used different risk based as well as behavioral model to identify the source momentum profitability. For behavioral model they used includes R^2, idiosyncratic volatility, and delay measures. They also followed the Jagadeesh and Titman (1993) methodology for portfolio construction. The found that during 1995 to 2006 there was momentum profits in Indian stock market. Whereas on the other hand they used CAPM and Fama and French (1965) model for risk based models and their results did not support the phenomena. There was a positive relation between momentum and idiosyncratic risk which proves the concept that behavioral factors are the source of momentum profits.

DeBondt and Thaler (1985) find that past losers outer perform the past winners due to which there is price reversal for stocks that experience long term gains or losses. Their findings are consistent with the overreaction hypothesis. In addition, they also found that their results are inconsistent with

the two alternative hypotheses that are based on firm size and difference in risk (measured by CAPM-betas). They also examined the seasonal pattern of returns in which they found that excess return in January was related to both short and long term past performance and pervious period year market return. Cornad et al. (1991) use the simple model in order to clarify the characteristics of short term returns and to find out the importance of several elements. They find that bid ask error (negative autocorrelation), expected returns (positive autocorrelation) and white noise were related to the security returns. The result show that bid ask error and time varying expected returns that exclude unobservable bid ask errors and expected return of stock returns, explained up to 24% of the variance of security returns.

Brozynski et al. (2003) use questionnaire to survey the fund managers to provide evidence that whether the respondents rely on momentum, contrarian and buy hold strategies. They found that majority of the respondents rely to some degree. Some of the respondents are also relied on single trading strategy and younger, less experienced professionals preferred all kinds of strategies. Subrahmanyam (2005) propose a model that was based on both behavior effects and risk-averse inventory phenomena to investigate the short term reversals. His results were consistent with the Jegadeesh (1990) that examine the monthly return reversal effect. This reversal played an important role in monthly reversal according to the financial markets' agent. Subadar and Hossenbacus (2010) test the presence of contrarian profits on Mauritius stock exchange by using the data of all 40 listed firms on the official market from 2001 to 2009. Their study shows the evidence of contrarian return. They noted the negative excess returns for all portfolios by considering the market return. Their result showed strong support to the portfolio management strategy and weak support to overreaction hypothesis. Furthermore, they also tested the size, price, earning per share and book to market value. The results showed that average market returns are higher than size and price based portfolios.

Paskevicius and Mickeviciute (2011) test the presence of contrarian profits on NASDAQ and OMX Vilnius stocks from 2003 to 2010. They used holding period returns to evaluate the contrarian strategy. They showed that there was no holding period returns during decline period in NASDAQ OMX Vilnius. They suggested contrarian strategy is a better option during the growth period because stocks are overrated during growth period as compared to standard market index. Chen et al. (2012) test the short term under market states contrarian strategy by using weekly dataset of A shares from 1995 to 2010 that are listed on Chinese stock exchange. They found that contrarian profits are significant especially after 2007 when china along with the world faced financial crisis. They find that profits are insignificant in the intermediate time horizon that was generated from momentum and contrarian strategies. They further find contrarian profits with one to two months holding period are significant after adjusting microstructure effects. Moreover, they conclude that contrarian profits are higher during down market as compared to the profits during up market. In the other words, they suggested that contrarian strategy is a shelter when the market declines. Hameed and Mian (2013) try to reinvestigate the short term reversal phenomenon and used stocks grouped by industries that may exposed to changes in supply and demand. They confirm that return reversals are not affected by standard risk adjustment. They also suggest that inter industry reversal are not influenced by January effect.

Avramov et al. (2007) study the relation of momentum profits with credit risk. They describe the firm having low grade have statistically significant and economically large momentum profits however this effect does not exist among the firm that have high grade for credit risk. Their sample consisted of 3578 firms that were listed on NYSE, AMEX and NASDAQ during July 1985 to December 2003. They show that the high momentum returns in high credit risk stocks are due to the deteriorating performance of loser stocks and improving performance of winner stocks over the formation and holding period as well as losers stock become less liquid and volatility increases and winner stocks become more liquid and their volatility decreases. Avramov and Zhou (2010) investigate the relation between financial distress, pattern in cross sectional average stock return and momentum profits. They use credit ratings as a proxy for credit risks and they report that stocks with high credit risk have high momentum profits and showed that the price momentum profits among other anomalies depends on financial distress periods. They use downgrade of credit rating as a

