P-ISSN: 2709-6254	Journal of Development and Social Sciences	Jan-Mar 2023, Vol.4, No.1
O-ISSN:2709-6262	http://dx.doi.org/10.47205/jdss.2023(4-I)53	[597-613]

Journal of Development and Social Sciences
www.jdss.org.pk

RESEARCH PAPER

Investor Sentiments Influencing Investor Decisions: The Mediating Role of Behavioral Biases

[1]Hani Baloch* [2]Dr. Jameel Ahmed [3]Dr. Kaneez Fatima

1. Ph. D Scholar, Department of Management Sciences, University of Balochistan, Quetta, Balochistan, Pakistan
2. Professor, Department of Management Sciences, University of Balochistan. Quetta, Balochistan, Pakistan
3. Associate Professor, Department of Management Sciences, University of Balochistan. Quetta, Balochistan, Pakistan

***Corresponding Author:** Hanibaloch1985@gmail.com

ABSTRACT

This paper explores the impact of investor sentiments on decisions within the Pakistan Stock Exchange (PSX), with a focus on mediating behavioral biases like the herding effect, anchoring effect, and disposition effect. Employing a deductive approach grounded in behavioral finance theory, the study utilized quantitative methods and panel data analysis on data collected from 182 nonfinancial firms listed on the PSX. Hypotheses were rigorously examined through correlation analysis and both simple and hierarchical regression analyses, with the Baron and Kenny method employed to assess the mediating role of behavioral biases. The findings reveal that the herding and anchoring effects fully mediate the relationships between investor sentiments and investment decisions. Simultaneously, the disposition effect exerts a direct and significant influence while also partially mediating the connection between investor sentiments and decisions, indicating its moderating role. These results underscore the influence of sentiments and behaviors on investor decision-making, suggesting that policymakers should integrate socio-psychological factors into financial models. Regular sentiment surveys can aid in predicting market trends and help regulatory authorities manage noise trader disturbances in the market. This holistic approach can enhance market stability and efficiency.

KEYWORDS Anchoring Effect, Disposition Effect, Herding Effect, Investor Decisions, Investor Sentiments

Introduction

Traditional finance has long relied on the assumption of rational investor behavior, where individuals meticulously process all available stock information and act logically in their investments. However, behavioral finance challenges this notion, highlighting that even rational investors often make irrational choices due to cognitive biases and emotional factors. Fatima (2019) notes these frequent missteps. The battle between rationality and irrationality in human behavior remains a core debate in this field.

Adam Smith's Moral Sentiments theory laid the foundation for behavioral finance, but its significant advancements began with Kahneman and Tversky's groundbreaking "Prospect Theory." Introduced in 1988, this theory revolutionized decision-making under uncertainty and risk, revealing how investors perceive gains and losses differently. Gains carry greater weight, influencing investment preferences towards opportunities with higher potential gains. This has brought attention to the role of socio-psychological factors in shaping human decision-making within the realm of behavioral economics.

Shiller (1981) challenged rational stock valuation theory due to excessive stock price fluctuations. This pivotal moment in behavioral finance sheds light on psychological traits impacting investors, portfolio managers, and analysts. It explores sentiments and

cognitive errors' influence on behavior, as emphasized by Miłaszewicz (2019), revealing actions beyond rationality. Behavioral finance evolved into two generations. The first studied rational investors making irrational decisions, while the second delves into investor decision-making processes. Both agree that emotions and sentiment impact the stock market (Baker & Wurgler, 2007).

In this regard, many studies have been conducted to understand the phenomena concerning factors that investors consider while making any investment decision either being a rational or irrational investor. In a similar vein, various researchers have investigated the biases, sentiments, and decision-making patterns of investors within their respective fields of expertise. These inquiries have uncovered numerous significant relationships that have enriched our collective knowledge. Building upon the existing literature and the logical underpinnings therein, this study seeks to examine the extent to which investor sentiments affect investment decisions. Furthermore, it aims to explore the potential mediating role of three specific behavioral biases, namely herding, anchoring, and disposition, in this relationship. Thus, this study endeavors to discern both the mediating influence of behavioral biases via investor sentiments and the distinct impact of investor sentiments on investment decisions, as argued above.

Literature Review

Markowitz (1952), a pioneer in portfolio selection, introduced a two-stage process. Initially, investors observe the market to build strong beliefs, and then they select portfolios to maximize returns. Markowitz's efficient frontier provided equations and models for optimal portfolio selection, forming the foundation for various financial theories. Sharpe (1964) later introduced CAPM (Capital Asset Pricing Model), using the Sharpe ratio to measure investment performance and risk. Lintner (1965) further tested and enhanced the model by incorporating diverse investor judgments and preferences for low-risk securities or risk-free assets, considering tax implications.

Furthermore, Fama and French further stretched their three-factor model to the five-factor model by adding two more variables profitability and investment (Fama & French, 2015). Numerous scholars have contributed in their ways like (Fraser et al., 2004; Hansson & Hordahl, 1998; Javid & Ahmad, 2008; Roll, 1977; Raei & Mohammadi, 2008; Scheicher, 2001; Michailidis, Tsopoglou, & Papanastasiou, 2006; & Qu & Perron, 2007) introduced different verities of pricing models but still, all has its limitations.

While many financial concepts assume investor rationality and full information access, investor sentiment plays a vital role in equity allocation. Kahneman & Tversky (1979) challenged the Efficient Market Hypothesis (EMH) and Expected Utility Theory (EUT) with Prospect Theory. This alternative theory explains decision-making under ambiguity, revealing how security gains and losses influence equity allocation. Pioneers like Kahneman, Tversky, and R. Thaler have illuminated irrational reactions to unexpected news, shifting markets from efficiency to inefficiency.

The noise trader concept, introduced by Long et al. (1990), suggests that individual investors' sentiment-driven heavy trading deviates from traditional metrics, impacting stock prices (Shiller et al., 1984; Baker & Wurgler, 2007). Studies by Lee et al. (1991) and Baker & Wurgler (2006) underscore the role of investor mood and psychology, often using proxies like turnover and consumer confidence indices to gauge sentiment effects. Long et al. (1990) categorized investors as rational (information-driven) or noise traders (sentiment-driven), highlighting persistent sentiment effects in select stocks.

