MEASURING INVESTOR SENTIMENT ON THE ZIMBABWE STOCK EXCHANGE

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ABSTRACT

Investor sentiment is belief about future cash flows and investment risks not justified by current relevant information. Additionally, investment decisions made without support from information. In classical finance theory, investor sentiment does not play any role in the cross-section of stock prices, realized returns, or expected returns. But inexplicable events such as the crash of October, 1987, The Great Crash of 1929, the Tonics Boom and Go-Go Years of the 1960s, the Nifty Fifty bubble of the 1970s have cast doubt on the standard finance model in which stock prices equal the rational expectations of unemotional investors. Behavioural finance attempts to explain these disparities using investor sentiment. The aims of the study are to document market measures of investor sentiment and to demonstrate whether investor sentiment exerts an influence on the Zimbabwe Stock Exchange. Daily return and trading volume data of 66 stocks, excluding delisted and suspended stocks, for the period from 19 February 2009 to 31 December 2012 were considered. A high-low volume sentiment indicator variable is introduced to distinguish when the market has higher or lower sentiment. An ordinary linear regression was used to show the evidence of the effect of investor sentiment indicator on stock returns. The researcher found that approximately 40% of the market moved contrary to the market sentiment indicator. The remaining 60% co-moved with the sentiment indicator, with the level of effect differing in magnitude, indicating that the sentiment indicator had a positive effect on the indicator. However, these results though are not statistically robust using the binomial test as only five out of the sixty-six stocks (approximately 7%) were significant at a 5% interval. This is less than the number of significant results expected under the null hypothesis. Hence, the null hypothesis cannot conclusively be accepted or rejected, and the effect of the sentiment indicator on returns could not be completely ruled out or established.

Contribution/ Originality: This study contributes in the existing literature on behavioural finance in emerging capital markets. This paper is one of the very few studies on the Zimbabwe Stock Exchange (ZSE) after currency reforms which were implemented in 2009. This study document that investor's sentiment could not be ruled out on the ZSE.

1. INTRODUCTION

Although there may be some agreement that investor sentiment has economic significance, there is no single universally accepted definition of investor sentiment. Zhang (2008) accords this largely to the fact that there is no commonly accepted definition, or theory, of investor sentiment since the term may be used in different ways depending on the context. The term itself is used in different ways by academic researchers, financial analysts, and the media.

Uygur and Tas (2012) mention that some researchers accredit investor sentiment as an inclination to trade on noise, while the same term is employed to make particular reference to investor optimism or pessimism. The term sentiment term is also associated with emotions, thus the media accredit it as investor fear or risk-aversion. In their particular research, Uygur and Tas (2012) regarded the term investor sentiment in terms of beliefs and defined it as "the representation of market players' beliefs about future cash flows in connection with some objective standard which is the correct fundamental value of the stock." This is to say investors subject to sentiment develop their beliefs not only fundamental information, but also irrelevant noisy signals. In line with this definition, but more general, is the possible definition of investor sentiment as the "propensity to speculate." In other words, investor sentiment refers to set of beliefs about cash flows and investment risks that are not necessarily justified by the facts at hand (Baker and Wurgler, 2006).

One might also define investor sentiment as optimism or pessimism about stocks in general. Zhang (2008) defines sentiment as follows; "Investor sentiment represents market participants' beliefs about future cash flows relative to some objective norm, namely the true fundamental value of the underlying asset". Zhang further asserts that a definition of sentiment along these lines captures why sentiment is important in the first place and by restricting our attention to this particular notion of sentiment, it is possible to develop a cohesive model, relying on specific assumptions and pre-existing theories of asset pricing and investor behaviour.

In line with the above, but from a demand perspective is the definition offered by Mclean and Zhao (2009). They defined sentiment as demand for securities that is not justified by fundamentals. This definition was well in line with their research which dealt with real investment and investor sentiment.

