



Investor Sentiment and Stock Market Dynamics: A case of Pakistan

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Abstract

Purpose: The main purpose of this article is to confirm that whether investor's sentiments had any impact on the return of Karachi Stock Exchange (KSE). If the results are found to have an impact on returns of KSE, this will mark a new research area in the field to explain variation in returns based on behavioral factors. Time series analysis of auto regressive distributive lag (ARDL) is used in this study. The results indicate that our variables are co integrated in the long run. Investor sentiments were proven to have positive and significant coefficient that indicates its impact on KSE returns. Further, the macroeconomic variable of inflation was also statistically significant. The study proves that investor sentiments have a positive significant coefficient when it comes to explaining market returns. We believe that psychological factors that are rarely studied do have an important bearing on investor's decision making and consequently market returns of Pakistan in particular and world at large. This study will help both practitioners and academicians in the sense that investors are not rational and sentiments dictate their investment decisions.

Keywords: Investor's sentiments; Karachi Stock Exchange (KSE); Inflation; GDP; Government Expenditure.

Introduction

Investors should encompass clear position about situations of pessimistic period. As assumed in economic models, human decisions are not rational but dominated by emotions; it is hard to accurately predict their behavior in reality¹. Investor sentiment has yet been proved as a systematic factor in affecting stock prices by Wang Meijin and Sun Jianjun; Wayne et al; Shefrin and Statman². Markets are not perfectly efficient as modern finance theory asserts. The view that stock prices fully reveal all necessary information should present clear picture about future investor's expectation nonetheless the presence of noise trader makes real stock price less important.

Sentiment impinges on momentum profitability in Asia. Momentum is seen just during positive and mild time period. Besides local sentiment present in the market, sentiment on a global level sways momentum too. Momentum however is absent during pessimistic periods. At the same time as sentiment boom phase gives investor major impetus portfolio returns, gloomy phase does not give in noteworthy returns even often there are incidents of loss reported³.

Stock prices oscillate with the fluctuation in investor sentiment⁴. There subjective beliefs or information of little relevance to asset fundamental value has impacted stock prices. However, the change as a result of rise and fall in sentiment is asymmetrical; with high sentiment being stronger in impact compared to low sentiment. It could be argued as well that if stock market drops, it may collapse investor or consumer confidence, thereby possibly further causing drop in stock market and so on.

This study holds significance in the sense that investor's sentiment has vaguely been studied as a critical factor in determination of stock price in Pakistan. Therefore, considering behavioral aspect will help in better understanding of financial markets. Considering reality of Pakistani stock exchange markets we will be using five variables of sentiment under our study. The sentiment index of ours constitutes dividend premium, initial public offerings (IPO), first day return, IPO volume and trading volume. The main purpose of this article is to confirm that whether investor's sentiments had any impact on the return of Karachi Stock Exchange (KSE). If the results are found to have an impact on returns of KSE, this will mark a new research area in the field to explain variation in returns based on behavioral factors.

Literature Review

Investor sentiment and arbitrage are two fundamental channels of price changes. Sentimental demand is haphazard and varies across stocks; whereas, real arbitrage has limits and constant. A good number to which sentiment impact investors decision are the following stock types: small stock, elevated volatility stock, tremendous expansion stock, doubtful stock, new stock and non-dividend selling stock. Being most difficult to price, they are vulnerable to investor sentiment. And arbitrage, contrary to that, would not be improvised provided this vulnerable nature of stocks as it would be risky and costly⁵.

Arbitrage, the phenomena by which rational investors can counter irrational transactions, has found to be of little affect in bringing back stock prices to its original level⁶. Hence, deviation caused by irrational investment is inevitable because

of unpredictable nature of sentiment factor. Market participants altogether form the asset price. It is the difference of opinion among them as suggested by Buraschi and Jiltsov; Palva and Rigobon that result in a specific price at a specific time of an asset. Change in investor sentiment is also prone to macro-economy expectations. Chen, Roll, and Ross establish that some macro-economic variables have impact on asset prices, such as the government expenditure growth rate, GDP growth rate, unexpected change of inflation rate, premium of interest rate period and risk, and other macro economic variables.

Behavioral finance literature challenges classic finance theory; by negating its' claim of rational investors present in the market soon offset the affect of trading by sentiment driven irrational investors and argues that investors' future expectations cause stock prices up or down, hence affecting price models. DeLong, Shleifer, Summers and Waldmann claim in their behavioral finance theory that noise trader sentiment can persist for longer period in financial markets and cannot be arbitrated away easily due to its unpredictable nature. Basically, investor sentiment, as explained by Chang, Faff and Hwang, is the investor opinion developed as a result of emotional reaction regarding some kind of speculations for future cash flows and asset risk⁴.

