مركز الاستشارات والبحوث والتطوير بأكاديمية السادات للعلوم الإدارية

11111





# مجلة البحوث الإدارية

Journal of Management Research

# علمية - متخصصة - مُحكمة - دورية ربع سنوية

# عدد يناير 2025

# jso.journals.ekb.eg

2 الثالثة والأربعين Vol. 43, No.1; Jan. 2025

رئيس التحرير أ. د. أحمد دسوقي محمد إسماعيل مدير مركز الاستشارات والبحوث والتطوير

رئيس مجلس الإدارة أ. د. محمد صالح هاشم رئيس أكاديمية السادات للعلوم الإدارية

للسنة

## ISSN: 1110-225X

ANNIVERSP

# The Impact of Sentiment Index on Market Volatility: A Literature Review

### Rana Ahmed Raafat,

Tel: 01126394526 Email: rana\_ahmed@foc.cu.edu.eg Affiliation: Faculty of Commerce, Cairo University, Giza, Egypt

## Prof. Dr. Yousri Khlefa,

Tel: 01118473730 Email: yokhlefa@foc.cu.edu.eg Affiliation: Faculty of Commerce, Cairo University, Giza, Egypt

### Dr. Dina Mohssen Mohssen,

Tel: 01224318999 Email: dina\_mohsen@foc.cu.edu.eg Affiliation: Faculty of Commerce, Cairo University, Giza, Egypt

#### Abstract

Through a comprehensive and critical literature review, the study sheds light on the paramount role of investor sentiment in the formation of the systemic risk by investigating the sentiment's impact on the mean-variance stock framework. The research reviews the impact of investor sentiment on stock market volatility and highlights the paradox and inconclusive results of past studies. In an attempt to provide guiding lines for resolving this paradox, the research emphasizes the importance of accounting for economic shocks when investigating the predictive and impact power of sentiment on the stock market volatility, highlighting the shift in the sentiment predictive powers within crisis and non-crisis periods and the heavier impact of the investor's sentiment in emerging markets compared to the developed markets. By providing a critical review of the literature, this study aims to open doors for various researchers to re-examine the dynamics of stock market volatility and

investor sentiment under various conditions and assumptions, in an attempt to resolve the underlying inconclusiveness of the past studies. By resolving this paradox, researchers can adjust asset pricing models to account for investor sentiment, while practitioners can better predict the market volatility and adjusting policies to accommodate for market behavior.

Keywords: investor sentiment, volatility, crisis and non-crisis periods, emerging markets

#### Introduction

Market volatility has always been a major concern for traders, investors, and policymakers alike. Not only is it a key factor in setting asset prices; it is also crucial for managing risk. For instance, the level of market volatility can significantly affect how smoothly capital markets operate. High volatility, for example, can drive up the cost of capital by increasing the risk premium, which in turn can lower economic output and impact investment decisions. As a result, understanding and predicting market volatility remains a significant topic among researchers, and until we can perfectly predict it, this interest is unlikely to wane. Many researchers have tried to unpack market volatility drivers. Some, like Schwert in 1989, have linked it to the ups and downs of the business cycle. Others, like French and Roll in 1986, point to trading activity, and Black in 1976 highlighted the role of financial leverage. But as the traditional financial theories struggled to explain various stock market puzzles and their inability to fully grasp market movements, behavioral finance emerged. Behavioral Finance looks at how individual biases and heuristics affect the stock market, moving beyond the mere calculations of risk while accounting for variables such as investor sentiment. However, even with behavioral finance, empirical evidence seemed to not reach definite and conclusive results on the impact of sentiment and its predictive power on volatility.

Hence, the following study is a comprehensive literature review shedding the light on the evolvement of the asset pricing and the shift from neo-classical to behavioral theory highlighting the eminent role of behavioral sentiment in asset pricing while combining and proposing probable explanations through the literature that can resolve the ongoing paradox of sentiment role in asset pricing, opening the doors for researchers to investigate various dynamics of the volatility-sentiment relationship.