proxy for financial distress. There are insignificant and small momentum profits, in the absence of financial distress periods from the sample. There is no momentum profit during the period of upgrade credit ratings. These explanations show that additional risks are compensated by momentum profits. Lien et al. (2014) study the relationship between momentum profits and credit risk in Taiwan Stock market. They classify the credit risk into three groups low, medium and high. They use the distance-to-default point of KMV model as a proxy for credit risk. They found that momentum effect exists in Taiwan stock market. Their results are consistent with the results of Avramov et al. (2007) that high credit risk group has, high momentum profits as compare to low and medium credit risk firm. Their findings confirmed the investment theory of high risk, high returns.

Sasaki and Miyazaki (2012) find a relationship between the contrarian return and credit risk (used credit rating as proxy) in Japanese stock market. They verify whether the contrarian return at statistically significant level differs by rating by applying Wilcoxon's signed rank test. In their research they examined in order to explain contrarian return is it indispensable to adopt credit rating or not. In the other words, they are trying to explain whether the factors explaining credit rating may explain contrarian return. They clarify the relationship between contrarian return and credit rating by dividing the contrarian return into its components and then examine the relationship between them. Bissoondoyal-Bheenick et al. (2014) find the relationship of credit risk and return. They compare the returns of high and low credit risk firms by considering the credit ratings given by standard and poor. They use the sample of most developed nations of Asia Pacific from 1990 to 2012. The results show that credit risk and return relationship exits in both Japan and Australian stock market. They conclude that downgrade announcements of firms in the market explain the credit risk and return anomaly and significantly impact the cross section of returns. Yu et al. (2019) use weekly returns of winner-minus-loser portfolios in China and find that weekly stock return reversals are significant. Based on above literature, we develop following hypotheses of our study.

Hypothesis 1 (H1). *Momentum and contrarian strategies returns are significantly related to low credit risk.*

Hypothesis 2 (H2). *Momentum and contrarian strategies returns are significantly related to medium credit risk.*

Hypothesis 3 (H3). *Momentum and contrarian strategies returns are significantly related to high credit risk.*

3. Methodology

We obtain price data for 2008 to 2014 for stocks listed on the Pakistan, Bombay and Dhaka stock exchange from their official websites. Data to compute the distance to default (DD) of KMV model is taken from the financial statements of listed firms available in their annual reports. The annual T-bill rate of Pakistan, India and Bangladesh is used as the risk free rate. Stocks whose data is missing during the formation and holding periods are excluded from the analysis.

The methodology for constructing the momentum portfolio follows that in Jegadeesh and Titman (1993). For the momentum strategies, stocks are selected and ranked on the basis of return of their past J month (where J is 3, 6, 9, 12) and hold for K-month (where K is 3, 6, 9, 12). All stocks are ranked on the basis of their cumulative return over the 6 months formation period, after which two portfolios are created that is designated as winner and losers. The winner portfolio contains stocks that have performed well in the past 6 month formation period whilst the loser portfolio contains stocks that have performed poorly over the 6 months formation period. Portfolios are equally weighted at formation period and held for K months holding period. Zero cost momentum strategy means winner minus loser. If the return of the zero cost momentum strategy is greater than the market index, this suggests that the market is inefficient as investors can generate extra returns by using momentum strategy.

We follow the methodology in DeBondt and Thaler (1985) to construct the contrarian portfolios. Stocks are selected on the basis of their cumulative returns, after that winner portfolios and loser portfolios are created. Winner portfolios contain stocks that have performance well in the past 24 months' formation period whilst loser portfolios contain stocks that have performed poorly over the past 24 months' formation period. The output of the contrarian strategy is a zero cost strategy which

means loser minus winner (buying losers and selling winners). If the value is greater than zero (AL-Aw>0), investors are able to generate abnormal returns by using a contrarian strategy.