Baker and Wurgler sentiment index that standardize six commonly employed proxies for measuring investor sentiment include trading volume based on KSE turnover, the dividend premium, the closed end fund discount, the number and First-day returns on IPOs, and the equity share in new issues is utilized to measure sentiment⁷.

Dividend premium. It is basically a safety measure by which investors gauge predictable income stream of dividend paying stocks. While dividends are at a first-class, firm is much likely expected disbursing it, and not as much of when it is on reduction⁸. Baker and Wurgler delineate it as:

“The difference between the average market-to-book value ratios of dividend payers and non payers⁹.”

Initial public offerings (IPO). It is calculated as the log of number of IPOs issued during the specified period. In general, Pakistani IPOs do better during short-run under different economic scenario through incentive giving to investors if significant positive return thereby according to under-pricing IPO phenomenon¹⁰.

IPO First day return: Often initial public offerings earn a great return on the very first day of trading that sentiment definitely is going to be involved¹¹.

IPO volume: Investment decisions are highly dependent upon the volume of IPOs. This further relates that firms during market enthusiasm period exploit by issuing new equity.

Trading volume: It is viewed as a sentiment proxy because of liquidity aspect of trading volume. Irrational investors lay importance if costly short selling is anticipated which increases liquidity in response to their optimistic approach and stock market thrives; and vice versa. The proxy for this variable is market turnover ratio.

According to Elster, emotions help in improve decision making by overcoming avoidable delays, hence resulting in better quality decision without exclusive rational deliberation. Emotions, as claimed by Damasio are:

“A combination of simple and complex mental evaluation process resulting in an emotional state of body as additional mental change¹”

It could be viewed both as a reaction to some stimuli or human brain itself preparing body to react in some direction. Individuals aim to gain maximum profit in financial affair moreover their sensation is based on best guesses and past experience about probable outcome. On average, emotional traders give positive vibe about uncertain matters; hence tend to buy the risky asset.

Noise traders too therefore, are essential part of price settlement mechanism, being higher the ratio of emotional investors, higher the possibility of returns and volatility of the market¹. Behavioral asset pricing model envisage that irrational sentiment and market price of risk (MPR) are linked; where noise traders show pessimist, rational arbitrageurs hold optimistic opinion thus risk compensation would be higher in this case to attract rational trade henceforth upward movement of MPR and likewise lower, where irrational investors are optimistic so that rational investors could do their investments⁵.

Chang et al. suggest that market integration level and cultural factor specific to ones country also hold significance in explaining investor behavior on future stock returns. Brown and Cliff found weaker relationship between sentiment and market return in short run (weekly data) and stronger evidence in case of long run (monthly data). Zouaoui says that sentiment volatility impacts countries that are culturally more prone to herd-like behavior and less institutionalized¹².

Based on the above discussion, we are inclined to test the following hypotheses for this study:

H1 Investor sentiments have positive significant impact on stock returns. H2 GDP has positive impact on investor sentiment and stock exchange relationship. H3 Inflation has negative relationship between investor sentiment and stock exchange. H4 Government expenditure has positive relationship between investor sentiment and stock exchange. H5 There is long term impact of sentiment on investor return.

Methodology

Data: The data for different variables was obtained from KSE stock exchange, World Bank database, Ministry of finance Government of Pakistan and IFS CDRM. All these sources are highly credible and frequently used by researchers to obtain reliable and accurate data for their variables. The data was quarterly range from first quarter of 2001 up till last quarter of 2012. Variables which were not available quarterly; their values were imputed on quarterly basis through Denton interpolation method of 1971. The impact of these imputed values will in no way compromise the integrity of our results as it does not obliterate the intended effect of the original values.

