

# ANÁLISIS EMPÍRICO DEL COMPORTAMIENTO DE MANADA EN LA BOLSA DE PAKISTÁN

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## RESUMEN

Este estudio intenta analizar e identificar la presencia de comportamiento de rebaño entre los inversores, utilizando los rendimientos diarios de 387 acciones que cotizan en la Bolsa de Valores de Pakistán (PSX) desde el 1 de enero de 2009 hasta el 31 de diciembre de 2017. También investiga las diferencias en el comportamiento de los inversores en diferentes condiciones de mercado y en diferentes sectores listados en PSX. El estudio utiliza el modelo CSAD (dispersión seccional absoluta) propuesto por (Chang et al., 2000) para probar la presencia de comportamiento de pastoreo en PSX. Los resultados del estudio no respaldan la existencia generalizada de pastoreo en la Bolsa de Valores de Pakistán en general, mientras que el análisis sectorial (específico de la industria) revela evidencia de pastoreo en 4 sectores que figuran en la Bolsa de Valores de Pakistán.

Palabras Clave: Comportamiento de rebaño, Bolsa, Mercados Emergentes, Eficiencia del Mercado

## Empirical Analysis of Herd Behavior in Pakistan Stock Exchange

### ABSTRACT

This study attempts to analyze and identify presence of herd behavior amongst investors, using daily returns of 387 stocks listed on Pakistan Stock Exchange (PSX) from January 1, 2009 to December 31, 2017. It also investigates difference in investor behavior under different market conditions and across different sectors listed on PSX. The study uses CSAD (Cross Sectional Absolute Dispersion) model proposed by (Chang et al., 2000) to test presence of herding behavior in PSX. The results of the study do not support widespread existence of herding in Pakistan Stock Exchange overall whereas sectoral (industry specific) analysis reveal evidence of herding in 4 sectors listed in Pakistan Stock Exchange.

Keywords: Herd Behavior, Stock Exchange, Emerging Markets, Market Efficiency

Clasificación JEL: E29, G14, G15

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## 1. INTRODUCTION

Recently, researchers have become more interested in investors' behavior because changes in investor behavior can affect financial markets and asset prices. Herd behavior and investors' psychology are the main areas of focus for behavioral finance studies. Analysis of herd behavior focuses on the similarity of actions of different investors during trading of financial assets/securities. This paper examines the concept of herd behavior in Pakistan stock exchange. Herd behavior can be defined as the behavior of investors following other investors and taking bets in a similar direction. (Lakonishok et al., 1992) defined herd behavior as "buying (selling) simultaneously the same stocks as others buy (sell)". Herd behavior can be classified into two types; Intentional herding (Irrational herding) and Unintentional herding (Rational herding) (Bikhchandani et al., 2001). Unintentional herding refers to "the phenomenon where groups facing similar decision problems and information sets, take similar decisions". This behavior arises due to change in fundamentals; e.g., a sudden surge in interest rates may trigger simultaneous sale of highly leveraged stocks by all investors. On the other hand, intentional herding refers to the behavior, when groups intentionally follow others due to informational cascades or reputation reasons, it is inefficient and generally marked by financial fragility (Bikhchandani and Sharma, 2001). Herd behavior has been observed in the financial markets since the seventeenth century. The first major asset bubble of tulip mania (in Holland) is believed to be caused by the imitating behavior of investors and irrational purchase of tulips, which drove the prices of tulips to unexpectedly high level before the market crash. The more recent observation is the market crash of 2008 in the United States. Many researchers believe that herding has a negative impact on the overall stability of the financial system. Herding in stock markets, drive the prices of equities away from their fundamental values besides increasing volatility in their returns (Tan et al., 2008). Additionally, it also has the tendency to debilitate the financial markets and make financial markets seem more fragile.

Pakistan Stock Exchange (PSX) is considered as one of the leading emerging stock markets in the world and is a target of many International fund managers and foreign investors. During the last decade the Pakistan Stock Market has gone through significant volatility and variations. Pakistan Stock Exchange (PSX) came into existence in January, 2016 as a result of demutualization and merging of three bourses of Pakistan namely; Karachi Stock Exchange, Lahore Stock Exchange and Islamabad Stock Exchange. PSX facilitates both local and foreign investors, institutional as well as retail. It was ranked amongst the top performers of stock market between 2019 and 2015. As of February, 2018, total of 559 companies are listed across 35 sectors, on PSX with the total market capitalization of \$84 billion.

The motivation for this research is to adequately study the presence of herd behavior in Pakistan. Authors have used Cross Sectional Absolute Dispersion (CSAD) model proposed by Chang et al (2000), and the rationale for using original model is that, Pakistani stock market is relatively young and the phenomenon of herd behavior is new to the market, Therefore, not enough studies have been conducted on the subject matter. The earlier studies conducted on Pakistani market have mostly used Cross Sectional Standard Deviation (CSSD) model proposed by Christie and Huang (1992), which only measures herd behavior in stress conditions only; where standard deviation is defined as 5% or 10% but Chang et al (2000), argues in their paper that herding may be present in all conditions. Therefore, CSAD is relatively sophisticated measure for examining market's tendency to exhibit herd behavior text line

## 2. LITERATURE REVIEW

This section presents a brief overview of the existing literature on herding behavior in financial markets. I have partitioned the literature review into two parts i.e. Theoretical Literature and Empirical Literature. The focus of theoretical literature is to ascertain reasons behind the existence of herd phenomenon and its classification and to identify motivations for various types of herd behavior. Whereas, the empirical literature presents the findings of earlier researches conducted on herd behavior in financial markets.