A definition of sentiment along the lines with efficient market hypothesis (EMH) is that sentiment is "the irrational component of investor expectations (Ling *et al.,* 2010). Sentiment results in decisions contrary to those that would be made by a rational investor under EMH, and hence a mispricing occurs in the stock market. The definition for investor sentiment used throughout this research is as outlined by Yung-Chou (2005) which is as follows; "Investor sentiment refers to the enthusiasm of irrational investors on an asset, relative to that of rational investors."

2. LITERATURE REVIEW

Measuring sentiment is controversial. Zhang (2008) subscribes this to the fact that doing so requires a preliminary judgment as to what the ideal measure should capture, and this is further complicated by the fact that researchers typically have a wide range of priors regarding what sentiment really is, and thus how to best measure it. Therefore there is need to assess the merits of the approaches to measuring sentiment in line with the proposed definition of investor sentiment.

There are many proposed sentiment measures in financial literature, ranging from measures that are developed for academic research, to daily indices employed by traders to use when making investment decisions. Examples include closed-end fund discount, consumer confidence indices, investor intelligence surveys, market liquidity and trading volumes as well as implied volatility of index options. There is no consensus about which sentiment measure is more accurate and efficient.

There are two basic approaches to measuring investor sentiment namely explicit or market based proxies for sentiment and direct surveys measures or implicit proxies. The measurement of sentiment is examined in two parts in the following section; the first part examines the market based approach that looks for extracting sentiment indirectly from financial proxies. The second part looks at the explicit approach of measuring sentiment directly from investors using surveys and questionnaires.

2.1. Market Proxies

Supporters for using market proxies for sentiment claim that specific financial data procure a dependable basis for sentiment approximation, although it is an indirect way of quantifying actual investor beliefs, as compared to direct methods to be described later. Most of the market-based proxies are derived from empirical puzzles like closed-end fund discount and Initial Public Offering under-pricing. Although no single measure is a pure indicator of sentiment, each imperfect proxy is likely to contain a sentiment component, as well as idiosyncratic, non-sentiment related components (Baker and Wurgler, 2006; Ling *et al.*, 2010).

It is important to also take into consideration the relative timing of the variables—that is, if they exhibit lead-lag relationships, some variables may reflect a given shift in sentiment earlier than others. Generally, proxies that involve firm supply responses for example a number of Initial Public Offerings (IPOs) can be expected to lag behind proxies that are based directly on investor demand or investor behaviour (Share Turnover, Closed End Fund Discount and returns on IPOs). Substantial variation both within and across our indirect proxies may also be observed. However, there is also substantial persistence in the levels and changes in the indirect proxies as noted by the sensitivity of the IPO market to investor sentiment (Ling *et al.*, 2010).

High first day returns on IPOs cited as a measure of investor enthusiasm, and the low idiosyncratic returns on IPOs often interpreted as a symptom of market timing. Lowry and Schwert (2002) found that IPO volume lags the first-day returns on IPOs. Perhaps sentiment is partly behind the high first-day returns, and this attracts additional IPO volume with a lag. The market timing of IPOs and secondary equity offerings have been used to measure investor

sentiment in the general stock market (Baker and Wurgler, 2000). Uygur and Tas (2012) argued that IPOs can be explained by investor enthusiasm. Rational firms exploit the prevailing market sentiment to raise new equity and therefore IPOs come in waves which relate to periods of high or low sentiment. In addition to this, IPOs are subject ample under-pricing, resulting in a considerable price increase on the first day of trading, when these companies first go public (Uygur and Tas, 2012). Based on the above, some researchers have used data on IPOs as a proxy for investor sentiment. Qiu and Welch (2006) constructed an index in their study based on violations of the law of one price in new equity issues. Baker and Wurgler (2006) have used high first day returns on IPOs or IPO volume as a measure of positive investor sentiment. Basing a sentiment measure solely on IPOs does not explain the sentiment fully and there might be confounding factors, though IPOs and sentiment are correlated (Uygur and Tas, 2012).