#### 1. From the Neo-classical Theory to the Behavioral Theory of Finance

#### 1.1. The Fundamentals of the Neo-Classical Theory of Finance

The neo-classical theory of finance, which emerged as a dominant paradigm in the second half of the 19th century, is grounded in the Rational Expectation Hypothesis (REH) and theorizes that economic agents are rational, risk-averse individuals who aim to maximize their expected utility while considering only economic factors (Friedman, 1953; Kumari & Mahakud, 2015).

Central to this theory are the Capital Asset Pricing Model (CAPM), the arbitrage principle, and the Efficient Market Hypothesis (EMH), which asserts that asset prices at any time fully reflect all available information (Fama, 1970). Hence, through a rational risk-return trade-off process, which is adopted by all rational market participants, the EMH posits that any asset mispricing can be corrected through arbitrage, which brings asset prices back to their fundamental value (Friedman, 1953; Fama, 1970; Kumari and Mahakud, 2015).

Further, and to empirically test for the EMH, Fama (1965) utilized the Random Walk Hypothesis (RWH), which traces back to Bachelier (1900). The RWH states that stock prices follow a random walk making future prices unpredictable. In other words, the RWH explains that news are immediately reflected in prices, and since news are unpredictable, todays price changes reflect only today's news and are independent of yesterday's and tomorrow's price changes (Malkiel, 2003).

Subsequently, the EMH has been tested by various researchers, like Wu (1996), Laurence et al. (1997), Choudhry (1997), Narayan and Smyth (2005, 2007), Chien-Chiang Lee et al., (2010), M.A. Sánchez-Granero (2020), among many others, who tested the EMH and the random walk hypothesis by utilizing different methods, including serial correlation, different unit root tests and trading strategies.

The EMH, however, faced criticism, particularly for its rationality assumption. Critics argued that the theory failed to account for the human factor in decision-making under uncertainty and risk (Kahneman & Tversky, 1979). This critique led to the emergence of Behavioral Finance, which challenges the notion of complete rationality by highlighting cognitive and emotional biases that often result in suboptimal decisions (Herve et al., 2019). Pioneers in this field, such as Bondt and Thaler, repeatedly challenged the EMH, pointing out market

anomalies that the neo-classical theory could not explain (Barberis & Thaler, 2003; Singh et al., 2021).

#### 1.2 EMH Critic and the Emergence of the Behavioral Finance

Since its introduction, the EMH faced ongoing critique. Despite Eugene Fama's 1970 acknowledgment of the strong form efficiency's impracticality, describing it as a theoretical benchmark for real market activity, various scholars have challenged EMH's notion of perfect efficiency. For instance, Grossman and Stiglitz (1980) debated that perfect market conditions do not provide enough incentives to allow trading, as it doesn't create enough profit opportunities to recompense for the trading cost. Additional criticism labeled the EMH as 'too restrictive' (Lim, 2007), largely due to its foundational assumption of rationality.

Empirical evidence also challenges the validity of EMH. Studies have identified anomalies that are inconsistent with market efficiency, such as the January effect, where stocks tend to perform better in January than in other months (Rozeff & Kinney, 1976), and the momentum effect, where past winners continue to perform well in the short term (Jegadeesh & Titman, 1993). These anomalies suggest that markets are not always efficient and that there are opportunities for investors to earn abnormal returns.

Moreover, the 2008 financial crisis further questioned the foundations of EMH. The crisis highlighted the limitations of relying solely on market efficiency and rational expectations, as it exposed the complexity and interconnectedness of financial markets and the role of irrational behavior in market dynamics (Shiller, 2003).