Risk measures are common tools to evaluate and mitigate the risk of financial position (Garrido and Okhrati 2018). We measure credit risk using KMV model (Merton 174). According to this model credit risk is divided into three categories: low, medium and high. According to the assumptions of Merton's (1974) model, equity value of firm should be equal to the following equation

$$Vs = Va\,N(d1) - Fe^{-rt}\,N(d2) \text{ .... (1)}$$

Where,

        Vs = firm's equity's market value

        Va = firm's asset's market value,

        F = face value of debt

        r = risk free rate of return

        N (.) = cumulative standard normal distribution

$$d1 = \frac{\ln\left(\frac{Va}{F}\right) + \left(r + \frac{1}{2}\sigma_A^2\right)t}{\sqrt{\sigma_A^2\,t}}$$

$$d2 = d1 - \sqrt{\sigma_A^2\,t}$$

        t = time horizon of the debt's face value

        σ_a = underlying asset's volatility

The following equation is used to find the relation between firms' volatility and equity of firm:

$$\sigma_E = \left(\frac{Va}{Vs}\right) N\,(d1)\sigma_A \text{ .... (2)}$$

In order to convert the value and the volatility of equity of firms into an implied default point in a KMV model the nonlinear equations (1) and (2) are used. For the implementation of KMV model we follow three steps. First, by using the data of historical returns of stocks, volatility of equity is estimated. Second, choose a time horizon and then there is measurement of face value of debt of the firm. The last step solving equations (1) and (2) in order to find the values of Va and σa.

The distance-to-default (DD) is our measure of credit risk (Fong, Wong, and Lean, 2004) which is computed as follows:

$$DD = \frac{E(V_A) - DPT}{\sigma_A}$$

Next, we categorize the portfolios into three credit-risk classes (low, medium and high). In order to examine the momentum and contrarian returns for the various types of credit risk (low, medium and high), stocks are classified first on the basis of credit risk and then on the returns of past six-month period.

4. Empirical

Table 1. Returns from momentum strategy for different holding period.

		Pakistan	India	Bangladesh
Years	**Holding period**	**Winner minus Loser**		
2008	K= 3	0.0188	-0.01854	-0.0668
	K= 6	0.2312	0.038002	-0.0886
	K= 9	0.2189	0.136179	-0.12337
	K=12	0.1897	-0.5908	-0.28923

2009	K= 3	0.0222	0.062376	0.268794
	K= 6	0.000381	0.031907	0.231891
	K= 9	0.0018	-0.08668	0.319653
	K=12	0.0326	-0.15083	-0.18341
2010	K= 3	0.0422	0.062638	0.048833
	K= 6	0.1688	0.107122	0.105621
	K= 9	0.2625	0.166243	0.22115
	K=12	0.4980	-0.09751	0.283725
2011	K= 3	0.03851	0.098095	0.021584
	K= 6	0.012413	0.237992	0.097435
	K= 9	0.432597	0.058875	0.233055
	K=12	0.6262	0.232839	0.093401
2012	K= 3	0.1561	0.035358	0.059826
	K= 6	0.3735	0.148605	0.045589
	K= 9	0.4063	0.083661	0.141754
	K=12	0.3625	-0.09352	0.25216
2013	K= 3	0.0442	0.179575	0.219989
	K= 6	0.1315	-0.0274	0.054988
	K= 9	0.5143	0.015913	0.197796
	K=12	0.7181	-0.2376	0.236246
2014	K= 3	0.0982	0.011189	0.087118
	K= 6	0.0421	0.015577	0.032048
	K= 9	--	--	--
	K=12	--	--	--

The momentum strategies are implemented for the period of 2008 to 2014. The results of monthly average returns are presented in Table 1. The winner and losers are the top and bottom 10 stocks respectively on the basis of past returns. It is evident that momentum profitability exists for holding period of short-, long- and medium term. These results suggest that the stock market of Pakistan, India and Bangladesh are inefficient. These findings are consistent with many similar studies in the literature (Agathee 2012; Liang 2012; Rehman and Mohsin 2012; Shah and Shah 2015).

Table 2. Returns from contrarian strategy for different holding periods.

		Pakistan	India	Bangladesh
Years	Holding Period		Loser minus Winner	
2008	K= 24	0.0496	-0.176	0.0439
	K= 36	0.8579	0.1039	0.0879
	K= 48	0.7721	0.0701	0.0272
	K=60	0.0189	0.028	0.079
2009	K= 24	0.1454	-0.007	0.0831
	K= 36	0.0563	0.0743	0.0843
	K= 48	0.3622	0.0277	0.0374
	K=60	0.0211	0.038	1.1087
2010	K= 24	0.0326	0.0668	0.0265
	K= 36	0.4046	0.0233	0.0597
	K= 48	0.0192	0.3747	0.1265
2011	K= 24	0.5064	0.0138	0.0188
	K= 36	0.9125	0.2299	0.0444

| 2012 | K= 24 | 0.0042 | 0.3856 | 0.0307 |

Table 2 presents the results of the contrarian strategy. The evidence of profitability exists in 24, 36, 48, and 60 months holding periods. It is also clear from the table that in all years the returns from contrarian strategy are greater than zero with contrarian profits present over all holding periods. Thus, contrarian strategy can be used to generate excess returns. Again, these findings are consistent with that of many other studies in the literature (Hameed and Mian 2015; Balvers et al. 2000).