The closed-end fund discount, CEFD, is the average difference between the net asset values (NAV) of closed-end stock fund shares and their market prices. The CEFD remains the only widely used proxy of investor sentiment, and is itself a component in some other measures of investor sentiment (Qiu and Welch, 2006). It has been suggested that CEFD is inversely related to sentiment (Baker and Wurgler, 2006). Uygur and Tas (2012) summarise the puzzle of the CEFD simply as follows; "if it is accepted that markets are efficient and arbitrage opportunities are exploited immediately, then why are closed-end funds traded at a discount?" Lee *et al.* (1991) suggest that closed-end fund discounts represent movements in stock prices away from fundamental values and this may, in part, be a reflection of the price impact of sentiment-based trading during periods of investor optimism or pessimism and they argue that sentiment is behind various features of closed-end fund discounts. Lee *et al.* (1991) further demonstrated that if decreases in the CEFD are positively correlated with asset returns held by irrational investors, then changes in the CEFD should be correlated negatively with retail sentiment. Uygur and Tas (2012) showed confirming evidence that small firms outperform large firms when the CEFD decreases. Uygur and Tas (2012) acknowledged though that although CEFD is used as a consistent proxy for investor sentiment in many studies, the extent to which CEFD can be used as a sentiment measure has limitations based on the explanations provided in (Ross, 2005; Qiu and Welch, 2006) which provided significant evidence that CEFD alone may not be sufficient to account for all investor sentiment because of omitted variable problem or confounding variables. Qiu and Welch (2006) attempted to validate CEFD as a proxy for investor sentiment, against a more direct proxy for investor sentiment from Union Bank of Switzerland-Gallup survey, a sentiment measure. Qiu and Welch (2006) found that the CEFD has no correlation with the Union Bank of Switzerland-Gallup survey (or other proxies of investor sentiment), which we would not expect if CEFD was a measure of sentiment. Hence they concluded that CEFD is not a good proxy for investor sentiment. Other researchers have provided rational explanations for the CEFD puzzle such as agency costs, illiquidity of assets, and tax liabilities (Ross, 2005).

Flows into and out of mutual funds have been used as a proxy for investor sentiment. Ling *et al.* (2010) highlighted that shifts in capital flows to dedicated mutual funds may indicate periods of high or low investor sentiment. Brown and Cliff (2004) proposed that the movements of fund investors between risk-free bonds and risky growth stock funds can be used as a market

sentiment measure. Frazzini and Lamont (2005) used fund flows as a proxy for sentiment for individual stocks, and found that when there is a considerable inflow to funds that hold a specific stock, the consecutive performance of that stock is relatively weak. Brown and Cliff (2004) noted that in times of high investor sentiment, individual investors cumulatively buy mutual funds. Clayton *et al.* (2009) argue that net commercial mortgage flows are generally viewed by industry participants as an indicator of investment sentiment, in part because of the association between past real estate cycles and excessive mortgage flows during periods in which default risk may have been under-priced by lenders. Therefore, periods of increased commercial mortgage flows may reflect the influence of investor sentiment.

Dividend premium refers to the log difference of the average market-to-book ratios of payers and nonpayers (Baker and Wurgler, 2006; Uygur and Tas, 2012). Baker and Wurgler (2004) use this variable to proxy for relative investor demand for dividend-paying stocks. Firms which pay dividends are large and profitable, with weak growth opportunities, the dividend premium may proxy for the relative demand for this correlated bundle of characteristics (Fama and French, 2001).