## 2.1. Theoretical Literature

There are two sets of opposing theories used to explain investor behavior in financial markets, the traditional finance theories and the behavioral finance theories. The traditional framework is mostly based on efficient market hypothesis (EMH) and its implications. As per EMH theory of Eugene Fama, in an efficient market, asset prices always “fully reflect” all the available information and investors always make informed decision and are rational with respect to their investment decisions. The empirical evidence researchers found in the 1960s and 1970s was consistent with the EMH. Thus, it became both a theoretical and empirical success (Shleifer, 2000). However, later in 1980s several empirical results that were not consistent with efficient market theory came to light (Shefrin, 2000). The notion of efficient security prices has long been challenged by several scholars, including: (Nicholson, 1968) and (Basu, 1977) who suggests that stocks with high price-to-earnings ratios (PE) are overvalued and stocks with low (PE) ratios are undervalued (De Bondt, 2008). Calendar Anomalies have also been recorded; (Keim, 1983) found the empirical evidence of January effect and reported that daily stock return distributions in January have higher means in comparison to the remaining months of the year. In response to the failure of traditional financial models based on the EMH to explain these anomalies, a new field of behavioral finance emerged. Behavioral finance looks at finance from a social science’ point of view and incorporates elements of both sociology and psychology. These days, it has gotten much attention and become one of the most important research fields (Shiller, 2003). Further, (Barberis and Thaler, 2003) emphasized that the field of behavioral finance has two primary aspects: limits to arbitrage and psychology. They assumed that real world arbitrage is both risky and costly. Therefore, stock prices may remain away from their fair value. This notion violates the EMH which states that in an efficient market, stocks will always trade at their fair value. The second aspect, psychology, focuses on how and why people make investment decision. After several stock market crashes especially 2008 Global financial crises, investors’ psychology has come to light as an important factor in the financial market (De Bondt et al., 2008). Additionally, the failure of traditional models to describe the past market behavior and market phenomenon such as panic selling and market euphoria, imply that rational decision making by participants does not always exist in the financial markets. Behavioral finance advocates that human psychology may provide a viable explanation for such market phenomenon and past behavior. In fact, nowadays the tendency of individuals to mimic the actions of other’s, is of particular interest (De Bondt et al, 2008).

### 2.1.1 Rational vs Irrational Herding

Characterizing herd behavior in financial market is a very difficult undertaking because of the several complexities involved. Scholars try to differentiate herd behavior from normal behavior in the market. Herd behavior can be of different type i.e. Spurious and Intentional (Devenow & Welch, 1996). Spurious herding is also known as unintentional or rational herding and Intentional herding is also known as irrational herding. The Rational herd behavior occurs due to external factors such as incentives and misleading information (Scharfstein and Stein, 1990); (Banerjee, 1992); (Bikhchandani et al, 1998); (Avery and Zemsky, 1998). (Bikhchandani and Sharma, 2001), concluded that three main reasons for rational herd behavior are information gap, reputation concern and compensation plan for asset managers. Herd behavior caused by information gap also known as informational cascades might help in explaining market behavior. For example, when firms decide to invest in R& D in a specific area or when analysts decide to recommend a particular stock, informational cascades are weak (Devenow and Welch, 1996). Variety of shocks could cause an informational cascade; e.g. entry of informed investors, arrival of new public information etc. (Bikhchandani et al, 1998). (Scharfstein and Stein, 1990) studied herding based on reputation concerns. Their model categorizes managers as either smart or dumb. They assumed that smart managers have informative signals whereas dumb investors have uninformative signals related to investment decision and smart managers’ decisions are highly correlated whereas dumb investors’ are not. According to them, manager’s poor quality is only revealed if other managers did not make the same bet. If the managers made similar bad investments, then they could blame it on poor investment climate. Due to this phenomenon, it might be rational for the managers to

follow others and avoid being the only manager investing in a risky asset. Whereas, herding due to compensation structures occurs when manager's compensation is based on their performance relative to other asset managers. This creates an incentive for the manager to herd (Bikhchandani and Sharma, 2001). Finally, non-rational herding occurs when investors ignore all rational analysis and began to imitate others and follow them blindly (Devenow and Welch, 1996).

### *2.1.2 Herd Behavior and Efficient Market Hypothesis*

Herd behavior may be a key factor to the uneven rise and fall in asset prices. The herding effect on stock price movement, violates the efficient market hypothesis especially its assumption about the rationality of investors' decisions and can result in mispricing of stocks. The valuation models based on EMH such as CAPM work under the assumption of rationality of investors decisions. When investors move away from rational choices and began to exhibit herd behavior, these valuation models based on linear relationships may no longer hold true.

## **2.2 Empirical Literature**

Empirical Studies on herd behavior indicate that results vary across financial markets and time. One gathering of researchers opines that markets indicate herding behavior with varying degree in different market conditions (Chang et al., 2000); (Chiang & Zeng, 2010); (Lindhe, 2012); (Prosad et al., 2012). On the other hand, the second gathering observes no significant evidence of herding in the financial markets (Demirer and Kutun, 2010); (Garg and Jindal, 2014); (Ashish Kumar et al, 2016).