Empirical evidence from various studies (Barberis & Xiong, 2009; Frazzini, 2006; Weber and Camerer, 1998) has substantiated the presence of the disposition effect. Hassan (2013) explored the impact of heuristics, fear, and anger on individual investors' decision-

making. The study observed that intense emotions led to irrational choices among Islamabad stock exchange investors.

Masomi and Ghayekhloo (2011) unveiled the influence of behavioral biases, including loss aversion, overconfidence, and anchoring, among Tehran Stock Exchange investors. Institutional investors were also found to succumb to cognitive biases such as overconfidence and anchoring (Qureshi, 2012). Waweru, Munyoki, & Uliana (2008) highlighted how these behavioral and psychological factors disrupted individual decision-making in financial markets.

Chhapra, Kashif, and Bai (2018) revealed the impact of behavioral dynamics on investment decisions, including overconfidence and herding. Baker & Wurgler (2007) created a sentiment index, adopted by Rehma (2013), illustrating the substantial influence of investor sentiments on stock market returns.

Rupande, Muguto, and Muzindutsi (2019) found a significant correlation between stock return volatility and investor sentiment in the South African market. P H & Rishad (2020) decomposed the sentiment index, revealing optimism's impact on speculative investor behavior.Tanta et al. (2021) endorsed the sentiment index, studying its influence on stock market liquidity and herding behavior. M. Khan & Ahmad (2018) expanded the sentiment index, uncovering various relationships with proxies and its susceptibility to prior returns.

Rupande et al. (2019) explored the link between investor sentiment and stock volatility in the Johannesburg Stock Exchange, finding a significant connection between sentiment and stock return volatility. Behavioral biases and cognitive errors significantly influence investor decisions, with Marchand (2012) identifying nine biases and four phenomena. Rehan and Umair (2017) highlighted five key biases affecting investor decisions, while Shah, Ahmad, and Mahmood (2018) revealed the negative impact of heuristic biases on investment choices, particularly among active traders, challenging market efficiency.

In a parallel vein, Kanojia, Singh & Goswami (2018) delved into the overarching behavioral factors guiding investors' stock selection choices. Their study revealed that representative bias, overconfidence, cognitive dissonance, and disposition effect played significant and influential roles in the stock selection process, offering valuable insights into investors' decision-making processes. In a similar vein, Chhapra et al.(2018) explored the influence of behavioral heuristics on investor decision-making, finding positive impacts from herding, overconfidence, overthinking, cognitive bias, and hindsight effect.

Mittal's (2019) comprehensive review of behavioral finance and biases underlines their significant influence on investment decisions, enriching our understanding of these decision-making factors. Pratikto & Uchil (2019) identified psychological elements impacting investor sentiment and decision-making, including advocate recommendations, herding behavior, media, and social interaction, all positively affecting investor sentiment and consequent choices.

Similarly, Ahmad et al. (2021) contributed empirical insights by exploring the connection between behavioral biases (anchoring, adjustment, representativeness, overconfidence, availability) and strategic decision-making in firms. They found that these biases notably hindered entrepreneurs' strategic decisions in emerging markets.

Pratikto & Uchil (2019) further analyze the relationship between investment decision influencers and individual investors' sentiment, highlighting the market and herding effects as significant factors, with social interaction, media, and advocate recommendations playing a more influential role than awareness.

The ongoing debate highlights the influence of investor sentiments and behaviors on investment decisions, prompting further exploration of their mediating patterns. Researchers examine whether behavioral biases stem from emotions or vice versa, with studies revealing interconnected biases affecting investor choices. Wajid (2013) noted the disposition effect's significance for fund managers but its influence on investors was tax-related. Khan (2014) found positive links between framing, herding effects, and perceived investment performance, with financial literacy moderating the framing effect.

Fatima (2019) identified cognitive dissonance, along with demographic and emotional factors, as mediators in investor decision-making. Rehman, Akhtar, & Shah (2019) examined the framing effect's mediating role in investment decisions, impacting financial wellbeing.Ady et al. (2020) focused on investors' expected and immediate emotions, leading to overconfidence and cognitive dissonance, impacting stock returns. Immediate emotions indirectly affected stock returns through cognitive dissonance. Parveen et al. (2020) also contributed by highlighting overconfidence's mediating role between anchoring heuristic and investment decisions.

Jabeen et al. (2020) delved into behavioral biases' mediating role and their origins. The study revealed that investor behaviors mediate the relationship between emotions/sentiments and investment decision-making. Herding, loss aversion, and overconfidence were found to mediate the connection between anxiety, depression, social interaction, and investor decisions.In contrast, P. Soma (2021) employed both investor sentiment and behavioral biases (such as overconfidence, over/under reaction, and herding behavior) as mediators between education level and investor decision. Results underscore the mediating role of investor sentiment and behavioral biases in influencing investment choices.

Recent studies have further explored the intricate relationships among these variables, highlighting the mediating roles they play. Amidst varying findings, the challenge remains in determining causality and significance. Researchers investigate whether behavioral biases drive investor emotions or vice versa. This study contributes by examining the link between investor sentiments and investment decisions, shedding light on the role of behavioral biases in this connection and unraveling the complex interplay of sentiments, behavior, and investor choices.

After reviewing the relevant literature, we hypothesized that

H_1: Investor decisions are influenced by investor sentiments.

H_2: Investor decisions are influenced by disposition effect.

H_3: Investor decisions are influenced by herding effect.

H_4: Investor decisions are influenced by anchoring effect.

H_5: Disposition effect is mediating the relationship between investor sentiments and decision making.

H_6: Herding effect is mediating the relationship between investor sentiments and decision making.

H_7: Anchoring effect is mediating the relationship between investor sentiments and decision making.

Material and Method

Theoretical framework

Adam Smith's moral sentiments theory laid the groundwork for behavioral economics by highlighting the impact of social nature on human behavior and moral ideas. However, significant advancements in behavioral finance came with Kahneman and Tversky's prospect theory (1988), which challenged traditional models. Prospect theory's insight into how investors perceive gains and losses differently due to socio-psychological factors underscored the role of emotions in decision-making. This study will investigate lesser-explored behavioral factors mediating between investor sentiments and decisions in the Pakistan stock market, shedding light on their relationships and direct influences.