A number of researchers suggest that trading volume, or more commonly liquidity, can be used as a proxy for investor sentiment. Trading volume refers to the share turnover, that is, the number of shares traded, divided by the number of shares outstanding. Share turnover eliminates the high association between trading volume and firm size (Watkins, 2002). Hou *et al.* (2009) used trading volume as a proxy since they argue that active trading involves investors' attention in analysing their portfolios and asset fundamentals. When they pay less attention to a stock, they are less likely to trade it; and when they pay more attention to a stock, behavioral biases such as overconfidence can give rise to heterogeneous opinions among investors about the stock, thus generating more trading (Odean, 1998; Scheinkman and Xiong, 2003). Baker and Wurgler (2004) argue that share turnover (or trading volumes or more generally, aggregate market liquidity) can serve as a sentiment proxy because in a market with short sale constraints, irrational investors participate only when they are optimistic, and therefore liquidity will likely increase during periods of investor over-confidence. This is to say, high liquidity is a symptom of overvaluation. This is a deviation from the fundamental value of the stock and is caused by investor sentiment. It must be noted that though volume is related to liquidity, it is not defined by it. Liquidity is more elusive and essentially describes ease of trade. Volume can, in some cases, represent increased liquidity, but it also serves as a measure of information dispersion and investor attention (Watkins, 2002).

Baker and Wurgler (2006) proposed the share of equity issues in total equity and debt issues as another measure sentiment, and defined equity share as "the gross equity issuance divided by gross equity plus gross long-term debt issuance." Baker and Wurgler (2000) noted that high values of the equity share predict low market returns and investor sentiment causes equity to be overvalued. Therefore, managers who try to time the market prefer to issue equity rather than debt when sentiment is high, and vice versa. Baker and Wurgler (2006) further noted that while they both may reflect equity issues, the number of IPOs and the equity share have important differences. The equity share includes seasoned offerings, predicts market returns, and scales by

total external finance to isolate the composition of finance from the level. On the other hand, the IPO variables may better reflect demand for certain IPO-like regions of the cross-section of returns that are most sensitive to sentiment (Baker and Wurgler, 2006).

The put-call ratio (the number of calls traded divided by the number of puts traded) is also a prominent proxy for investor sentiment (Brown and Cliff, 2004). The put-call ratio measures how bullish or bearish the market is. In times when most stocks perform strongly, the number of calls bought typically far outweighs the number of puts bought, resulting in a relatively low put-call ratio. The opposite holds in times when most stocks perform poorly (Finter *et al.*, 2008). Instead of using a single sentiment measure, some have averaged or combined different sentiment measures to reduce the biases inherent in each of the various proxies. Baker and Wurgler (2006) developed a sentiment index which averaged six commonly used proxies for investor sentiment using principal component analysis: trading volumes based on New York Stock Exchange turnover, the dividend premium, the closed-end fund discount, the number and first-day returns on IPOs, and the equity share in new issues. Each proxy was regressed on macroeconomic variables (industrial production, real growth in durable, non-durable, and services consumption, growth in employment, and National Bureau of Economic Research recession indicator) to get rid of the economic fundamental effects. Then principal component analysis is used to extract the common features into an averaged index. Baker *et al.* (2009) also utilized this methodology to create local and global sentiment indices across six major international stock markets. Ling *et al.* (2010) again followed the Baker and Wurgler (2006) framework to construct an indirect measure of investor sentiment for the general stock market. They used principal component analysis to generate a quarterly sentiment index based on the common variation in six underlying proxies of investor sentiment in the stock market: the Closed-End Fund Discount, share turnover, the number of Initial Public Offerings, the average first-day returns on Initial Public Offerings, the share of equity issues in total equity and debt issues, and the dividend premium.

3. METHODOLOGY

The data related to the study was taken for sixty six (66) stocks from the Zimbabwe Stock Exchange (ZSE). The 66 stocks were chosen from the industrial stock exchange market but excluded those counters that were either suspended or delisted during the period. Only those stocks in which a complete set of data for the period could be ascertained were included in the study. Furthermore, stocks that had five or more consecutive days of no trading were excluded from samples that included that period. For non-trading periods shorter than five days, the stocks were included and the return for those days was taken as zero. Samples cannot begin later than 2010 as they need to have at least 500 workdays of observations available following the beginning date, hence any new listings after 2010 were also excluded.