Several studies have found evidence, supporting herd behavior in financial markets. The study of (Chang et al., 2000) examined the stock markets in US, Japan, Hong Kong, South Korea and Taiwan by using Christie and Huang's methodology from 1963 to 1997. But their results showed evidence of significant herding only for South Korea and Taiwan markets and partly herding behavior in the Japan market. This may be because of more government intervention, less reliable company information and the existence of more speculators. Furthermore, herding behavior in 18 global stock markets was examined by (Chiang and Zheng, 2010) from 1988 to 2009. According to their results, herding existed in advanced stock markets (except the US market) and in Asian markets. There was no evidence of herding in Latin American markets. In addition, stock return dispersions in the US played a significant role in explaining the non-US market's herding activity. Even though herding was stronger in Asian markets during rising markets, it existed in both up and down markets (except the US and Latin American markets). (Lao and Singh, 2010) also found evidence of herding in Indian and Chinese markets by using CSAD approach of (Chang et al., 2000). Their study says that the intensity of herding increases during extreme market conditions in both the markets. Herding is reported to be greater for Chinese market during bear phase and high trading volume while it is more prevalent during bull phase in India. (Tan et al., 2007) also studied herd behavior of Shenzhen and Shanghai stock markets. They find evidence of herding in both the Shanghai and Shenzhen A-share markets. They found that the evidence of herding was stronger in the Shanghai market at the time of rising stock markets, high trading volume, and high volatility. However, they claimed that there is no herd behavior in the B-share market. (Kabir et al, 2018) studied the herd phenomenon in Asian and Latin American stock markets using smoot transition regression model (SLR). They found significant evidence of herding in India, China, Malaysia and Singapore during high volatility regime. The study of (Lindhe, 2012) found evidence of herding in some European markets. Their study examines herding in Nordic countries; Finland, Sweden, Norway and Denmark by using the model of (Chiang and Zheng, 2010). The study concludes that that Finland exhibits significant local market wide herding while all countries herd around European market in addition to each other. Another research on European markets conducted by (Khan et al., 2011) supported the presence of herding in the stock markets of Great Britain, France, Germany and Italy with the help of model proposed by (Hwang and Salmon, 2001, 2004, and 2008). (Blake et al., 2017) studied the herd phenomenon among pension funds in UK. They analyzed asset allocation of defined benefit plan funds for 25 years and found evidence of significant evidence of herd behavior among pension funds. (Flip et al., 2015) study Central and South Eastern European markets from 2008 to 2010 and observe that

investors herd during decline periods and it exists across all markets except Poland. (Balcilar et al., 2017) studied the cross market herd behavior of emerging stock markets towards oil market. They found no evidence of relationship between oil prices and herding, but strong relationship between volatility in oil market and herding in emerging country stocks. They concluded that low volatility in oil markets is consistent with anti-herding in emerging stocks whereas, high volatility in oil market leads to significant herding in emerging stock markets. Similar study was undertaken by (BenMabrouk et al., 2018), they used a modified version of CSAD model to study cross market herd behavior in American Industries. They analyzed US stocks at sector level from 2000 to 2017. They concluded that sector herding is evident during extreme market movement in Crude oil and that herding is more significant in extreme market downturns in Crude oil. In contradiction to these studies, several researchers observe no significant evidence of herding in financial markets. (Demirer and Kutan, 2006) used the (Christie and Huang, 1995) measure to analyze herd behavior in the Chinese stock market: Shenzhen and Shanghai stock markets. They used daily stock return data to analyze single firm returns and sector returns from 1999 to 2002, and did not find evidence of herding. Similar study was conducted on Indian stock market by (Ashish Kumar et al. 2016), they examined Indian stock market using Cross sectional absolute dispersion approach during 2008-2015 and found no empirical evidence of herding activity. (Kabir et al., 2018) studied the herd phenomenon in Asian and Latin American stock markets using smooth transition regression model (SLR). They found no evidence of herding in Argentina and Brazil. (BenMabrouk et al., 2018), examined the herd behavior in American stocks at sector level during 2000 to 2017 and found no evidence of herding towards sector returns. (Chaffai et al., 2018) analyzed the stock market of GCC countries from 2010 to 2016 using GARCH and Quantile regression technique proposed by (Chiang and Zheng, 2010). They divided the data into upward market and downward market. Their results revealed presence of herding in up market only.

Although several empirical studies are available on financial markets across the world, very few researches have been conducted on Pakistan stock markets and the result have not been conclusive. (Javaira et al., 2015) examined the firms listed on Pakistan Stock Exchange from 2002 to 2007 using methodologies suggested by (Christie and Huang, 1995) and (Chang et al., 2000) and found no evidence of herd behavior. Another research on Pakistan market conducted by (Mohay Ud Shah and Attaullah Shah, 2017) found evidence of herding under stress market. (Nousheen Zafar and Arshad Hassan, 2016), also studied constituent companies of KSE-100 index from 2000 to 2014, to find evidence of herd behavior using CSSD (Cross Sectional Standard Deviation) approach. Their study concluded that market exhibits herd behavior in down market only, when extreme market condition is defined at 5% and in both up and down market, when extreme market situation is defined at 10%.

### **3. DATA AND METHODOLOGY**

Identifying empirical evidence of herding in stocks is a troublesome assignment because of inaccessibility of applicable information. Mostly, historical market information only indicates choices taken by the participants and does not reveal the motivation behind those choices. Amirat and Bouri (2009) partitioned the investigations led so far on herd activity into two gatherings. The primary gathering depends on the individual market participant's trade activities. Subsequently, for this gathering point by point and clear data on the participant's trades is required. Lakonishok, Shleifer, and Vishny (1992) measure is a case of this gathering. Then again in the second gathering, the data about the collective trade activities of the participants is utilized as a sign of group behavior. The cases of such measures are Christie and Huang (1995), Chang, Cheng, and Khorana (2000) and Christie and Chiang (2013).

This examination takes after the second gathering and uses cross-sectional stock prices as a measure of herd activity. The study follows the CSAD model proposed by Chang et al (2000), which is a modified version of the Cross sectional standard deviation (CSSD) model proposed by Christie and Huang (1992). The model is based on the rationale that when investors began to herd they have a tendency to take after the market and, accordingly, stock returns are closer to the average market return.