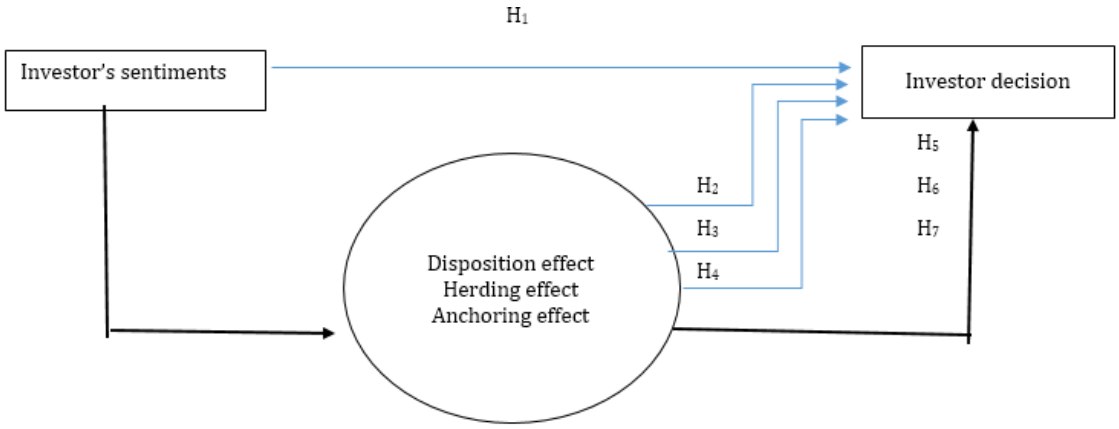


Figure 1 Framework

Research Design

The primary aim of this study is to elucidate the mediating relationship between investors' sentiments, behaviors, and their influence on decision-making. It adopts a positivist philosophy for empirical testing. Employing deductive reasoning and a mono method approach, specifically explanatory (causal) quantitative research design, the study utilizes panel data estimation techniques such as bivariate regression and multivariate hierarchical regression analysis to derive results. Therefore, the characteristics of the study require employing panel data to track how behavior and sentiments change over time.

Data Collection and Variables

To achieve the study's goals, data was sourced from secondary data like the PSE website, SBP quarterly reports, and financial statements of listed companies, SECP, and Open Doors. The data encompassed stock returns and volume, spanning from 2013 to 2020. Specifically, data was obtained from non-financial sector companies listed on the Pakistan Stock Exchange, as earlier records were largely unavailable.

Description of Variables and Measuring Techniques

No	Variable	Methodology	Source
	Econometric Models.	$ID_{it} = \beta_0+\beta_1 SENT_{it} + \varepsilon_t$ $ID_{it} = \beta_0+\beta_1 DE_{it} + \varepsilon_t$ $ID_{it} = \beta_0+\beta_1 ANCHE_{it} + \varepsilon_t$ $ID_{it} = \beta_0+\beta_1 HRDE_{it} + \varepsilon_t$ $MDE = \beta_0+\beta_1 SENT_{it}^* + \varepsilon_t$ $MANCHE = \beta_0+\beta_1 SENT_{it} + \varepsilon_t$ $MHRDE = \beta_0+\beta_1 SENT_{it} + \varepsilon_t$ $ID_{it} = \beta_0+\beta_1 SENT_{it} + \beta_2 MDE + \varepsilon_t$ $ID_{it} = \beta_0+\beta_1 SENT_{it} + \beta_2 MANCHE + \varepsilon_t$ $ID_{it} = \beta_0+\beta_1 SENT_{it} + \beta_2 MHRDE + \varepsilon_t$	

		IDit = β0+β1SENTit + β2 DEit + β3 ANCHEit +β4 HRDEit + εt IDit = β0+β1SENTit + β2 MDE + β3 MANCHE+β4 MHRDE + εt Where: it is the Investor's decision SENTit is investor sentiments DEit is Disposion Effect ANCHEit Is Anchoring Effect HRDEit Is Herding effect MDE , MANCHE & MHRDE are the mediating terms	
1	Investor decision	Differential log of daily trading volume of stocks	(Statmen et al 2006)
2	Investor sentiments	CCI (Consumer Confidence Index as a proxy of investor sentiment)	(Bolaman & Mandaci, 2014)
3	Herding Effect	CSSDt = $\frac{\sqrt{\Sigma(R_{i,t} - R_{m,t})2}}{N_{t-1}}$ Where Ri,t = return on stocks at time t Rm,t = Index returns at time t Nt = Number of listed stock at time t Herd behavior model would be estimated as: CSSDt = α + β1DUt + β2DLt + εt Where DUt = 1 if the market return for period t is in the extremely high range. Zero "0" otherwise. DLt = 1 if the market return for period t is at the bottom of the return distribution. Otherwise, a value of zero is assigned '0'. Negative coefficients in the model that are statistically significant will suggests herding effect exist.	Christie and Huang (1995)
4	Anchoring Effect	Rt = α + α1Rt−1 + α 2X(HH) + α 3X(24w) + α 4Dt + α 5It + μ where Rt = Stock Returns at present date Rt−1 = Stock Returns at previous date X(HH) = Closeness to Historical High value,{X(24w) = Pt/ P24,t } X(24w) = Closeness to twenty four weeks high value,{X(HH) = Pt / Pmax,t} Dt = historical high dummy It = (historical high = twenty-four weeks high) dummy αn = Coefficient of variables μ = Error term	(Li and Yu, 2009)
5	Disposition Effect= DEit	The average share holding period is taken as a proxy of disposition effect which was measured as: $DE = \frac{\frac{Shares\ Outstanding}{VOLD}}{N}$ Shares Outstanding = shares outstanding on last day of quater VOLD = respective trading volume N = total number of trading days during quater	Visaltanachoti et. al., 2007)

Statistical Analysis

This section covers the descriptive analysis of all the variables included in the study, there correlation matrix and econometric analysis:

Descriptive Analysis

Table 1
Descriptive Statistics

Statistics						
		Investor Decision	**Investor Sentiment**	**Herding Effect**	**Disposition Effect**	**Anchoring Effect**
N	Valid	6048	6048	6048	6048	6048
	Missing	0	0	0	0	0
Mean		8.719965	4.55309	.066316	.500083	4.0934
Median		8.517193	4.88942	.060000	.500124	4.0853
Mode		6.214608	3.57262	.060000	.0314	4.53
Std. Deviation		3.857231	.5923633	.012079	.2886634	34.4518
Skewness		-.399	-.493	1.460	.001	.002
Kurtosis		0.050	1.613	.213	1.203	0.365

Table 01 offers a comprehensive statistical analysis of all study variables. With 6048 observations, no missing data exist. Key statistics including mean, median, mode, standard deviation, skewness, and kurtosis are presented. The dependent variable is investor decision, while investor sentiment is the independent variable, with herding, anchoring, and disposition effect as mediating variables. The mean for the dependent variable is 8.7199, and for the independent variable, it's 4.553. The three mediating variables have mean values of 0.06, 0.50, and 4.093, respectively. Standard deviation measures data spread; lower values indicate more reliable data. Standard deviations for the dependent and independent variables are 3.857 and 0.5923, respectively, suggesting low data dispersion. Herding and disposition effect have smaller standard deviations compared to anchoring, which exhibits the largest deviation, signifying higher data dispersion. Skewness and kurtosis values assess data symmetry and peak; values near zero indicate symmetry. Skewness values are close to zero for all variables except herd0/9iokj ming effect, which has a slightly higher value. Kurtosis values are near zero, indicating mesokurtic distributions for all variables.

Table 2
Correlation Matrix

	Investor Decision	**Investor Sentiment**	**Anchoring Effect**	**Herding Effect**	**Disposition Effect**
Invester Decision	1	.033*	-.009	-.027*	-.034**
Investor Sentiment	.033*	1	.146**	-.047**	-.063**
Anchoring Effect	-.009	.146**	1	-.067**	.001
Herding Effect	-.027*	-.047**	-.067**	1	.028*
Disposition Effect	-.034**	-.063**	.001	.028*	1

*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level.

Table No-2 displays correlation coefficients among variables. Investor sentiment significantly correlates positively with investor decision (r = 0.033*, p < 0.005). Anchoring effect (r = -0.009) shows a non-significant negative relationship with investor sentiment. Herding effect (r = -0.027*) significantly and negatively relates to investor decision (p < 0.05). Disposition effect (r = -0.034**) also significantly and negatively relates to investor decision (p < 0.01). Investor sentiment significantly correlates with all variables (p < 0.001), with the strongest positive correlation between investor sentiment and anchoring effect (r = 0.146**). Disposition and herding negatively correlate with investor sentiment (r = -0.047**, -0.063**). Anchoring and herding have a negative, significant correlation (r = -0.067**, p < 0.01), while disposition and anchoring show no significant correlation (r = 0.001). Herding positively and significantly correlates with disposition effect (r = 0.028*, p < 0.05).

Econometric Analysis

This study employs hierarchical regression analysis to investigate the interplay among dependent, independent, and mediating variables. It delves into the relationships between investor sentiment, investor decisions, and behavioral factors like herding, disposition, and anchoring effects. Additionally, the study assesses how these behavioral biases mediate the impact on investment decisions, employing the Barren and Kenny (1986) mediation method after ensuring that regression analysis assumptions are met.

The first assumption checks if the dependent variable is continuous, which is met in our panel data context. Secondly, all variables are continuous. Thirdly, a linear relationship between the response and predictor variables is confirmed by significant linear relationships seen in the correlation matrix (Table 2).

Fourthly, multicollinearity is examined, and all correlation values in Table 2 are below the threshold of 0.7, ensuring there is no multicollinearity. Tolerance values exceeding 0.04 and IVF values near 1 for all variables further support this assumption.

The fifth assumption regarding influential outliers is met, as Cook's distance values are all below 1.

The sixth assumption checks residuals' normal distribution (heteroscedasticity). P-P and Q-Q plots confirm that standardized residuals are normally distributed, with only minor disturbances. Additionally, the Breusch-Pagan test and the response of residuals to increasing independent variables reveal no heteroscedasticity issues. The seventh assumption, autocorrelation, is tested using the Durbin-Watson value, which is around 2, indicating no autocorrelation in the data.