Hence, The EMH assumption of rationality and the failure of the neo-classical finance theories in explaining the market anomalies market anomalies paved the road for the development of Behavioral Finance as a field, which points out the critical role of human behavior in financial decision-making under various conditions of certainty and uncertainty (Kahneman and Tversky, 1979). The behavioral finance theories challenged the EMH fundamental pillar by describing the market participants as irrational agents, influenced by their biases and heuristics, (Barberies and Thaler, 2003; Daniel et al, 2002; Schiller 2003), which set the ground and pillars for the development of the noise trader theory in asset pricing.

#### 2. Behavioral Theory and the Role of Investor Sentiment in Asset Pricing

#### 2.1The Noise Trader theory and the Market Anomlaies

The Behavioral Finance theory which emerged as a critique to the neo-classical theory challenging the assumptions of EMH, posits that investors' rationality is bounded by cognitive biases, such as overconfidence, anchoring, and herd behavior, among others, which can lead to systematic errors in judgment and decision-making (Kahneman & Tversky, 1979).

Further, the behavioral theory introduces the concept of 'noise traders', describing noise traders as irrational unsophisticated traders who 'falsely believe that they have special information about the future price of the risky asset' (J. Bradford De Long, 2005, p.3, 1.1). Hence, these traders trade on non-fundamental information, follow trends and chart patterns (Bender et al., 2013) and underreact (overreact) to bad (good) news, while exhibiting poor market timing (Black, 1986, Vikash Ramiah, 2015). As a result, noise traders drive the asset prices away from their intrinsic values, increasing the market's volatility and thus the systematic risk (De Long et al, 1990; Black 1986; Shleifer and Vishny, 1997). Vis-à-vis, a substantial amount of empirical studies demonstrated the presence of noise traders in speculation (De Long et al., 1990), hedging (Dow & Gorton, 1994), and liquidity trading (Foster & Viswanathan, 1990, 1993; Pagano & Roell, 1996). Empirical studies also provide evidence of the influence of investor sentiment and noise trading on market anomalies. For instance, the closed-end fund puzzle, where the prices of closed-end funds deviate significantly from their net asset values, has been attributed to investor sentiment (Lee, Shleifer, & Thaler, 1991). Similarly, the momentum effect, where past winners continue to outperform past losers, has been linked to the gradual diffusion of information and the behavior of noise traders (Hong & Stein, 1999). Moreover, the low-volatility anomaly, where low-volatility stocks outperform high-volatility stocks, can be partially explained by the preferences of noise traders for high-volatility stocks, leading to their overvaluation (Baker, Bradley, & Wurgler, 2011). These anomalies highlight the role of sentiment and noise trading in creating deviations from market efficiency.

Finally, this 'noise trading' or 'excessively bullish and bearish expectations of noise traders', or the 'waves of sentiment' as described by Kumari and Mahakud (2015), can persist in the market (Brown and Cliff, 2005), affecting the asset prices (Lee et al., 1991). Put differently,

the Investor sentiment is considered a component of the systematic risk and should hence be incorporated in the asset pricing (Kumari and Mahakud, 2015; Baker and Wurgler, 2006, 2007; Black 1986).

#### 2.2 Investor Sentiment and the Mean-Variance Stock Return

Market volatility is a key area of study in both neo-classical and behavioral finance. The neoclassical view, represented by the Black-Scholes model (Black and Scholes, 1973), attributes volatility to changes in fundamental factors. In contrast, behavioral finance suggests that volatility can also result from investor sentiment, cognitive biases, and herd behavior, as discussed by Shiller (1984) in his work on speculative bubbles. De Long et al. (1990) further elaborate on this concept by showing that the presence of noise traders can lead to excess volatility and return predictability, as rational investors adjust their strategies to account for the unpredictable behavior of noise traders. This creates a feedback loop where the actions of noise traders can have a sustained impact on market prices, even in the absence of new fundamental information. Subsequently, Bollerslev et al. (1992) introduced the concept of volatility clustering in financial markets, where periods of high volatility tend to be followed by periods of high volatility, and periods of low volatility followed by periods low volatility. This impact volatility clustering and feedback loop has been further investigated by Lux (1995), who observed in his model of herding behavior that investor sentiment can contribute to feedback effects and volatility clustering in financial markets concluding that sentimentinduced buying or selling can lead to self-reinforcing price movements. In capturing volatility clustering, Engle (1982) introduced the autoregressive conditional heteroskedasticity (ARCH) model, which captures volatility clustering, a phenomenon where periods of high volatility are followed by periods of high volatility and periods of low volatility followed by periods of low volatility. Sentiment fluctuations can contribute to this clustering, as shifts in investor mood can lead to sustained periods of increased or decreased volatility.