3.1. *Research Variables and Data Analysis*

A sentiment indicator that condenses information of several well-known sentiment proxies was required. In this instance, it was based on the trading volumes as an indicator of investor sentiment. A high-low volume indicator variable V_t similar to the one used in Li (2008) was used

to evaluate the relationship between investor sentiment, stock returns, and the day of the week. This high-low volume indicator variable was introduced to distinguish when the market has higher or lower sentiment. In this case, the trading volumes in monetary terms (US$) is taken to be the investor sentiment indicator. If the trading volumes are greater than the previous five day average, the indicator is set to 1, and to 0 otherwise. Day-of-the-week variables are also employed together with this investor sentiment indicator to check the effect on stock returns and changing directions. In the equation below, TV stands for the investor sentiment proxy of trading volumes. Whenever the TV exceeds the previous week's average (average of last 5 days' investor sentiment), it is equal to 1 and to 0 otherwise, shown as follows;

$$V_t = \begin{cases} 1 \ if \ TV_t > (TV_{t-1} + TV_{t-2} + TV_{t-3} + TV_{t-4} + TV_{t-5})/5 \\ \\ 0 \ otherwise \end{cases}$$

A weekly indicator was determined for the whole market using the total volumes traded per week on the market. This reflected the sentiment of the investors for the whole market. A sentiment indicator was also determined using the weekly total traded volumes for each stock. This was referred to as the stock sentiment indicator, V_{it} and it referred to the sentiment of the investors with respect to each particular stock independent of other stocks. The following model aimed to testify that there is a positive effect of investor sentiment, as proxied by trading volume, on stock returns on the Zimbabwe Stock Exchange. The null hypothesis is given as,

H0: Investor sentiment has no effect on future stock market returns of the Zimbabwe Stock Exchange

An ordinary linear regression was used to show the evidence of the effect of investor sentiment on stock returns. Firstly, the closing stock return in a given week was regressed on market investor sentiment V_{it} shown as follows

$$r_{it} = \alpha_i + \beta_i V_t + \varepsilon_{it}$$

Where V_t or V_{it} – the stock sentiment indicator

r_{it} is the weekly closing return for each portfolio.

β_i is the sentiment indicator parameter.

V_{it}, reflects the investor's sentiment with respect to each portfolio. The sentiment indicator parameter, β_i reflects the relationship of the stock return, r_{it}, with the sentiment indicator, V_t

r_t is defined as the continuously compounded return at time t:

$$r_t = 100 \log \frac{P_t}{P_{t-1}}$$

Where P_t is the closing price at time t. Log refers to the natural logarithm.

A Student's *t*-test was employed to determine whether the results obtained for each test were significant or not. A critical value of 5% was assumed. If the *p*-value was less than 0.05, then the value is significant and we reject the null hypothesis, and there is no effect or relationship. To determine whether the results of the student's *t*-test were consistent with the hypothesis H₀ for the whole sample, a binomial test similar to the one used by Oran and Soytas (2008) was

employed. The outcomes from each *t*-test were either significant or insignificant, with probabilities for *p* for significant, and 1-*p* for insignificant. The *t*-test results follow a Binomial with parameters *n* and *p*, where n is the number of samples. In order to determine whether the results of a particular test are consistent with a particular hypothesis or distribution, the *p*-value is calculated. This is the probability of getting a result (successes or s) as, or more, inconsistent with the null hypothesis than the data actually observed, assuming the null hypothesis is true. In this case, it is the probability of getting as many significant results, under the null hypothesis, as those observed in the actual data. The predetermined cut-off point, α, is 5% since our t-tests were calculated at a 5% significance interval (Banfielder, 2008).