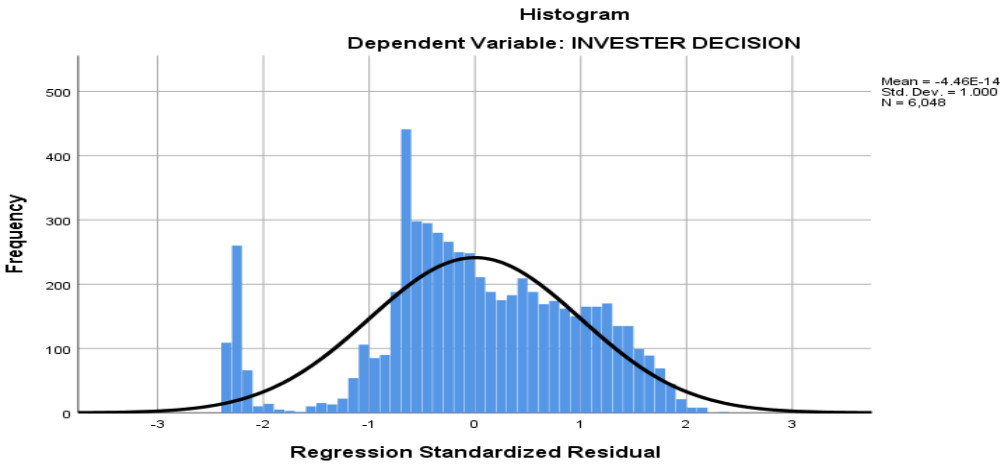


Figure 2: Histogram

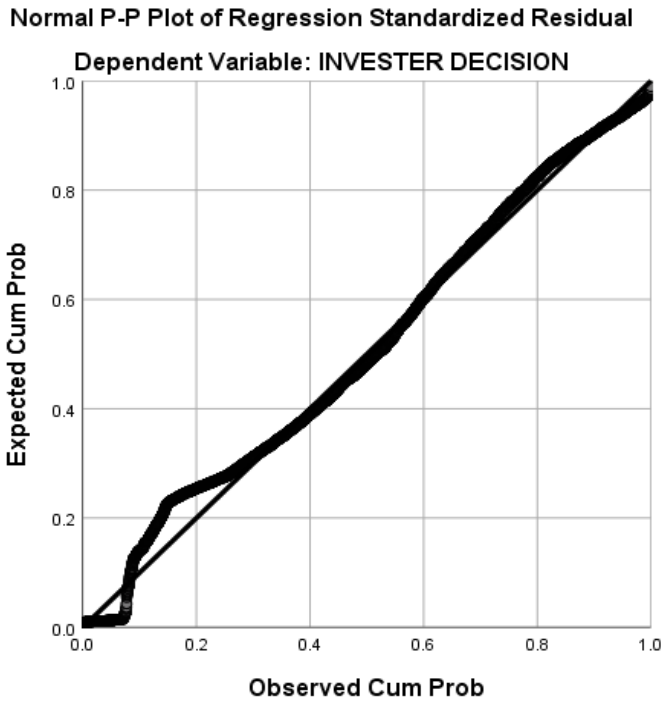


Figure 3: P-P Plots

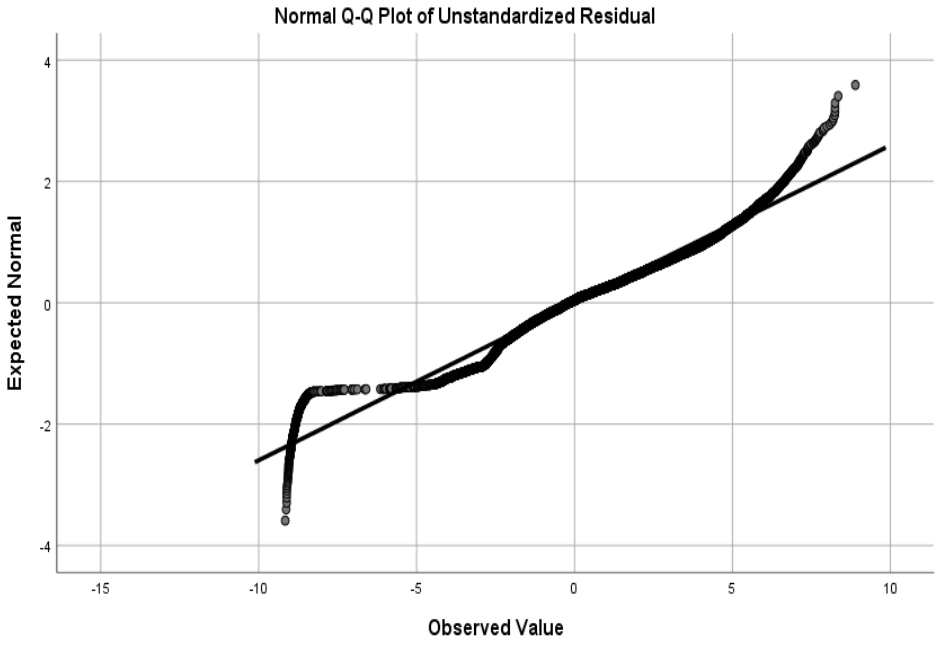


Figure 4: Normal Q-Q Plots

Table 3
No Heteroskedastic

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1545.970	5	309.194	.712	.615[b]
	Residual	2624639.707	6041	434.471		

	Total	2626185.677	6046

a. Dependent Variable: SqrResduals
b. Predictors: (Constant), Herding Effect, Dispositioneffect, Anchoringeffect, Investor Sentiment

Table 4
No Autocorrelation

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.054[a]	.003	.002	3.853156206192815	1.953

a. Predictors: (Constant), Herding Effect, Disposition effect, Anchoring effect, Investor Sentiment
b. Dependent Variable: Investor Decision

Regression Analyses and Empirical Findings

This paper aims to elucidate the link between behavioral biases, investment sentiment, and investor decision-making. Hierarchical regression revealed direct relationships, while mediation was explored using Barren and Kenny's (1986) method.

Testing of hypothesis

The first hypothesis was tested using bivariate regression analysis in SPSS, with investor decision as the dependent variable and investor sentiment as the independent variable. The results reveal a significant relationship between the two variables, with a t-value above 2 and a p-value below 0.05. The positive coefficient in table 5 indicates that investor sentiment has a positive impact on investor decisions, accounting for 21.4% of the variation in the dependent variable. The R2 value of 0.033, while small, aligns with the limited variables considered in this model. As such, we accept the null hypothesis and conclude that investor sentiments do influence investor decisions.

Table 5
Investor sentiment Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	7.745	0.384		20.154	0.00		
	INVESTOR SENTIMENT	0.214	0.084	0.033	2.558	0.011**	1	1

a. Dependent Variable: INVESTER DECISION
*. Correlation is significant at the 0.05 level.
**. Correlation is significant at the 0.01 level

To test out H_2,H_3 and H_4 we have applied hierarchical regression that has two steps. In first step we have regressed investor decision on investor sentiments in second step we have regressed investor sentiment on behavioral biases.