Further, theoretical models and empirical evidence suggest that investor sentiment can lead to overreactions and underreactions in the market, contributing to increased volatility. For example, Barberis, Shleifer, and Vishny (1998) proposed a model of investor sentiment that

explains how investors can become overly optimistic or pessimistic, leading to price swings and volatility. Similarly, Hong and Stein (1999) developed a model showing how differences in investor beliefs and the slow diffusion of information can result in momentum and reversals, contributing to market volatility. Focusing on the volatility-sentiment dynamics, Lee et al. (2002) and Aydogan (2016) showed that investor sentiment acts as a component in explaining the conditional volatility in developed markets, precisely the US and the European market, respectively. Additionally, Verma and Verma (2007) examined and verified the influence of noise trading in the formation of conditional volatility.

Further, Huang et al. (2015) investigated the asymmetric effects of investor sentiment on market volatility. They found that negative sentiment has a stronger impact on increasing market volatility compared to the stabilizing effect of positive sentiment. This asymmetry suggests that fear and pessimism can lead to more pronounced market reactions than optimism. The results are in line with the Prospect Theory developed by Daniel Kahneman and Amos Tversky in 1979, who demonstrate the asymmetry between the evaluation of gains and losses, loss aversion, and diminishing sensitivity, asserting that losses are perceived as more significant than gains, and as a result, individuals are more likely to make decisions that avoid losses rather than those that result in gains, demonstrating a "loss aversion" attitude.

In terms of predictive power of the investors' sentiment, Neal and Wheatley (1998), Simon and Wiggins (1999) and Wang et al (2006) studied the predicting power of investor sentiment and concluded that sentiment indeed predicts stock returns. Additionally, Tetlock (2007) analyzed the predictive power of sentiment indicators derived from financial news and found that news sentiment can predict future stock returns and market volatility, confirming the value of sentiment analysis in forecasting market movements. Simultaneously, Baker and Wurgler (2006, 2007), examined the investor sentiment and cross-sectional returns. The researchers concluded that different groups of investors have different cross-sectional returns, and hence different stock types are affected differently by sentiment. Particularly, value and small stocks which are difficult to arbitrage and evaluate are more inclined to be affected by the sentiment, compared to their counterpart. Additionally, Baker and Wurgler (2007) also argued that unprofitable, highly volatile stocks and/or stocks of growth-seeking or distressed firms are more widely impacted by the investor sentiment and noise trading.

Other researchers shifted their investigation of sentiment impact to the commodity market. For instance, Yang et al. (2019) and Qadan and Nama (2018) showed that investor sentiment contains useful information that help in forecasting the crude oil volatility. Similarly, ZChen, et al., (2021) investigated the predictive power of investor sentiment within the energy sector and found a significantly positive impact of investor sentiment on WTI oil spot and futures prices. Another study investigating the sentiment impact in the commodity market is that of Lutz (2014) which examined the role of investor sentiment in the volatility of commodity markets. The study found that sentiment significantly influences the volatility of commodity prices, with periods of high sentiment associated with lower volatility. This indicates that sentiment can affect not only equity markets but also other asset classes.