Although there have been several modifications made to the original CSAD model to increase its sophistication such as Christie and Huang (2013), which incorporates time varying volatility using GARCH models to capture time varying nature of Herd Behavior. We are still using the original CSAD model and the rationale for using original model is that, Pakistani stock market is relatively young and the phenomenon of herd behavior is new to the market, Therefore, not enough studies have been conducted on the subject matter. The earlier studies conducted on Pakistani market have mostly used CSSD model proposed by Christie and Huang (1992), which only measures herd behavior in stress conditions only; where standard deviation is defined as 5% or 10% but Chang et al, argues in their paper that herding may be present in all conditions. Therefore, CSAD is relatively sophisticated measure for examining market's tendency to exhibit herd behavior.

This research is of purely quantitative nature and it is based on daily return of 387 stocks, listed on Pakistan Stock Exchange from 2009 to 2017. In this paper Cross Sectional Absolute Dispersion (CSAD) model has been used to find evidence of herd behavior in Pakistan stock market using Ordinary Least Square (OLS) regression. The study follows the method proposed by Chang et al. (2000). According to their model, the absolute distance between the average individual stock return and the market return decreases as equities' traders began to herd and take on similar positions.

Cross Sectional Absolute Dispersion (CSAD) is a measure of absolute average dispersion of individual stocks' return from the market return. CSAD has been calculated using the following formula.

For overall market:

$$CSAD_{M,T} = \frac{1}{N} \sum_{i=1}^N |R_{i,T} - R_{M,T}| \quad (1)$$

For sectors:

$$CSAD_{S,T} = \frac{1}{N} \sum_{i=1}^N |R_{i,T} - R_{S,T}| \quad (2)$$

Where, N= number of stocks,  $R_{i,T}$  = return on individual stock,  $R_{M,T}$  = return on market portfolio,  $R_{S,T}$  = return on sector portfolio

After the calculation of CSAD of individual returns and sector portfolios' returns for the entire period, following regression equations are used to detect herding activity in the Pakistan Stock Market.

$$CSAD_{M,T} = \beta_0 + \beta_1 |R_{M,T}| + \beta_2 (R_{M,T}^2) + \epsilon_T \quad (3)$$

Equation (3) is used to detect presence of herding in all market conditions.

$$CSAD_{S,T} = \beta_0^S + \beta_1^S |R_{S,T}| + \beta_2^S (R_{S,T}^2) + \epsilon_T \quad (4)$$

Equation (4) is used to detect presence of herding in different sectors listed on PSX.

$$CSAD_{M,T}^{UP} = \beta_0^U + \beta_1^U |R_{M,T}^U| + \beta_2^D (R_{M,T}^U)^2 + \epsilon_T \quad (5)$$

Equation (5) is used to detect herding in Bull market.

$$CSAD_{M,T}^{DOWN} = \beta_0^D + \beta_1^D |R_{M,T}^D| + \beta_2^D (R_{M,T}^D)^2 + \epsilon_T \quad (6)$$

Equation (6) is used to detect herding in Bear market.

In addition to normal, bull and bear market conditions, these above mentioned equations are used to detect herd behavior in extreme market conditions; which are defined as when market return lies in the upper or lower 5% of the tail of return distribution. However, this analysis will be limited to market level returns only.

### 3.1. Hypothesis

Hypothesis of the study is that: when market moves strongly in either direction (Up or down), investors began to follow the market and dispersion of returns of individual stocks from the market return / portfolio return decreases. In order to test the hypothesis, we have tested the

relationship between the market/portfolio returns and CSAD of individual stocks' return at the market level, the sector level and in extreme market conditions.

If the herding is present amongst the investors,  $\beta_2$  in the above mentioned equations should be negative and statistically significant. Whereas, positive or statistically not significant  $\beta_2$  indicate that market does not exhibit herd behavior.

Mathematically,

$$H_0: \beta_2 = 0 \text{ \& } H_1: \beta_2 < 0$$

CSAD (Cross Sectional Absolute Dispersion) has been calculated for market and different sectors using daily log returns of the stocks under study. Log returns are calculated using daily closing price of stocks.

$$\text{Log Return} = \ln(cdc_p) - \ln(ldcp) \quad (7)$$

Where,  $cdc_p$ = Current day closing Price and  $ldcp$ = Last day closing price

Afterwards, daily return of PSX-100 index has been calculated using daily closing value of the index. Then, returns on sector portfolios have been undertaken to detect herding behavior within different sectors listed on Pakistan stock Exchange and are calculated as average return on individual stocks within the sector.

In accordance with the models proposed by Christie & Huang (1995) and Change et al, (2000), square of daily returns of PSX-100 index and returns on sector portfolios are also used as explanatory variables in the regression model to account for the nonlinear relationship between the dependent and the independent variable.

Historical quotes of stocks listed on Pakistan Stock Exchange are collected and daily, log returns of each stock and PSX-100 index are calculated. For sectoral analysis, top ten sectors are selected based on total market capitalization of the sectors as on April 1, 2018\*. For the selected sectors, equally weighted sector portfolios are created and daily log returns of these portfolios calculated. After calculation of returns, daily CSAD of stock returns is calculated; PSX-100 index is used as a proxy for Market return. Finally, OLS regression is applied to find evidence of herd behavior.

#### 4. EMPIRICAL ANALYSIS

Table 1. shows descriptive statistics of daily CSAD and Market return. The observed mean of the daily CSAD for the entire period is 2.46% and std. deviation is 0.796%. Whereas, mean value of the daily market return is .087% and std. deviation is 1.04%. The value of kurtosis is greater than 3, indicating that both the series are non-normal. The significant values of Jarque-Bera test also points to non-normality of the data. Regardless, OLS - Regression is used in accordance with the central limit theorem because the sample size is of sufficiently large size. There is no presence of unit root in either series (CSAD or RMT) as ADF test statistics are significant for both the series, hence both series are stationary. The table also shows mean values of CSAD and market return in bull and bear phase of the market as well.