Table 3. Momentum returns by credit risk.

		Winner minus Loser returns on the basis of credit risk								
	Holding	Pakistan			India			Bangladesh		
		Credit risk								
Years	Period	High	Medium	Low	High	Medium	Low	High	Medium	Low
2008	K= 3	-0.118	-0.319	-0.163	0.111	0.106	-0.101	0.027	-0.006	-0.077
	K= 6	0.015	0.333	-0.111	0.248	0.109	-0.282	0.136	0.069	-0.099
	K= 9	0.322	0.396	-0.223	0.263	0.239	-0.114	0.293	0.044	-0.125
	K=12	0.056	0.258	-0.305	0.088	0.747	-0.589	0.456	0.170	-0.359
2009	K= 3	0.433	-0.188	-0.128	0.029	0.008	-0.265	0.296	-0.153	-0.076
	K= 6	0.394	-0.267	-0.043	-0.018	0.122	0.478	0.774	0.155	-0.569
	K= 9	0.487	0.329	-0.045	-0.055	0.092	0.576	0.679	0.511	-0.478
	K=12	0.179	0.009	-0.241	-0.183	0.024	-0.035	0.238	0.579	-0.852
2010	K= 3	-0.122	-0.193	-0.077	0.185	0.044	-0.114	0.396	-0.147	-0.034
	K= 6	0.184	0.201	0.488	0.240	0.003	-0.029	0.473	0.272	-0.378
	K= 9	0.009	0.3013	-0.203	0.334	0.021	-0.178	0.201	0.744	-0.591
	K=12	0.011	0.393	-0.143	0.114	0.004	-0.139	0.308	0.827	-0.443
2011	K= 3	0.259	-0.052	-0.177	0.113	0.224	-0.008	0.055	-0.018	0.110
	K= 6	0.099	0.149	-0.144	0.379	0.411	-0.008	0.789	1.221	-0.921
	K= 9	0.209	0.094	-0.015	0.048	0.101	-0.036	1.349	1.254	-0.536
	K=12	0.355	0.089	-0.202	0.308	0.301	-0.04	0.171	0.933	-0.337
2012	K= 3	-0.044	-0.284	-0.028	0.202	0.024	-0.172	0.146	-0.137	-0.095
	K= 6	-0.051	0.073	-0.085	0.452	0.107	-0.141	-0.002	0.027	-0.047
	K= 9	0.121	0.025	-0.235	0.484	0.084	-0.121	0.698	0.193	-0.066
	K=12	0.128	0.159	-0.367	0.598	0.469	-0.127	0.321	0.177	-0.684
2013	K= 3	-0.483	-0.118	-0.299	0.036	0.319	-0.056	0.194	-0.137	0.185
	K= 6	0.138	0.602	-0.183	0.004	0.073	-0.236	0.464	0.137	-0.052
	K= 9	0.3187	0.882	-0.002	0.177	0.127	-0.171	0.161	0.022	-0.047
	K=12	0.646	0.897	-0.382	0.563	0.019	-0.353	0.333	0.128	-0.521
2014	K= 3	-0.233	-0.377	-0.259	0.239	0.17	-0.137	0.051	0.358	-0.152
	K= 6	0.221	0.159	-0.085	0.277	0.236	0.316	0.483	0.354	-0.035

Note: Momentum returns and credit risk (low, medium and high), stocks are classified first on the basis of credit risk and then returns of past six-month period.

Table 3 presents the momentum profits of the three credit risk groups. We find that momentum strategy returns depend on credit risk. For all the years, when high credit risk portfolio are held for 3, 6, 9 and 12 month (W-L) returns are greater than zero with some exceptions. In the case of Pakistan, when high credit risk portfolios are held for 3-month, the momentum returns are negative. In all other holding periods and in all years the returns are greater than zero. For the other two countries the returns are greater than zero which show that the excess returns can be produced by investments with high credit risk. Similar results are obtained when the portfolio contains medium credit risk firms. Conversely, no excess returns can be obtained when this strategy is applied to low-

credit-risk investment portfolios suggesting that such portfolios are informationally efficient. Similar findings are reported by others (Avramov et al. 2007; Tielkemeijer 2007).