Despite the rich literature investigating the effect of investor sentiment on the mean-variance relation and the stock volatility, the findings of the predictive power of investor sentiment on stock volatility is far from conclusive, specifically within the emerging markets and during crisis periods. For instance, Baker and Stein (2004) explored the dynamics between investor sentiment and market volatility. They found that periods of high investor sentiment are often associated with lower subsequent market volatility, as optimistic investors tend to underestimate risk. Conversely, periods of low sentiment are linked to higher volatility due to increased risk aversion. The results contradict with the volatility clustering model and previous results of Engle (1982), De Long et al. (1990) and Bollerslev et al. (1992), respectively.

Further, Wang el al., (2006) found a stronger reverse causality between investor sentiment and stock market volatility. Conducting their analysis on the US stock market data, the researchers found that it is the return volatility that affects the investor sentiment rather than contra-wise. Comparably, Spyrou (2012) shows that it is the lagged volatility that impacts the conditional volatility rather than the investor sentiment Furthermore, Kling and Gao (2008) found no presence of a long-term relation between sentiment and stock prices. Contrarily to Spyrou (2012) and Wang el al., (2006) and Kling and Gao (2008), Abhijeet Chandraa and M. Thenmozhib (2013) investigated the mean-variance and sentiment dynamics. They found a positive relation between excess return and sentiment, as well as between market volatility and sentiment. Moreover, Wenzhao Wang and Darren Duxbury (2021) explained that markets characterized with cultural tendency to overreaction, are more prone to be driven by sentiment, compared to their counterparts. Additionally, in their investigation of the sentiment-volatility dynamics, Haritha and Abdul Rishad (2020) found strong evidence supporting the impact of sentiment on market volatility, stating that irrational sentiment indeed increases the excess volatility in the market and thus affects the excess market returns. Further studies investigating and validating the proposition that investor sentiment is embedded in the systematic/market risk and hence priced into the market by investigating the effect of sentiment on excess return and conditional volatility, include Yu and Yuan (2011). Finally, Cagli et al., (2020) attributed the inconclusive results to the fact that various of the past empirical studies, conducted their investigation under a linear model, failing to account for structural breaks which accommodate the market changes and market distress.

#### 3. Investor Sentiment and the Emerging Markets

Previous research recorded Investors' behavior in emerging markets to be different than developed markets (Kim and Nofsinger, 2008). The aforementioned difference can be attributed to the higher stock volatility, uncertain policies and overall weaker market efficiency, compared to the developed markets (Bekaert and Harvey, 2003; Lim and Brooks, 2011; Lesmond, 2005). For instance, Bekaert et al. (2011) conducted a cross-market analysis of investor sentiment in emerging markets. They found that global sentiment had a substantial impact on local market returns, with emerging markets being more sensitive to changes in global sentiment than developed markets. Comparably, Bekaert and Hoerova (2014) examination of the relationship between investor sentiment and market volatility in emerging markets, with positive sentiment is a significant predictor of market volatility in these markets, with positive sentiment associated with lower volatility and negative sentiment linked to higher volatility. Additionally, Wenzhao Wang and Darren Duxbury (2021) found that emerging markets tend to show an instant reaction to changes in investor sentiment compared to developed markets.

Further empirical evidence include Kumari and Mahakud (2015) investigated the role of investor sentiment in the Indian stock market within a conditional non-linear mean-variance framework. Their findings validated the embeddedness of the sentiment in the market risk of the Indian stock market and its positive correlation with the excess return as well as its

predictive power of the stock return volatility; Akdeniz and Salih (2016) studied the impact of investor sentiment on stock returns in the Turkish market. Their results showed that sentiment, measured by trading volume and the number of transactions, had a significant effect on stock returns, particularly during periods of market downturns; Da Silva et al. (2018) investigated the impact of investor sentiment on stock returns in the Brazilian market. They found that sentiment had a significant and positive effect on stock returns, with the impact being more pronounced during periods of market stress; Qiao et al. (2019) explored the relationship between investor sentiment and stock market volatility in China. Their findings indicated that investor sentiment, measured by the turnover rate and the number of new accounts, significantly contributed to market volatility, especially during bullish periods.