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\* List of sectors listed on Pakistan Stock Exchange and their Market Capitalization given in Appendix.

**Table 1**  
*Descriptive statistics for Pakistan Stock Exchange*

Description	CSAD <sub>M,T</sub> (entire period)	R <sub>M,T</sub> (entire period)	CSAD <sub>M,T</sub> (Bull Market)	R <sub>M,T</sub> (Bull Market)	CSAD <sub>M,T</sub> (Bear Market)	R <sub>M,T</sub> (Bear Market)
Mean	0.0246264	0.00087	0.02517	0.00757	0.02396	-0.0073
Std Deviation	0.0079602	0.01048	0.00811	0.00718	0.00773	0.00774
Kurtosis	5.586604	6.090853	6.085089	7.532917	4.7500	6.66289
Skewness	1.3956832	-0.2399	1.47778	1.83452	1.28015	-2.293
Jarque-Bera Statistic	1344.668	909.0325	931.6741	1734.207	404.442	2711.505
Augmented Dickey Fuller test (CSAD <sub>M,T</sub> )	-4.084322	Prob. 0.0011*				
Augmented Dickey Fuller test (R <sub>M,T</sub> )	-41.83638	Prob. 0.0000*				

\*statistically significant at 95% confidence level

**Table 2**  
*Regression Results for Pakistan Stock Exchange*

**Table 2 (a): Entire period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.02067	0.00026	80.08907	0.0000*
$\beta_1$	0.49780	0.04662	10.67882	0.0000*
$\beta_2$	2.31047	1.40575	1.64359	0.10040
<b>R Square</b>	0.281953			
<b>Adj. R square</b>	0.281308			
<b>F Statistic</b>	437.233761			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 2 (b): Bull period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.02162	0.00036	60.83241	0.0000*
$\beta_1^u$	0.31939	0.06497	4.91567	0.0000*
$\beta_2^u$	10.47645	2.09390	5.00332	0.0000*
<b>R Square</b>	0.311467446			
<b>Adj. R square</b>	0.310341473			
<b>F Statistic</b>	276.6206795			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\* defined as when market return is positive

**Table 2(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.01993	0.00036	54.93723	0.0000*
$\beta_1^d$	0.59633	0.06629	8.99589	0.0000*
$\beta_2^d$	-2.63600	1.88722	-1.39676	0.16279
<b>R Square</b>	0.264536771			
<b>Adj. R square</b>	0.263084721			
<b>F Statistic</b>	182.1816089			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\* defined as when market return is negative

**Table 2(d): Extreme Market Conditions\*\* (Bull)**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^{up}$	0.01701	0.01082	1.57201	0.11885
$\beta_1^{up}$	0.65003	0.75236	0.86398	0.38949
$\beta_2^{up}$	5.15987	12.30934	0.41918	0.67591
<b>R Square</b>	0.346518			
<b>Adj. R square</b>	0.334528			
<b>F Statistic</b>	28.899397			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level,

\*\* defined as when market return lies in the upper 5% tail of distribution

**Table 2(e): Extreme Market Conditions\*\* (Bear)**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^{down}$	0.01701	0.01082	1.57201	0.11885
$\beta_1^{down}$	0.65003	0.75236	0.86398	0.38949
$\beta_2^{down}$	5.15987	12.30934	0.41918	0.67591
<b>R Square</b>	0.138453			
<b>Adj. R square</b>	0.122645			
<b>F Statistic</b>	8.758332			
<b>Significance F</b>	0.0002*			

\*statistically significant at 95% confidence level,

\*\*defined as when market return lies in the lower 5% tail of distribution

The above results shown in table 2 (a to e) show that,  $\beta_2$  coefficient is either positive or statistically not significant under all conditions. These results indicate absence of herd behavior in PSX.

**Table 3**  
*Regression Results for Commercial Banks Sector*

**Table 3(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.01199	0.00020	59.02115	0.0000*
$\beta_1$	0.33431	0.02456	13.61268	0.0000*
$\beta_2$	-0.35297	0.46212	-0.76380	0.44507
<b>R Square</b>	0.259032			
<b>Adj. R square</b>	0.258367			
<b>F Statistic</b>	389.263886			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 3(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.01291	0.00030	42.89124	0.0000*
$\beta_1^u$	0.29873	0.03452	8.65460	0.0000*
$\beta_2^u$	0.84620	0.63198	1.33896	0.18086
<b>R Square</b>	0.286591			
<b>Adj. R square</b>	0.285267			
<b>F Statistic</b>	216.527059			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 3(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.01116	0.00027	41.52560	0.0000*
$\beta_1^d$	0.36943	0.03438	10.74654	0.0000*
$\beta_2^d$	-1.78380	0.66572	-2.67950	0.00748*
<b>R Square</b>	0.234039			
<b>Adj. R square</b>	0.232702			
<b>F Statistic</b>	175.079830			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

The above tables 3(a), 3(b) and 3(c) show the regression results for Commercial Bank sector. The results show that  $\beta_2$  is negative and significant in bear conditions only, therefore, we can conclude that there is evidence of herding in banking sector during bear conditions only.