4. RESULTS AND DISCUSSION

Appendix 1 shows the relationship of each stock return to the market sentiment indicator V_t as reflected by the market sentiment parameter in the regression equation, or β_i. β_i ranged from -2.28047 to 4.83245 with βi being positive for 39 stocks, and negative for 27 stocks. This meant that contrary to expectations, approximately 40% of the market moved contrary to the market sentiment indicator, and were negatively affected by investor sentiment. The remaining 60% though, co-moved with the sentiment indicator, with the level of effect differing in magnitude. As expected, N.T.S., which had the highest volatility of 30.59% as well as being one of the smallest in firm size, had the highest beta of 4.83245. These results were not statistically robust using the binomial test. Only five out of the sixty-six stocks (approximately 7%) were significant at a 5% interval. Of these five, four were positively affected by sentiment, while one was negatively affected by investor sentiment. Though the number of significant results was greater than the expected number under the null hypothesis (greater than 5% of the total results), they are insignificant under the binomial test, and hence, the null hypothesis cannot conclusively be accepted or rejected. Hence, the effect of sentiment on returns could not be completely ruled out.

5. CONCLUSIONS

A high/low volume indicator variable was introduced to distinguish when the market has higher or lower sentiment. This high/low investor sentiment variable was used to evaluate the relationship between sentiment indicator and stock returns. 39 stocks had a positive market sentiment parameter and 27 stocks had a negative market sentiment parameter, meaning that contrary to expectations, approximately 40% of the market moves contrary to the market sentiment indicator. The remaining 60% though, co-moves with the sentiment indicator, with the level of effect differing in magnitude. These results though are not statistically robust using the binomial test as only five out of the sixty-six stocks (approximately 7%) were significant at a 5% interval. Hence, the null hypothesis cannot conclusively be accepted or rejected. Hence, the effect of sentiment on returns could not be completely ruled out. These results contradict (Li, 2008) who found a significant positive role of investor sentiment on the returns.

The researcher recommends that investor sentiment should be taken into consideration when making investment decisions, and when coming up with financial models on the ZSE, but further research is required as this study was narrowed down to a specific proxy for sentiment, and to the

industrial index of ZSE. Behavioural finance is a fairly recent area of study and there are many areas of further research. These may include; determining the effect of investor sentiment using other proxies suggested in literature and investigating the suitability of trading volumes, and other suggested proxies of investor sentiment as measures of investor sentiment.