Analytical Model

In order to test our hypotheses we will estimate the following base line regression model:

$$IR = f(GDP, CPI, GEXP, SENTI)$$

$$IR = \alpha + \beta_1 GDP_t + \beta_2 CPI_t + \beta_3 GEXP_t + \beta_4 SENTI_t$$

Where: $IR = P_t - P_0 / P_0$ where, IR = Index returns, P_t = current closing KSE index at time t and P_0 = closing KSE index at t-1;

$GDP = \Delta GDP$ growth rate per quarter, measured as:

$$GDP_t - GDP_0 / GDP_0$$

Where: GDP_t = GDP growth rate at time t and GDP_0 = GDP growth rate at t-1;

$CPI = \Delta$ inflation rate per quarter, measured as:

$$CPI_t - CPI_0 / CPI_0$$

Where: CPI_t = inflation rate at time t and CPI_0 = inflation rate at time t-1;

$GEXP = \Delta$ government expenditure rate per quarter, measured as: $GEXP_t - GEXP_0 / GEXP_0$

Where: $GEXP_t$ = government expenditure at time t and $GEXP_0$ = government expenditure at time t-1; $SENTI$ = dividend premium, initial public offerings (IPO), first day return, IPO volume and trading volume. Sentiment level is gauged by using their index.

Descriptive

Index returns (table-1) show 29.98% growth with 21.68% standard deviation. GDP growth is explaining .896 %

Growth with 3.48% standard deviation. Inflation is telling 15% growth with 2.33% standard deviation. Government expenditure has however not shown growth but depreciated by -2.97% with 20.14% standard deviation. Sentiments have shown 1.1% growth with 14.5% standard deviation.

The correlation results (table-2) show that variables under study are not significantly associated. Thus, it's evident that we do not have the problem of multi collinearity.

Time Series Analysis

Since we are dealing with the time series analysis, we will follow all the procedures necessary to conduct impact analysis.

Test for stationality

Since time series data is prone to the problem of non stationality, we will conduct stationality test using Augmented Dickey Fuller (ADF) under all its assumption of intercept, trend and intercept and none. If we found all our variables to be stationary at the same level, we will conduct cointegration test to see whether there exist a long term relationship among our variables or not. However, if our variables are stationary at different levels we will then resort to conduct Auto Regressive Distributive Lag (ARDL) analysis.

Augmented Dickey Fuller test (table-3) showing the unit root results reveals that our variables are not stationary at same level. Inflation, GDP, government expenditure and sentiments are stationary at same level (at level). However, index return is leveled at first difference. Therefore, in accordance with governs of time series analysis we have to conduct ARDL analysis.

Table-1
Correlation

	Mean	Standard Deviation	Sample Variance	Kurtosis	Skewness	Range	Minimum	Maximum	Count
Index Returns	0.299792	0.21679	0.046998	8.975853	-0.78644	1.67	-0.6	1.07	48
GDP Growth	0.008958	0.034778	0.00121	8.956402	-0.52003	0.26	-0.12	0.14	48
CPI	0.001458	0.023337	0.000545	21.67317	3.243431	0.2	-0.07	0.13	48
Govt Exp	-0.02979	0.201373	0.040551	7.423243	0.499417	1.46	-0.71	0.75	48
Sentiments	0.010833	0.145351	0.021127	17.0843	-2.22718	1.2	-0.74	0.46	48

Table-2
ADF Test Results

	Index Returns	GDP Growth	CPI	Govt Exp	Sentiments
Index Returns	1				
GDP Growth	0.45	1			
CPI	-0.5	-0.42014	1		
Govt Exp	-0.28	0.076286	0.42	1	
Sentiments	-0.25	-0.32897	0.48	0.43	1

Table-3
Significant at 5% level

Variables	At Level			At First Difference		
	With intercept	With trend and intercept	None	With intercept	With trend and intercept	None
IR				-7.874972	-7.761894	-7.958658
CPI	-6.704525	-6.666931	-6.742473			
GDP	-5.693196	-5.746804	-5.299809			
GEXP	-8.134312	-8.124369	-7.602663			
SENTI	-6.709584	-6.720838	-6.749129			

ARDL Equation: The following ARDL equation will be estimated for conformity of long term association of the variables and also to obtain causal relationship on the dependent variable by our independent variable:

$$d(ir) c ir(-1) gdp(-1) cpi(-1) gexp(-1) senti(-1) d(ir(-1)) d(gdp(-1)) d(cpi(-1)) d(gexp(-1)) d(senti(-1)) \quad (1)$$

Adopting general to specific approach methodology, we will estimate the above equation in the first run ARDL 1,1,1,1,1 (eq.1) using Eviews 6.1. Later, differenced variables that exhibit highly insignificant results will be eliminated and model with remaining variable will be re-estimated. After adopting this methodology we eventually eliminated the following variables (table 4). Table-5 depicts the ARDL estimates after the omission of variables exhibited in table-4.