**Table 4**  
*Regression Results for Oil and Gas Exploration Sector*

**Table 4(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.00827	0.00023	35.91615	0.0000*
$\beta_1$	-0.10964	0.02124	-5.16113	0.0000*
$\beta_2$	8.19375	0.30199	27.13220	0.0000*
<b>R Square</b>	0.361914			
<b>Adj. R square</b>	0.361341			
<b>F Statistic</b>	631.562551			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 4(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.00603	0.00032	18.64361	0.0000*
$\beta_1^u$	0.53346	0.04617	11.55372	0.0000*
$\beta_2^u$	-11.82058	1.19352	-9.90400	0.0000*
<b>R Square</b>	0.108872			
<b>Adj. R square</b>	0.107310			
<b>F Statistic</b>	69.699625			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 4(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.00734	0.00035	21.15564	0.0000*
$\beta_1^d$	-0.07366	0.03172	-2.32208	0.0204*
$\beta_2^d$	8.62389	0.35568	24.24606	0.0000*
<b>R Square</b>	0.522189			
<b>Adj. R square</b>	0.521307			
<b>F Statistic</b>	591.793469			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

The tables 4(a), 4(b) and 4(c) above show the regression results for Oil and Gas Exploration Sector. The results show that  $\beta_2$  is negative and significant in bull conditions only, therefore, we can conclude that there is evidence of herding in banking sector during bull conditions only.

**Table 5**  
*Regression Results Food and Personal Care Products Sector*

**Table 5(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.01286	0.00023	55.53129	0.0000*
$\beta_1$	0.64578	0.02714	23.79587	0.0000*
$\beta_2$	6.69266	0.21358	31.33553	0.0000*
<b>R Square</b>	0.765176			
<b>Adj. R square</b>	0.764965			
<b>F Statistic</b>	3628.356722			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 5(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.01286	0.00023	55.53129	0.0000*
$\beta_1^u$	0.64578	0.02714	23.79587	0.0000*
$\beta_2^u$	6.69266	0.21358	31.33553	0.0000*
<b>R Square</b>	0.765176			
<b>Adj. R square</b>	0.764965			
<b>F Statistic</b>	3628.356722			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 5(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.01193	0.00034	34.93231	0.0000*
$\beta_1^d$	0.77636	0.03954	19.63611	0.0000*
$\beta_2^d$	7.09668	0.32910	21.56358	0.0000*
<b>R Square</b>	0.816357			
<b>Adj. R square</b>	0.816006			
<b>F Statistic</b>	2329.355268			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

In Tables 5(a), 5(b) and 5(c) above, regression results for the Food and Personal Care Products Sector show that  $\beta_2$  is positive and significant under all conditions, therefore, it is concluded that there is no evidence of herding in Food and Personal Care Products sector.

**Table 6**  
*Regression Results for Tobacco Sector*

**Table 6(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.00849	0.00031	27.58304	0.0000*
$\beta_1$	0.44504	0.02421	18.38116	0.0000*
$\beta_2$	3.44909	0.19451	17.73250	0.0000*
<b>R Square</b>	0.51436			
<b>Adj. R square</b>	0.5139257			
<b>F Statistic</b>	1179.359345			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 6(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.01237	0.00048	25.96851	0.0000*
$\beta_1^u$	0.18612	0.03306	5.62999	0.0000*
$\beta_2^u$	4.43699	0.22317	19.88151	0.0000*
<b>R Square</b>	0.560537			
<b>Adj. R square</b>	0.559698			
<b>F Statistic</b>	668.363004			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 6(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.01090	0.00055	19.78607	0.0000*
$\beta_1^d$	0.33352	0.04577	7.28704	0.0000*
$\beta_2^d$	4.77133	0.44705	10.67280	0.0000*
<b>R Square</b>	0.445643			
<b>Adj. R square</b>	0.444439			
<b>F Statistic</b>	370.191708			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

In Tables 6(a), 6(b) and 6(c) above regression results for the tobacco sector show that  $\beta_2$  is positive and statistically significant under all conditions, Hence there is no evidence of herding in the tobacco sector.

**Table 7**  
*Regression Results for Fertilizer Sector*

**Table 7(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.00957	0.00024	40.14378	0.0000*
$\beta_1$	-0.00867	0.01831	-0.47359	0.63584
$\beta_2$	6.15465	0.13709	44.89514	0.0000*
<b>R Square</b>	0.62045			
<b>Adj. R square</b>	0.620104422			
<b>F Statistic</b>	1820.200903			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 7(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.00755	0.00035	21.57928	0.0000*
$\beta_1^u$	0.58854	0.04891	12.03325	0.0000*
$\beta_2^u$	-13.28976	1.28969	-10.30461	0.0000*
<b>R Square</b>	0.119096			
<b>Adj. R square</b>	0.117519			
<b>F Statistic</b>	75.507632			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 7(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.00837	0.00036	23.09503	0.0000*
$\beta_1^d$	0.06508	0.02770	2.34950	0.01897
$\beta_2^d$	5.97988	0.16704	35.79949	0.0000*
<b>R Square</b>	0.736449			
<b>Adj. R square</b>	0.735973			
<b>F Statistic</b>	1546.666528			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

Table 7(a), 7(b) and 7(c) show regression results for the fertilizer sector. From the results, it is observed that the  $\beta_2$  is negative and statistically significant during bull period only. Therefore, there is evidence of herding in fertilizer sector during bull phase only.

**Table 8**  
Regression Results result for Automobile Sector

**Table 8(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.01435	0.00032	45.54600	0.0000*
$\beta_1$	0.43492	0.04002	10.86872	0.0000*
$\beta_2$	-1.16731	0.94074	-1.24084	0.21480
<b>R Square</b>	0.20694			
<b>Adj. R square</b>	0.206228795			
<b>F Statistic</b>	290.5569796			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 8(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.01484	0.00044	33.89955	0.0000*
$\beta_1^u$	0.41032	0.05587	7.34422	0.0000*
$\beta_2^u$	-0.06000	1.35352	-0.04433	0.96465
<b>R Square</b>	0.218885			
<b>Adj. R square</b>	0.217557			
<b>F Statistic</b>	164.770086			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 8(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.01391	0.00045	30.68412	0.0000*
$\beta_1^d$	0.44215	0.05753	7.68557	0.0000*
$\beta_2^d$	-1.82176	1.31364	-1.38680	0.16580
<b>R Square</b>	0.195324			
<b>Adj. R square</b>	0.193788			
<b>F Statistic</b>	127.193751			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

The Tables 8(a), 8(b) and 8(c) above results for Automobile sector show that,  $\beta_2$  is not significant under any condition. Hence there is no evidence of herding in automobile sector during the time under study.