Table 4. Contrarian profitability by credit risk.

		Loser minus Winner returns on the basis of credit risk								
Holding		Pakistan			India			Bangladesh		
		Credit Risk								
Years	Period	High	Medium	Low	High	Medium	Low	High	Medium	Low
2008	K=24	0.2201	0.056	0.2620	0.9145	-0.672	-0.063	0.3000	1.132	-0.225
	K=36	0.0445	0.002	-0.090	0.3893	0.069	-0.230	0.3499	0.379	0.003
	K=48	0.1966	0.209	-0.312	0.0325	0.244	0.1922	0.0888	0.743	-0.170
	K=60	0.0173	0.047	-0.023	0.3841	0.514	0.1856	0.1579	0.035	-0.214
2009	K=24	0.0178	0.108	-0.058	0.0976	0.487	-0.347	0.0681	0.828	-0.219
	K=36	0.0909	0.508	-0.145	0.0049	0.114	0.0742	0.0015	0.042	-0.583
	K=48	0.8057	1.175	-0.212	0.1569	0.097	-0.061	0.1477	0.202	0.162
	K=60	3.2119	0.155	-0.298	0.2940	0.311	-0.048	0.2983	3.275	0.122
2010	K=24	0.0153	0.116	-0.093	0.1793	0.108	-0.082	-0.344	-0.158	0.063
	K=36	0.5586	0.050	-0.072	0.0094	0.109	-0.385	0.2865	0.084	-0.059
	K=48	0.7970	1.480	0.0081	0.1171	0.383	-0.099	0.0523	0.097	-0.005
2011	K=24	0.6173	0.218	-0.201	0.0101	0.044	-0.152	0.3141	0.023	-0.094
	K=36	0.3159	0.230	-0.268	0.0799	0.123	0.1301	0.3249	0.003	0.294
2012	K=24	0.2156	0.210	0.3331	0.2926	0.189	0.0264	0.1641	0.136	0.052

Note: In order to find different contrarian returns for types of credit risk (low, medium and high), we classify the stocks first on the basis of credit risk and then on the returns of past 24-month periods.

Table 4 presents the contrarian profits of three credit risk groups and similarly shows that contrarian strategy returns are related to credit risk. For all the years, for Pakistan stock exchange, when high credit risk portfolio are held for 24, 36, 48 and 60 months the (L-W) returns are greater than zero. Identical results are found for the Bombay and Dhakar stock exchanges. Similar results are obtained when the portfolio contains medium credit risk firms. Conversely, no excess returns are obtained when this strategy is applied to low-credit-risk portfolios. These results are consistent with that of others (Avramov et al. 2007; Sasaki and Miyazaki 2012; Bissoondoyal-Bheenick et al. 2014).

Table 5. Hypotheses Testing W R T Momentum Returns.

Countries	Holding Periods	Types of Risk	Coeff.	t-values	F-stat	R²
Pak	3- months holding period return	High Risk	2.97E-12	0.658	0.433	0.079
		Medium risk	-3.94E-13	-0.538	0.289	0.055
		Low risk	1.99E-15	0.167	0.028	0.006
	6-months holding period return	High Risk	5.692***	2.716	47.123***	0.718
		Medium risk	-3.61E-12**	-3.059	54.935***	0.818