#### 4. Investor Sentiment and Market Distress Periods

Comparably to the different impact of sentiment in emerging and developed markets, studies also showed the distinct role that sentiment plays during crisis and non-crisis periods. For instance, Chau et al. (2014) conducted a cross-country analysis of investor sentiment during the global financial crisis and found that sentiment has a significant impact on stock returns in both developed and emerging markets, with the effect being more pronounced in emerging markets. Alternatively, Bekaert et al. (2014) studied sentiment spillovers during financial crises. Their research showed that sentiment in one market could spill over to other markets, contributing to the global transmission of crises. Moreover, and in their investigation of the dot-com bubble of the late 1990s and early 2000s (Ofek & Richardson, 2003) showed that sentiment during crises can have long-term effects on asset prices and market structure. Notably, the dot-com bubble of the late 1990s stocks, causing overvaluation of internet stocks and leading to a market crash and a subsequent reevaluation of the valuation of tech companies.

The impact of sentiment on market during financial crisis has been a focus of various researchers. For instance, Baur, Quintero and Stevens (1998) investigated the impact of sentiment on stock return prices during the 1987 stock market crash and found significant impact of sentiment on stock market during the crash, but no impact on the periods surrounding the crash. Similarly, Baker and Wurgler (2007) studied the impact and

predictability of investor sentiment on stock returns during the 2008 global financial crisis and showed that sentiment-driven trading contributed to the market downturn and that sentiment was a significant predictor of future stock returns during the crisis. Comparably, Zouaoui, Nouyrigat and Beer (2011) investigated the predictability of sentiment on the global financial crisis and found significant predictive powers of sentiment on the financial crisis, especially for countries with low institutional development and high market overreaction. Alternatively, Beirne et al. (2013) investigated the role of investor sentiment in the European debt crisis. Their findings indicated that changes in sentiment were closely associated with bond yield spreads in peripheral Eurozone countries, highlighting the importance of sentiment in sovereign debt markets during crises.

However, the study of impact of sentiment is not limited to financial crises but also extends to non-financial crises as well. For instance, research showed that political uncertainty has a significant effect on sentiment, causing increased market volatility and shifts in asset allocation (Atilgan et al., 2016). Other studies compared the impact of sentiment in financial and non-financial crisis, like Hong Van Hoang and Syed (2021) who investigated the predictive powers of fear sentiment on currency and commodity volatility for the global financial crisis and the covid-19 pandemic. Their findings showed significant predictive powers of sentiment on the volatilities during the global financial crisis, while the findings showed insignificant and no predictive power of the sentiment on the volatilities during the covid-19 pandemic. The researchers attributed their results to the notion that the sentiment predictive powers during crisis largely depend on the source of the crisis. And as the source of the (fear) sentiment under each crisis was different, (i.e., investors were driven by fear of financial loss during the global financial crisis, and health issues on top of financial loss during the covid-19 pandemic), the significance of fear sentiment predictability on the stock volatility under each crisis came different as well. Equivalently, Baker et al., (2020) attributed the low effect of sentiment on market volatility during the COVID-19 to external economic factors such as the unprecedented fiscal and monetary stimulus measures which helped to stabilize markets and restore investor confidence relatively quickly.

Finally, the relationship between sentiment and market dynamics during crises can also vary across different types of investors. Research showed that retail investors, who are often considered to be more sentiment-driven, may react more strongly to crisis events than institutional investors, who may have better access to information and risk management tools (Kaniel et al., 2008).