**Table 9**

*Regression Results Power Generation & Distribution Sector*

**Table 9(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.01469	0.00032	45.33034	0.0000*
$\beta_1$	0.70221	0.02494	28.15494	0.0000*
$\beta_2$	0.70245	0.27873	2.52020	0.0118*
<b>R Square</b>	0.54751			
<b>Adj. R square</b>	0.547106839			
<b>F Statistic</b>	1347.345285			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 9(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.01474	0.00046	32.23753	0.0000*
$\beta_1^u$	0.78480	0.03269	24.00871	0.0000*
$\beta_2^u$	0.23830	0.31620	0.75364	0.45123
<b>R Square</b>	0.632013			
<b>Adj. R square</b>	0.631331			
<b>F Statistic</b>	927.442274			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 9(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.01446	0.00049	29.78846	0.0000*
$\beta_1^d$	0.64595	0.04866	13.27383	0.0000*
$\beta_2^d$	0.33202	0.83092	0.39959	0.68953
<b>R Square</b>	0.421681			
<b>Adj. R square</b>	0.420696			
<b>F Statistic</b>	428.011068			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

The Tables 9(a), 9(b) and 9(c) above regression results show that  $\beta_2$  is positive under all conditions, therefore, it is concluded that there is no evidence of herding in the sector.

**Table 10**  
*Regression Results Oil & Gas Marketing Sector*

**Table 10(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.00973	0.00027	35.50793	0.0000*
$\beta_1$	0.30577	0.03975	7.69168	0.0000*
$\beta_2$	-2.42049	1.05319	-2.29824	0.02164*
<b>R Square</b>	0.08867			
<b>Adj. R square</b>	0.087847278			
<b>F Statistic</b>	108.3348676			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 10(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.00967	0.00037	25.99394	0.0000*
$\beta_1^u$	0.53541	0.05601	9.55973	0.0000*
$\beta_2^u$	-11.18163	1.65239	-6.76696	0.0000*
<b>R Square</b>	0.096800			
<b>Adj. R square</b>	0.095204			
<b>F Statistic</b>	60.660551			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 10(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.00956	0.00040	24.16446	0.0000*
$\beta_1^d$	0.14739	0.05746	2.56516	0.01045
$\beta_2^d$	2.68510	1.41840	1.89305	0.05862
<b>R Square</b>	0.114827			
<b>Adj. R square</b>	0.113206			
<b>F Statistic</b>	70.828912			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

The Tables 10(a), 10(b) and 10(c) above tables show that  $\beta_2$  is negative and statistically significant during entire period and only bull period as well, therefore it is concluded that Oil & Gas marketing sector exhibit herd behavior under normal and bull condition during time under study.

**Table 11**  
*Regression Results for Chemical Sector*

**Table 11(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.01598	0.00033	48.14575	0.0000*
$\beta_1$	0.49333	0.04682	10.53585	0.0000*
$\beta_2$	7.53415	1.21299	6.21122	0.0000*
<b>R Square</b>	0.38833			
<b>Adj. R square</b>	0.387781476			
<b>F Statistic</b>	706.92842			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 11(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.01628	0.00047	35.00978	0.0000*
$\beta_1^u$	0.44179	0.07548	5.85341	0.0000*
$\beta_2^u$	12.87609	2.30290	5.59126	0.0000*
<b>R Square</b>	0.436466			
<b>Adj. R square</b>	0.435506			
<b>F Statistic</b>	454.640280			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 11(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.01632	0.00049	33.33992	0.0000*
$\beta_1^d$	0.37549	0.06523	5.75622	0.0000*
$\beta_2^d$	8.08864	1.51354	5.34419	0.0000*
<b>R Square</b>	0.360015			
<b>Adj. R square</b>	0.358796			
<b>F Statistic</b>	295.331670			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

The Tables 11(a), 11(b) and 11(c) above regression results show that  $\beta_2$ , coefficient is positive and significant under all conditions, hence there is no evidence of herding in Chemical sector during the time under study.

**Table 12**  
*Regression Results Cement Sector*

**Table 12(a): Entire Period**

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0$	0.01443	0.00031	46.99164	0.0000*
$\beta_1$	0.34305	0.03211	10.68313	0.0000*
$\beta_2$	2.30586	0.58388	3.94923	0.0008*
<b>R Square</b>	0.28689			
<b>Adj. R square</b>	0.286250814			
<b>F Statistic</b>	447.9728835			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

**Table 12(b): Bull Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^u$	0.01487	0.00044	33.85794	0.0000*
$\beta_1^u$	0.33985	0.04232	8.03032	0.0000*
$\beta_2^u$	2.50018	0.68636	3.64264	0.0028*
<b>R Square</b>	0.333511			
<b>Adj. R square</b>	0.332297			
<b>F Statistic</b>	274.719558			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is positive

**Table 12(c): Bear Period\*\***

Variable	Coefficient	Standard Error	t Stat	P-value
$\beta_0^d$	0.01387	0.00045	30.56903	0.00000*
$\beta_1^d$	0.38084	0.05731	6.64534	0.00000*
$\beta_2^d$	1.00669	1.28325	0.78448	0.43292
<b>R Square</b>	0.228141			
<b>Adj. R square</b>	0.226770			
<b>F Statistic</b>	166.407651			
<b>Significance F</b>	0.0000*			

\*statistically significant at 95% confidence level

\*\*defined as when sector portfolio return is negative

In Tables 12(a), 12(b) and 12(c) above, regression results show that  $\beta_2$  is positive and significant under all conditions except bear period, where it is not significant. Therefore, it is concluded that there is no evidence of herding in cement sector during the time under study.