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APPENDICES

	Beta	Std. Error	T	p-value	Significant at a 5% interval	Minimum Statistic	Maximum Statistic	Std. Deviation Statistic	Variance Statistic	Average Firm Size
Coefficient of Market Sentiment Indicator										
ABCH	0.73464	1.05839	0.69411	0.48848	_	-69.31%	40.55%	6.59668%	43.516	38,115,633.75
AFDIS	0.33605	0.75623	0.44438	0.65729	_	-33.65%	33.65%	4.77655%	22.815	13,798,323.56
AFRE(fml)	-0.55702	0.72588	-0.76738	0.44383	_	-179.18%	69.31%	9.61583%	92.464	11,849,335.80
AFRICANSUN	2.73055	1.33180	2.05026	0.04174	*	-45.68%	51.08%	7.76040%	60.224	26,775,250.42
AICO AFRICA	0.85502	0.68412	1.24981	0.21294	_	-109.86%	38.57%	6.65551%	44.296	95,898,066.15
APEX	-0.42035	1.03687	-0.40540	0.68565	_	-91.63%	91.63%	9.29405%	86.379	1,181,679.71
ARIS	0.95884	1.33052	0.72065	0.47203	_	-109.86%	69.31%	10.55044%	111.312	6,299,203.51
ART	3.96637	1.65879	2.39112	0.01779	*	-205.13%	82.38%	11.30086%	127.709	6,467,484.00
ASTRA	-0.16330	0.96512	-0.16920	0.86582	_	-78.85%	69.31%	8.03966%	64.636	4,805,036.33
BAT	0.35021	0.42236	0.82918	0.40807	_	-78.28%	27.02%	4.40423%	19.397	37,997,189.21
BARC	0.35436	1.15421	0.30702	0.75918	_	-91.63%	69.31%	6.39679%	40.919	153,800,571.20
BORD	0.88792	1.42593	0.62270	0.53425	_	-138.63%	109.86%	10.63226%	113.045	17,278,807.12
CAFCA	-0.42261	0.54240	-0.77916	0.43688	_	-32.85%	109.86%	5.75917%	33.168	4,792,607.71
CAIRNS	0.37475	1.68446	0.22247	0.82419	_	-91.63%	91.63%	9.21789%	84.969	3,261,786.77
CBZ	0.82847	1.02474	0.80847	0.41985	_	-69.31%	69.31%	6.25357%	39.107	90,420,704.49
CFI	0.76488	0.57495	1.33033	0.18504	_	-47.00%	45.20%	4.82822%	23.312	16,077,308.93
COLC	-0.03802	0.82187	-0.04626	0.96315	_	-40.55%	37.47%	5.38523%	29.001	48,901,781.52
DAIR	0.91931	0.74898	1.22742	0.22122	_	-69.31%	33.65%	5.53959%	30.687	52,251,047.88
DAWN	1.15627	1.16821	0.98978	0.32357	_	-69.31%	69.31%	7.47714%	55.908	29,154,974.28
DELT	0.38778	0.39894	0.97204	0.33229	_	-28.77%	22.31%	3.13266%	9.814	714,737,461.01
ECONET	0.44339	0.30425	1.45732	0.14672	_	-230.26%	19.09%	7.68776%	59.102	399,515,937.18
EDGA	-0.20808	1.06014	-0.19628	0.84461	_	-69.31%	55.96%	7.12409%	50.753	17,901,883.63
FBCH	0.47107	1.05326	0.44725	0.65521	_	-51.08%	69.31%	6.86732%	47.160	24,263,705.09
FIDELITY	0.79630	1.52289	0.52289	0.60167	_	-109.86%	160.94%	11.19452%	125.317	7,998,895.15
GEN BELT	-1.86294	1.89389	-0.98366	0.32656	_	-132.18%	83.62%	11.04292%	121.946	1,098,019.36
HIPP	-0.20063	0.72074	-0.27837	0.78104	_	-17.59%	33.65%	4.00465%	16.037	189,783,035.38
HUNY	-0.43270	1.07844	-0.40123	0.68871	_	-69.31%	91.63%	8.07569%	65.217	16,498,401.06
INNS	0.38325	0.50555	0.75808	0.44936	_	-69.31%	51.08%	4.16154%	17.318	311,834,484.02
INFR	0.57036	1.80145	0.31661	0.75189	_	-69.31%	91.63%	12.17082%	148.129	1,885,246.81
LAFARGE(circ)	-0.75941	0.90273	-0.84124	0.40129	_	-232.06%	220.73%	11.63123%	135.285	71,120,717.53
M &R	-0.64603	0.95924	-0.67348	0.50148	_	-69.31%	69.31%	7.09663%	50.362	27,296,258.23
MASH	2.34673	1.08546	2.16196	0.03190	*	-138.63%	92.90%	9.18716%	84.404	35,648,596.25
MEDTECH	1.01230	2.35949	0.42904	0.66839	_	-160.94%	138.63%	15.54637%	241.690	1,926,144.85
MEIKLES	0.39967	0.57932	0.68989	0.49112	_	-40.55%	22.31%	3.96076%	15.688	87,401,073.73
N T S	4.83245	5.57938	0.86613	0.38754	_	-461.42%	461.42%	30.59221%	935.884	3,774,620.86
N.M.B.Z	0.99500	1.11763	0.89028	0.37447	_	-120.40%	91.63%	10.46782%	109.575	22,577,530.66
NATF	1.48917	0.65850	2.26144	0.02489	*	-35.14%	34.83%	4.40757%	19.427	67,134,274.19
NICOZ	1.48754	2.39391	0.62138	0.53511	_	-138.63%	69.31%	10.86952%	118.146	9,741,259.42
OK ZIM	-0.00583	1.28714	-0.00453	0.99639	_	-58.78%	91.63%	5.61697%	31.550	81,696,237.81
OLDMU	-0.17040	0.35607	-0.47855	0.63282	_	-22.31%	35.67%	2.67694%	7.166	152,472,469.92