		Low risk	6.26E-15	0.577	0.333	0.062
	9-months holding period return	High Risk	-4.943**	-2.299	57.816***	0.832
		Medium risk	3.03E-12***	2.942	42.625***	0.830
		Low risk	-7.83E-14*	-2.328	5.421*	0.575
	12-months holding period return	High Risk	-6.32E-12**	-3.176	49.141***	0.678
		Medium risk	5.52E-12**	2.379	48.125**	0.730
		Low risk	-4.41E-14	-1.683	0.0332*	0.021
Ind	3- months holding period return	High Risk	5.52E-12**	2.379	48.125**	0.730
		Medium risk	-2.90E-13**	-2.462	19.092***	0.754
		Low risk	-2.89E-16	-0.505	0.255	0.049
	6-months holding period return	High Risk	7.30E-12**	2.212	56.033**	0.801
		Medium risk	-3.48E-13***	-2.071	10.683***	0.702
		Low risk	2.41E-15	1.447	2.095	0.295
	9-months holding period return	High Risk	4.04E-12**	2.448	21.030***	0.752
		Medium risk	2.98E-13**	3.365	11.325**	0.739
		Low risk	2.10E-15	1.1155	1.243	0.237
	12-months holding period return	High Risk	-6.51E-13**	-3.085	34.042***	0.661
		Medium risk	4.52E-13**	2.249	20.082***	0.702
		Low risk	2.96E-15	1.073	1.1509	0.223
Ban	3- months holding period return	High Risk	-3.97E-12**	2.612	56.994***	0.873
		Medium risk	-6.21E-12	-0.622	0.294	0.075
		Low risk	2.99E-14	0.143	0.179	0.074
	6-months holding period return	High Risk	6.952**	2.569	51.987***	0.759
		Medium risk	4.61E-11**	0.211	53.662***	0.786
		Low risk	4.16E-11*	1.427	0.110	0.154
	9-months holding period return	High Risk	9.994**	1.998	51.664***	0.765
		Medium risk	-2.03E-11***	-2.183	44.964***	0.775
		Low risk	-5.36E-14	-1.558	0.005*	0.412
	12-months holding period return	High Risk	-5.41E-11**	-2.719	12.765***	0.775
		Medium risk	-7.42E-12**	-2.108	58.411**	0.815
		Low risk	-5.61E-13	-1.417	0.109	0.129

Note: Pak= Pakistan, Ind = India, Ban= Bangladesh, Coeff.= Coefficients, Regression analysis for different credit risk and momentum returns of different portfolio (formed by sorting first on the basis of holding period return and then on the basis of credit risk).

It is evident from the Table 5 that the momentum returns for portfolios having high credit risk firms and 6, 9 and 12 month holding period are significant, which shows that when a firm bear high credit risk then by applying momentum strategy of these stocks firms' investor can generate excess return in medium and long term investment. Similar results are obtained for medium credit risk which supports H2. In case of low firm investor cannot generate excess return by applying momentum strategies. Even negatives returns are generated for short term investment period. So we reject H1 that is momentum strategy returns are significantly related to low credit risk firm". Results of our study also support the investment theory that "high risk high return", i.e. portfolio expose to high risk have high returns. Similar results were found in many other studies (Avramov et al. 2007 and Tielkemeijer 2007).

Table 6. Hypotheses Testing W R T Contrarian Returns.

Countries	Holding Periods	Types of Risk	Coeff.	t-value	F-stat	R²
Pak	24- months holding period return	High Risk	2.97E-12	0.658	0.433	0.079
		Medium risk	-3.94E-13	-0.538	0.289	0.055
		Low risk	1.99E-15	0.167	0.028	0.006
	36-months holding period return	High Risk	5.692***	2.716	47.123***	0.718
		Medium risk	-3.61E-12**	-3.059	54.935**	0.818
		Low risk	6.26E-15	0.577	0.331	0.062
	48-months holding period return	High Risk	-4.943**	-2.299	57.816***	0.832
		Medium risk	3.03E-12***	2.942	42.625**	0.830
		Low risk	-7.83E-14*	-2.328	5.421*	0.575
	60-months holding period return	High Risk	-6.32E-12**	-3.176	49.141***	0.678
		Medium risk	5.52E-12**	2.379	48.125**	0.730
		Low risk	-4.41E-14	-1.683	0.033*	0.021
Ind	24- months holding period return	High Risk	5.52E-12**	2.379	48.125**	0.730
		Medium risk	-2.90E-13**	-2.462	19.092***	0.754
		Low risk	-2.89E-16	-0.505	0.255	0.049
	36-months holding period return	High Risk	7.30E-12**	2.212	56.033**	0.801
		Medium risk	-3.48E-13***	-2.071	10.683***	0.702
		Low risk	2.41E-15	1.447	2.095	0.295
	48-months holding period return	High Risk	4.04E-12**	2.448	21.030***	0.752
		Medium risk	2.98E-13**	3.365	11.325**	0.739
		Low risk	2.10E-15	1.115	1.243	0.237
	60-months holding period return	High Risk	-6.51E-13**	-3.085	34.042***	0.661
		Medium risk	4.52E-13**	2.249	20.082***	0.702
		Low risk	2.96E-15	1.073	1.151	0.223
Ban	24- months holding period return	High Risk	-3.97E-12**	2.612	56.994***	0.873
		Medium risk	-6.21E-12	-0.622	0.294	0.074
		Low risk	2.99E-14	0.143	0.179	0.074
	36-months holding period return	High Risk	6.952**	2.569	51.987***	0.759
		Medium risk	4.61E-11**	0.211	53.662***	0.786
		Low risk	4.16E-11*	1.427	0.110	0.154
	48-months holding period return	High Risk	9.994**	1.998	51.664***	0.765