## 5. CONCLUSION

The aim of the study is to analyze stock returns and identify evidence of herding behavior in Pakistan Stock Exchange. Focus of the study is companies and sectors listed on Pakistan Stock Exchange. The study examines herding behavior at market level and at sector level under normal conditions and stress conditions using market returns for the sample period and relies on the assumption that observed returns reflect the collective behavior of investors during the sample period. Statistical results based on Chang et al (2000) model of CSAD, lead to no evidence of herding in PSX at market under both normal conditions and stress conditions. According to the model, for herding to be present, coefficient of the square variable needs to be negative and significant, whereas, positive or not significant coefficient indicates to no evidence of herding. Further, sector level analysis reveal evidence of herding in 4 sectors listed on PSX, namely: Commercial Banks, Oil & Gas Marketing and Oil & Gas Exploration and Fertilizer sectors only, which implies that companies listed under these sectors may be more sensitive to common Macro factors or developments; research needs to be carried out to identify these factors. Apart from these, there is no wide spread evidence of investors herding in Pakistan Stock Exchange. Thus, the results of this study are consistent with earlier studies conducted on PSX and Chinese and Indian markets, and it is safe to say that stock market in Pakistan is efficient and investors mostly make informed decisions and do not engage in herd behavior. The reason for lack of herding behavior could be that; majority of the participants in Pakistan stock market are institutional investors and

there is very little participation from retail investors and because institutional investors have more knowledge, high research budgets and access to information, therefore they tend to make more informed decisions than retail investors. Further research is required to understand the factors that affect herding behavior at sector level to analyze and determine why some sectors are more efficient than others. Finally, the lack of evidence of herding at the market level and most of the sectors suggest that investors need not to worry about the herding effect and not incorporate herding factors in their valuation of stocks listed on Pakistan stock exchange. One way to incorporate herding factor in valuation of stocks in sectors; where herding is observed, could be to regress Square of Cross Sectional Absolute Dispersion measure against return of stock and calculate beta coefficient then incorporate that coefficient/factor loading in CAPM or other valuation model to calculate discount rate for the security.

Finally, this study aims to fill the gap in available research on Pakistani Stock Market, the result of this study may not be conclusive due to the simplicity of the model. Further research using more sophisticated models with ability to incorporate time varying volatility and cross market volatility needs to be carried out to reach a conclusive end.

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## APPENDIX

### *Sectors Listed on Pakistan Stock Exchange and their Market Capitalization as of April 1, 2018*

S. No.	Sector Code	Sector Name	Market Capitalization (Rs.)
1	801	<u>AUTOMOBILE ASSEMBLER</u>	467,791,124,885
2	802	<u>AUTOMOBILE PARTS &amp; ACCESSORIES</u>	82,269,664,282
3	803	<u>CABLE &amp; ELECTRICAL GOODS</u>	44,200,120,909
4	804	<u>CEMENT</u>	633,298,727,729
5	805	<u>CHEMICAL</u>	355,573,026,938
6	806	<u>CLOSE - END MUTUAL FUND</u>	14,564,783,036
7	807	<u>COMMERCIAL BANKS</u>	1,640,960,258,052
8	808	<u>ENGINEERING</u>	181,410,129,888
9	809	<u>FERTILIZER</u>	570,486,616,931
10	810	<u>FOOD &amp; PERSONAL CARE PRODUCTS</u>	926,963,647,264
11	811	<u>GLASS &amp; CERAMICS</u>	47,342,525,469
12	812	<u>INSURANCE</u>	235,352,852,115
13	813	<u>INV. BANKS / INV. COS. / SECURITIES COS.</u>	54,944,552,778
14	814	<u>JUTE</u>	124,612,291
15	815	<u>LEASING COMPANIES</u>	6,814,634,102
16	816	<u>LEATHER &amp; TANNERIES</u>	33,779,038,800
17	818	<u>MISCELLANEOUS</u>	79,600,226,148
18	819	<u>MODARABAS</u>	20,209,804,041
19	820	<u>OIL &amp; GAS EXPLORATION COMPANIES</u>	1,506,141,944,166
20	821	<u>OIL &amp; GAS MARKETING COMPANIES</u>	358,594,285,041
21	822	<u>PAPER &amp; BOARD</u>	82,690,299,994
22	823	<u>PHARMACEUTICALS</u>	328,579,033,921
23	824	<u>POWER GENERATION &amp; DISTRIBUTION</u>	451,856,717,373

<b>24</b>	836	<u>REAL ESTATE INVESTMENT TRUST</u>	28,885,863,000
<b>25</b>	825	<u>REFINERY</u>	149,988,971,532
<b>26</b>	826	<u>SUGAR &amp; ALLIED INDUSTRIES</u>	85,951,839,291
<b>27</b>	827	<u>SYNTHETIC &amp; RAYON</u>	31,312,125,569
<b>28</b>	828	<u>TECHNOLOGY &amp; COMMUNICATION</u>	104,559,046,306
<b>29</b>	829	<u>TEXTILE COMPOSITE</u>	221,173,017,234
<b>30</b>	830	<u>TEXTILE SPINNING</u>	49,113,787,442
<b>31</b>	831	<u>TEXTILE WEAVING</u>	25,861,108,675
<b>32</b>	832	<u>TOBACCO</u>	664,176,790,192
<b>33</b>	833	<u>TRANSPORT</u>	94,447,973,308
<b>34</b>	834	<u>VANASPATI &amp; ALLIED INDUSTRIES</u>	6,232,717,512
<b>35</b>	835	<u>WOOLLEN</u>	571,685,825

Source: ksestock.net