Table-4

ARDL Results (ARDL 1, 1, 1, 1, 1) Dependent variable IR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IR(-1))	-0.009558	0.18012	-0.053067	0.958
D(GDP(-1))	0.254212	1.482339	0.171494	0.865
D(CPI(-1))	0.514517	2.585338	0.199014	0.8436
D(GEXP(-1))	-0.010646	0.174515	-0.061003	0.9517
D(SENTI(-1))	-0.043316	0.350885	-0.123448	0.9025

According to it, in long run inflation is a significant coefficient however its impact on index return is inverse, consistent with past studies. Government expenditure (-1.05) has shown insignificant and negative impact reason being expenditures have gone down over the period of time as indicated by its mean value reported in the descriptive statistics (table-1). Gross domestic product (1.5) is also insignificant but has a positive sign hence we cannot report its impact with full confidence.

Finally, sentiments (1.0) have positive significant impact on index return with higher the optimism and expectation of positive return, the investor will generally drive the index in the upward direction that will cause index to rise and vice versa. The results generally confirm Zhang Qiang (2009) conclusion on these variables and therefore add towards previous literature.

Table-5
WALD Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.289809	0.049686	5.832855	0
IR(-1)	-0.991515	0.165117	-6.004924	0
GDP(-1)	1.502669	1.599617	0.939393	0.3536
CPI(-1)	-8.130566	3.167935	-2.566519	0.0145
GEXP(-1)	-0.232695	0.220771	-1.054012	0.2987
SENTI(-1)	1.001525	0.441626	2.267814	0.0293
D(GDP)	1.72833	0.837183	2.064459	0.046
D(CPI)	-7.673834	2.045792	-3.751033	0.0006
D(GEXP)	-0.242145	0.151862	-1.594513	0.1193
D(SENTI)	0.963073	0.298906	3.221989	0.0027

WALD Test: The WALD coefficient diagnostic test has an f-statistic of 8.44 and a probability of .000. This indicates that coefficients are related in the long run. Thus, we reject the null hypothesis whereby we put the coefficients of all the long run variables to '0', indicating the null hypothesis of no long run relation.

Error Correction Model: The error correction model (ecm) equation is as follow:

$$d(ir) c d(gdp) d(cpi) d(gexp) d(senti) ecm \quad (2)$$

Table-7 shows that of the variables taken in this endeavor inflation (-6.9), gross domestic product (2.1), sentiments (.9) have significant short term relationship with inflation negatively

impacting furthermore GDP and sentiments showing positive trends. Government expenditure is negatively reported and is near to significant level. These results point out that in short run inflation, GDP and sentiment significantly impact investors which is in accordance with the findings of Chen, Roll, and Ross as well; hence contributing to existing literature.

Table-6
Error Correction Representation for ARDL Model
Dependent variable dIR

Test Statistic	Value	Df	Probability
F-statistic	8.444449	(5, 37)	0
Chi-square	42.22224	5	0

ECM, error correction term is negatively significant with adjustment made in one quarter 49.1%. Yet again, evidence that long term relation between variables, is there. Therefore, hypothesis 1, 3 and 5 are accepted in their entirety.

Table-7
Variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.007495	0.029097	0.257586	0.7981
D(GDP)	2.10679	0.80914	2.60374	0.013
D(CPI)	-6.921867	1.814993	-3.813716	0.0005
D(GEXP)	-0.251196	0.12778	-1.965851	0.0565
D(SENTI)	0.899238	0.254439	3.534193	0.0011
ECM	-0.491135	0.142855	-3.437991	0.0014

Conclusion

Pakistani investors generally have hopeful outlook towards investment in the biggest stock exchange market of country KSE hence depicting positive sentiment in this otherwise seemingly depressing condition of economy. Sentiments do fluctuate according to economic conditions of country. The results highlight this point as inflation, one of the most important issues of this country has found to negatively impact stock index returns, GDP to positively impact on stock index returns and sentiment too projecting positively and significantly in the short run.

Still stock exchange thrives under this circumstance which is something to flaunt about. This optimistic attitude of most of the investors in Pakistan depicts the significance of sentiment factor on the country's investment potential. Investors in quest of implementing momentum approach in Asia and possibly elsewhere should be watchful of the sentiment established at the time of portfolio formation. The results also signify that in long run sentiment and inflation have significant role and confirms the logic of base papers with sentiment having positive and inflation having negative impact. These mixed results conclude the fact that sentiment is an important factor in investor decision making of Pakistan.

Other macro economic variables not under present study should be explored and its impact on stock market progress be studied in future. Moreover, impact of global sentiment can also be checked on local sentiment to see its role as well, which could not be dealt in here because of time constraint.

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