	Medium risk	-2.03E-11***	-2.183	44.964***	0.775
	Low risk	-5.36E-14	-1.558	0.005*	0.412
60-months holding period return	High Risk	-5.41E-11**	-2.719	12.765***	0.775
	Medium risk	-7.42E-12**	-2.108	58.411**	0.815
	Low risk	-5.61E-13	-1.417	0.109	0.129

Note: Pak= Pakistan, Ind = India, Ban= Bangladesh, Coeff.= Coefficients, Regression analysis for different credit risk and contrarian returns of different portfolio (formed by sorting 1st on the basis of holding period return and then on the basis of credit risk).

In Table 6, we find that the contrarian returns for portfolios having high credit risk firms and 36, 48 and 60 month holding period are significant. When a firm bears high credit risk then by applying contrarian strategy on these stocks investor can generate excess return in medium and long term investment. So we accept H3 that is "contrarian strategy returns are significantly related to high credit risk firms". Similar results are obtained for medium credit risk which supports to H3. In case of the firms having low credit risk, investor cannot generate excess return by applying contrarian strategies. So we reject H1 that is contrarian strategy returns are significantly related to low credit risk firm". However, results also support the investment "high risk high return", i.e. portfolio expose to high risk have high returns and these results are aligned with the findings of previous studies (Avramov et al. 2007; Sasaki and Miyazaki 2012; Bissoondoyal-Bheenick et al. 2014).

Table 5 shows the significance level of the relationship of our excess return (that we have generated by applying momentum strategy in table 3) and the credit risk. It is evident that the firm with 6, 9 and 12 month holding period have significant relationship between momentum returns and high credit risk, which shows that when the credit risk is high then by applying momentum strategy we will get high return in medium and long term investment. Similar results are obtained for medium credit risk which supports H2. In case of low credit risk firm investor cannot generate excess return by applying momentum strategies because the momentum return and low credit risk have insignificant relation. Even negatives returns are generated for short term investment period. So we reject H1 that is momentum strategy returns are significantly related to low credit risk firm". Results of our study also support the investment theory that "high risk high return", i.e. portfolio expose to high risk have high returns. Similar results were found in many other studies (Avramov et al. 2007; Tielkemeijer 2007).

Table 6 shows the significance level of the relationship of our excess return (that we have generated by applying contrarian strategy in table 4) and the credit risk. It is evident that the firm with 36, 48 and 60 months holding period have significant relationship between contrarian returns and high credit risk, which shows that when the credit risk is high then by applying contrarian strategy we will get high return in medium and long term investment. So we accept H3. Similar results are obtained for medium credit risk which supports H2. In case of low credit risk firm investor cannot generate excess return by applying contrarian strategies because the excess return and low credit risk have insignificant relation. So we reject H1 that is contrarian strategy returns are significantly related to low credit risk firm". However, results also support the investment "high risk high return", i.e. portfolio expose to high risk have high returns and these results are aligned with the findings of previous studies (Avramov et al. 2007; Sasaki and Miyazaki 2012; Bissoondoyal-Bheenick et al. 2014)

5. Conclusion

Returns from momentum and contrarian strategies remain one of the most persistent anomalies for stock market. We examine the influence of credit risk (low, medium and high) on momentum and contrarian returns in the stock markets of Pakistan, India and Bangladesh. We find that momentum and contrarian profits exist in the stock markets in all the three countries. There is no relation of low credit risk with momentum and contrarian returns. We also find that momentum strategy is more beneficial for 6, 9 and 12 months holding periods and contrarian strategy is prominent for 36, 48 and 60 months holding periods. Findings suggest that when holding period is extended, investors get

more benefits from contrarian strategy. The results suggest that when making the investment through momentum and contrarian strategies, investor should also consider the credit risk of the stock.

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