				Significant at a 5% interval	Minimum Statistic	Maximum Statistic	Std. Deviation Statistic	Variance Statistic	Average Firm Size
	Beta	Std. Error	T	p-value					
PEARL PROP	-1.03429	0.85835	-1.20498	0.22974	_	-109.86%	69.31%	7.10203%	50.439	30,089,812.00
PELH	1.89507	1.74651	1.08506	0.27930	_	-138.63%	138.63%	14.72478%	216.819	3,286,486.81
PGI	1.73301	1.30335	1.32966	0.18526	_	-94.45%	94.45%	9.62332%	92.608	13,229,096.77
PHOEN	-2.16843	1.67198	-1.29692	0.19627	_	-109.53%	69.31%	9.22590%	85.117	1,916,350.87
PIONEER	-0.46114	2.44325	-0.18874	0.85050	_	-160.94%	219.72%	14.11548%	199.247	2,927,211.88
POWR	-0.87205	1.02401	-0.85160	0.39553	_	-98.69%	69.31%	7.52517%	56.628	5,162,179.44
PPC	0.08808	0.47922	0.18381	0.85437	_	-458.94%	460.55%	21.10437%	445.395	57,523,992.20
R T G	0.22882	1.19769	0.19105	0.84869	_	-69.31%	42.74%	7.74752%	60.024	32,363,165.28
RADA	-0.67346	2.09381	-0.32164	0.74809	_	-132.18%	62.86%	9.96369%	99.275	11,132,577.16
RED	-1.26325	3.21174	-0.39332	0.69453	_	-189.71%	179.18%	16.13988%	260.496	1,310,751.24
SEED	0.65433	0.47563	1.37573	0.17056	_	-13.35%	87.55%	4.44459%	19.754	177,424,555.18
STAR AFRICA	0.91906	1.32004	0.69624	0.48715	_	-40.55%	84.73%	7.57966%	57.451	24,135,723.48
T.S.L	1.10178	1.11115	0.99157	0.32269	_	-40.55%	71.78%	6.58729%	43.392	28,023,269.31
T.P. H	-0.60597	0.53384	-1.13511	0.25779	_	-109.86%	69.31%	7.61480%	57.985	12,309,218.03
TA	-1.66664	1.51865	-1.09745	0.27386	_	-151.16%	151.16%	9.54086%	91.028	50,121,796.63
TN Bank	-0.10834	1.46767	-0.07382	0.94124	_	-355.53%	355.53%	18.58493%	345.400	13,463,769.53
T.H.L	-0.53764	1.20697	-0.44545	0.65652	_	-69.31%	69.31%	9.16315%	83.963	4,637,757.84
TRUW	0.85983	1.30078	0.66101	0.50943	_	-45.95%	69.31%	7.39867%	54.740	13,992,790.21
TURNALL	1.92256	1.31569	1.46126	0.14563	_	-94.80%	91.63%	8.59881%	73.940	27,944,687.68
W/DALE	0.28365	2.10769	0.13458	0.89309	_	-109.86%	69.31%	12.91591%	166.821	3,960,912.51
ZBFH	-1.08511	0.60784	-1.78520	0.07586	_	-43.08%	69.31%	6.03374%	36.406	16,179,387.61
ZECO	-0.86760	4.38064	-0.19805	0.84322	_	-299.57%	230.26%	22.69231%	514.941	2,029,789.02
ZIMPA	1.18228	1.28886	0.91730	0.36017	_	-58.78%	51.08%	8.01339%	64.214	4,780,562.47
ZIMPL	1.63772	0.99332	1.64874	0.10089	_	-109.86%	69.31%	8.00993%	64.159	17,011,496.47
ZIMRE	-2.28047	0.98672	-2.31116	0.02192	*	-69.31%	69.31%	7.69186%	59.165	11,974,325.14
ZPI	-1.11519	0.75961	-1.46812	0.14376	_	-51.08%	69.31%	6.80047%	46.246	13,681,762.54

Coefficient of Market Sentiment Indicator

* means significant at 5% level.