Table 6
ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	97.250	1	97.250	6.542	.011[b]
	Residual	89871.421	6046	14.865		
	Total	89968.671	6047			

2	Regression	260.368	4	65.092	4.385	.002[c]
	Residual	89708.303	6043	14.845		
	Total	89968.671	6047			

a. Dependent Variable: Invester Decision
B. Predictors: (Constant), Investor Sentiment
C. Predictors: (Constant), Investor Sentiment, Herding Effect, Disposition Effect, Anchoring Effect

Table 7
Investor Decision: Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.745	.384		20.154	.000
	Investor Sentiment	.214	.084	.033	2.558	.011
2	(Constant)	8.522	.493		17.274	.000
	Investor Sentiment	.208	.085	.032	2.455	.014
	Anchoringeffect	-.002	.001	-.015	-1.170	.242
	Herding Effect	-8.094	4.115	-.025	-1.967	.049
	Dispositioneffect	-.411	.172	-.031	-2.390	.017

a. Dependent Variable: Invester Decision

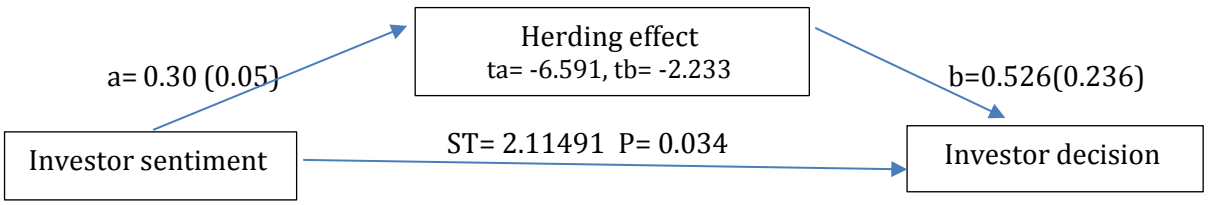
The ANOVA table indicates the significance of both models, with an R2 value of 0.053, a slight increase from the initial 0.033. This 2% change suggests that our variables are not strong predictors of the dependent variable. In model one, investor sentiment, with β = 21.4%, is significant ($p < 0.05$, $t = 2.455$).

In our second model, the herding effect (β = -8.09, $p = 0.049$, $t < 2$) is not significant. Anchoring effect (β = -0.002, $p = 0.242$, $t = 1.170$) is also insignificant. However, disposition effect (β = -0.411, $p = 0.017$, $t = -2.390$) is a significant predictor. Other behavioral biases in the model have $p > 0.05$ and $t < 2$, indicating insignificance.

The study reveals that, except for the disposition effect, behavioral biases don't directly affect investor decisions. This prompts exploration of their potential indirect effects. H3 and H4 are rejected, confirming that herding and anchoring lack direct effects on decisions. H2 is accepted, indicating the disposition effect's influence on investor choices.

Mediator Analyses

Mediation regression analysis explored the indirect impact, using Barren and Kenny's (1986) method. Conditions included the independent variable predicting the dependent and mediating variables, and both predicting the dependent variable. Insignificant direct paths indicate full mediation; otherwise, it's partial mediation.



The direct path between investor sentiment (β = 21.4%, $p = 0.01$, $t = 2.558$) and investment decisions was significant, satisfying the first condition. Second, investor sentiment had a significantly negative relationship with the herding effect (β = -0.010, $p = 0.00$, $t = -3.632$), fulfilling the second condition. The table demonstrates that the third condition is also met, as the mediating path is significant. The independent variable (β =

20.6%, p = 0.014, t = 2.46) shows a positive relationship, while the mediating variable (β = -8.05, p = 0.05, t = 1.9) is insignificant. These results indicate a strong/full mediating relationship of the herding effect between investor sentiment and investment decisions. Additionally, the indirect relationship of variables is confirmed by applying the Sobel test, which yields a value of 2.1149, exceeding ±1.96. where a and b are the unstandardized coefficients and their standard errors and t is there significant t value.

Table 8
Investor Sentiment Coefficients[a]

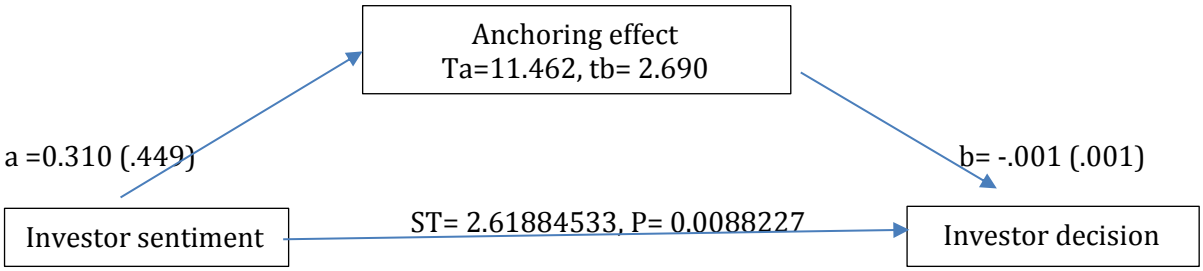
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.071	.001		58.736	.000
	INVESTOR SENTIMENT	-.010	.000	-.047	-3.632	.000

Dependent Variable: HERDING EFFECT

Table 9
Investor Sentiment and Herding Effect Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.314	.482		17.267	.000
	INVESTOR SENTIMENT	.206	.084	.032	2.464	.014
	HERDING EFFECT	-8.050	4.108	-.025	-1.960	.050

a. Dependent Variable: INVESTER DECISION



First condition was already satisfied as investor sentiment significantly predicted investment decisions. Moving to the second condition, regressing investor sentiment on the anchoring effect yielded β = 8.48, showing a significant positive relationship between the variables (p = 0.00, t = 11.461, R2 = 0.146).

When testing the third condition, the results revealed that investor sentiment positively influenced investor decision (p = 0.007, t = 2.68, β = 0.227), while the anchoring effect with β = -0.002 was insignificant (p = 0.283, t < 2). This indicates that the anchoring effect does not directly influence investor decisions but plays a strong mediating role between investor sentiments and investor decision making. This indirect relationship was further confirmed through the Sobel test, where the test value was 2.6188 with a significant p-value of 0.008, signifying that the anchoring effect indirectly influences investor sentiment and serves as a mediator between investor sentiment and investor decision.

Table 10
Investor Sentiments Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-34.521	3.398		-10.16	0

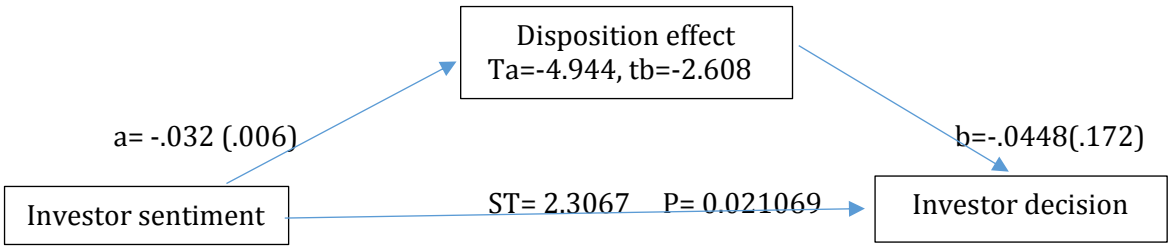
	INVESTOR SENTIMENT	8.481	0.74	0.146	11.461	0

a. Dependent Variable: ANCHORINGEFFECT

Table 11
Investor Sentiment and Anchoring Effect Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.691	0.388		19.845	0.00
	INVESTOR SENTIMENT	0.227	0.85	0.35	11.461	0.00
	ANCHORING EFFECT	-0.002	0.001	-0.014	-1.075	0.28

a. Dependent Variable: INVESTER DECISION



The first condition was already tested and satisfied, allowing us to proceed to the second condition. Regressing disposition effect on investor sentiment revealed a negative and significant relationship between both variables, with a coefficient of β = -0.031, p-value = 0.00, and t = -4.94. This finding indicates that investor sentiments significantly predict the disposition effect, fulfilling the second condition.

To verify the third condition, we regressed investor decision on the independent and mediating variables. The results showed that both variables significantly predicted investor decisions, with positive coefficients for investor sentiments (β = 0.020) and a negative coefficient for the disposition effect (β = -0.42). This suggests that investor decisions are negatively influenced by the disposition effect, and the relationship is significant (p = 0.014, t = -2.45). This significant and positive relationship indicates that the disposition effect partially mediates the relationship between investor sentiment and investor decisions, satisfying all three conditions.

Table 12
Investor Sentiments Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.641	.029		22.317	.000
	INVESTOR SENTIMENT	-.031	.006	-.063	-4.944	.000

a. Dependent Variable: DISPOSITIONEFFECT

Table 13
Investor Sentiments and Disposition Effect Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.016	.400		20.057	.000
	Investor Sentiment	.201	.084	.031	2.398	.017
	Dispositioneffect	-.422	.172	-.032	-2.452	.014

a. Dependent Variable: Invester Decision

The above mediation analysis was conducted to test our H_5, H_6 and H_7. While investigative the mediating role of the disposition effect between investor sentiments and investment decision-making, we applied Barrene and Kenny's (1986) mediation analysis method with three conditions. Firstly, we tested and satisfied the first condition, enabling us to proceed to the second. Our regression of the disposition effect on investor sentiment revealed a significant negative relationship, with a coefficient of $\beta = -0.031$ ($p = 0.00$, $t = -4.94$), indicating that investor sentiments significantly predict the disposition effect, fulfilling the second condition. To assess the third condition, we regressed investor decisions on the independent and mediating variables. Both variables emerged as significant predictors of investor decisions, with positive coefficients for investor sentiments ($\beta = 0.020$) and a negative coefficient for the disposition effect ($\beta = -0.42$). This implies that the disposition effect partially mediates investor decisions and investor sentiments, satisfying all three conditions.

Conclusion

This study represents a pioneering effort, as it is the first to investigate the connection between investor sentiments and investment decisions, considering the mediating influence of behavioral biases like the herding effect, anchoring effect, and disposition effect. Previous research has primarily focused on the direct impact of heuristics on investment sentiments and decisions, as exemplified by studies conducted by Barber and Odean (2000) and Shah et al. (2018). However, this paper breaks new ground by examining, for the first time, the mediating role of specific behavioral biases in the relationship between investor sentiments and investment decision-making.

The study provides an empirical ground to argue that traditional finance theories ignore the socio- psychological that has significant effect on investor decisions and behaviors plays mediating role between them. Behavioral biases are influenced by investor sentiments, which make investors to react in certain way that is beyond the boundaries of rationality. This concludes that the assumption of rationality not always prevails in the market and highlights the factor that are responsible for noise trader’s decisions.

Recommendations

1 Establish and promote educational programs to enhance investor awareness of behavioral biases' impact on decisions. Collaborate with financial and educational institutions to offer resources, workshops, and seminars.
2 Regulators should regularly monitor behavioral biases using primary and secondary sources to predict investor decisions and control market movements.
3 Stock markets' unpredictability stems from diverse participants. By considering socio-psychological factors alongside financial metrics, policymakers can manage market stability effectively.
4 Continuously assess policy effectiveness in addressing behavioral biases. Adapt policies based on empirical evidence and evolving market dynamics. Foster cooperation between regulators, financial institutions, and industry stakeholders to craft and implement robust policies for mitigating behavioral biases.

References

Ady, S. U., Tyas, A. M., Farida, I., & Gunawan, A. W. (2020). Immediate and Expected Emotions Toward Stock Returns Through Overconfidence and Cognitive Dissonance: The Study Of Indonesian Investor *Behavior. PalArch's Journal of Archaeology of Egypt/Egyptology, 17(3), 1140-1165.*

Ahmad, M., & Shah, S. Z. A. (2020). Overconfidence heuristic-driven bias in investment decision-making and performance: mediating effects of risk perception and moderating effects of financial literacy. *Journal of Economic and Administrative Sciences*, *38*(1), 60-90.

Ahmad, M., Shah, S. Z. A., & Abbass, Y. (2021). The role of heuristic-driven biases in entrepreneurial strategic decision-making: Evidence from an emerging economy. *Management Decision*, *59*(3), 669–691. https://doi.org/10.1108/MD-09-2019-1231

Ahmed, S., & Ullah, N. (2013). Investor sentiment and stock market dynamics: A case of Pakistan. *Journal of Public Administration, Finance and Law*, *4*(4), 126-135.

Barberis, N., & Xiong, W. (2009). What Drives the Disposition Effect? An Analysis of a Long-Standing Preference-Based Explanation. *The Journal of Finance*, *64*(2), 751–784. https://doi.org/10.1111/j.1540-6261.2009.01448.x

Baron, Reuben M., & David A. Kenny. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations." *Journal of personality and social psychology* 51, no. 6 1173.

Bolaman, Ö., & EVRİM, P. (2014). Effect of investor sentiment on stock markets. *Finansal Araştırmalar ve Çalışmalar Dergisi*, *6*(11), 51-64.

Chhapra, I. U., Kashif, M., Rehan, R., & Bai, A. (2018). An empirical investigation of investor's behavioral biases on financial decision making. *Asian Journal of Empirical Research*, *8*(3), 99-109.

Christie, W. G., & Huang, R. D. (1995). Following the pied piper: do individual returns herd around the market?. *Financial Analysts Journal*, *51*(4), 31-37.

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, *25*(2), 383. https://doi.org/10.2307/2325486

Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, *116*(1), 1–22. https://doi.org/10.1016/j.jfineco.2014.10.010

Fatima, A. (2019). Cognitive dissonance and investors' decision-making: A review. *International Journal of Financial, Accounting, and Management*, *1*(1), 39–45. https://doi.org/10.35912/ijfam.v1i1.56

Fraser, P., Hamelink, F., Hoesli, M., & Macgregor, B. (2004). Time-varying betas and the cross-sectional return–risk relation: Evidence from the UK. *The European Journal of Finance*, *10*(4), 255–276. https://doi.org/10.1080/13518470110053407

Frazzini, A. (2006). The Disposition Effect and Underreaction to News. *The Journal of Finance*, *61*(4), 2017–2046

Jabeen, S., Shah, S. Z. A., Sultana, N., & Khan, A. (2020). Impact of socio-psychological factors on investment decisions: The mediating role of behavioral biases. *Abasyn University Journal of Social Sciences*, *13*(1). https://doi.org/10.34091/JASS.13.1.03

Javed, M. A., & Marghoob, S. (2017). *The effects of behavioural factors in investment decision making at Pakistan stock exchanges*. *7*(1), 13.

Javid, A. Y., & Ahmed, E. (2008). Test of multi-moment capital asset pricing model*: Evidence from Karachi Stock Exchange* (No. 2008: 49). *Islamabad, Pakistan: Pakistan Institute of Development Economics.*

Kahneman, D., & Tversky, A. (1988). Prospect theory: An analysis of decision under risk. In P. Gärdenfors & N.-E. Sahlin (Eds.), *Decision, Probability and Utility* (1st ed., pp. 183–214). Cambridge University Press. https://doi.org/10.1017/CBO9780511609220.014

Lintner, J. (1965a). Security prices, risk, and maximal gains from diversification. *The Journal of Finance*, *20*(4), 587–615. https://doi.org/10.1111/j.1540-6261.1965.tb02930.x

Long, J. B. D., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Noise Trader Risk in Financial Markets. *Journal of Political Economy*, *98*(4), 703–738

Masomi, S. R., & Ghayekhloo, S. (2011). Consequences of human behaviors' in Economic: the Effects of Behavioral Factors in Investment decision making at Tehran Stock Exchange. In *International Conference on Business and Economics Research* (Vol. 1, No. 1, pp. 234-237).

Mittal, S. K. (2022). Behavior biases and investment decision: theoretical and research framework. *Qualitative Research in Financial Markets*, *14*(2), 213-228.. https://doi.org/10.1108/QRFM-09-2017-0085

P.H., H., & Uchil, R. (2019). Impact of investor sentiment on decision-making in Indian stock market: An empirical analysis. *Journal of Advances in Management Research*, *17*(1), 66–83. https://doi.org/10.1108/JAMR-03-2019-0041

P.H., H., & Uchil, R. (2020). Influence of investor sentiment and its antecedent on investment decision-making using partial least square technique. *Management Research Review*, *43*(11), 1441–1459. https://doi.org/10.1108/MRR-06-2019-0254

Rehman, K. U., Akhtar, H., & Shah, S. Z. A. (2019). Framing Effect and Financial Wellbeing: Role of Investment Behaviors as Mediator. *Review of Economics and Development Studies*, *5*(2), 343–354. https://doi.org/10.26710/reads.v5i2.555

Roll, R. (1977). A critique of the asset pricing theory's tests Part I: On past and potential testability of the theory. *Journal of Financial Economics*, *4*(2), 129–176. https://doi.org/10.1016/0304-405X(77)90009-5

Rupande, L., Muguto, H. T., & Muzindutsi, P.-F. (2019). Investor sentiment and stock return volatility: Evidence from the Johannesburg Stock Exchange. *Cogent Economics & Finance, 7*(1), 1600233. https://doi.org/10.1080/23322039.2019.1600233

Scheicher, M. (2001). The comovements of stock markets in Hungary, Poland and the Czech Republic. *International Journal of Finance & Economics*, *6*(1), 27–39. https://doi.org/10.1002/ijfe.141

Shah, S. Z. A., Ahmad, M., & Mahmood, F. (2018). Heuristic biases in investment decision-making and perceived market efficiency: A survey at the Pakistan stock exchange.

Qualitative Research in Financial Markets, *10*(1), 85–110. https://doi.org/10.1108/QRFM-04-2017-0033

Sharpe, W. F. (1964). capital asset prices: a theory of market equilibrium under conditions of risk. *The Journal of Finance*, *19*(3), 425–442. https://doi.org/10.1111/j.1540-6261.1964.tb02865.x

Shiller, R. J., Fischer, S., & Friedman, B. M. (1984). Stock Prices and Social Dynamics. *Brookings Papers on Economic Activity*, *1984*(2), 457. https://doi.org/10.2307/2534436

Statman, M., Thorley, S., & Vorkink, K. (2006). Investor Overconfidence and Trading Volume. *Review of Financial Studies*, *19*(4), 1531–1565. https://doi.org/10.1093/rfs/hhj032

Visaltanachoti, N., Lu, L., & Luo, H. (2007). Holding periods, illiquidity and disposition effect in the Chinese stock markets. *Applied Financial Economics*, *17*(15), 1265-1274.

Waweru, N. M., Munyoki, E., & Uliana, E. (2008). The effects of behavioural factors in investment decision-making: A survey of institutional investors operating at the Nairobi Stock Exchange. *International Journal of Business and Emerging Markets*, *1*(1), 24. https://doi.org/10.1504/IJBEM.2008.019243