#### Conclusion

To conclude, previous research demonstrates how the relationship between investor sentiment and market volatility is rather complex and multifaceted. Empirical evidence investigating the dynamics between investor sentiment and the stock-return and volatility remain inconclusive and unsettled. Comparatively, despite various studies investigating the stock-market-sentiment dynamics during market-stress periods, limited empirical studies investigated the predictive power of sentiment on conditional volatility of market stock returns during different types of economic turmoil, causing incomplete and inconclusive empirical evidence.

In light of the inconclusive results on the investor sentiment index and the lack of sufficient evidence on the dynamics between stock market volatility and sentiment in the emerging markets, the current literature review provides research evidence supporting the importance of investigating the role of sentiment in the formation of the systematic risk, while shedding light on the importance of carrying the investigation within a non-linear conditional meanvariance framework and structural breaks as indicators for crisis and non-crisis periods. Such consideration in the analysis allows a more effective investigation of the predictive and impact power of investor sentiment on the stock market volatility. Hence, a research within the aforementioned domain will have significant implications in both theory and practice, as it will highlight the ability of behavioral finance in explaining stock return volatility, and resolving the eminent paradox of the sentiment-volatility dynamics. Second, by showing the sentiment as a significant factor in the stock return volatility, the research opens the door for future research addressing the augmentation of the asset pricing models to include the sentiment. On the practical side, empirical evidence of such research can improve the predictability of the Stock Market volatility, which Central banks could use to better understand the financial markets' stability and reactiveness to policy changes.

#### References

Akdeniz, L., & Salih, A. K. 2016. Investor sentiment and stock returns: Evidence from the Istanbul Stock Exchange. *International Journal of Economics and Financial Issues*, 6(2), 540-546.

Antweiler, W., & Frank, M. Z. 2004. Is All That Talk Just Noise? The Information Content of Internet Stock Message Boards. *The Journal of Finance*, 59(3), 1259-1294.

Atilgan, Y., Demirtas, K. O., & Simsek, K. D. 2016. Political risk and stock market volatility in the Middle East and North African (MENA) countries. *Journal of Economics and Finance*, 40(4), 809-831.

Aydogan, B., 2017. Sentiment dynamics and volatility of international stock markets. *Eurasian Business Review*, 7(3), pp.407-419.

Babashova, S., 2020, October. Conditional Volatility Models in Financial Markets and Its Application. In 2nd HEZARFEN International Congress of Science, Mathematics and Engineering. Proceeding Book.

Bachelier, L., 1900. Théorie de la spéculation. In *Annales scientifiques de l'École normale supérieure* (Vol. 17, pp. 21-86).

Baker, D., De Long, J.B. and Krugman, P.R., 2005. Asset returns and economic growth. *Brookings Papers on Economic Activity*, 2005(1), pp.289-330.

Baker, M. and Wurgler, J., 2006. Investor sentiment and the cross-section of stock returns. *The journal of Finance*, *61*(4), pp.1645-1680.

Baker, M., & Stein, J. C. 2004. Market Liquidity as a Sentiment Indicator. Journal of Financial Markets, 7(3), 271-299.

Baker, M., & Wurgler, J. 2007. Investor Sentiment in the Stock Market. *Journal of Economic Perspectives*, 21(2), 129-152.

Baker, M., Bradley, B., & Wurgler, J. 2011. Benchmarks as Limits to Arbitrage: Understanding the Low-Volatility Anomaly. *Financial Analysts Journal*, 67(1), 40-54.

Baker, M., Ruback, R.S. and Wurgler, J., 2007. Behavioral corporate finance. In *Handbook of empirical corporate finance* (pp. 145-186). Elsevier.

Baker, S. R., Bloom, N., & Davis, S. J., 2020. Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics*, 131(4), 1593-1636.

Barberis, N. and Thaler, R., 2003. A Survey of Behavioral finance, Chapter 18, George M. Constan.

Barberis, N., Shleifer, A., & Vishny, R. (1998). A Model of Investor Sentiment. Journal of Financial Economics, 49(3), 307-343.

Baur, M.N., Quintero, S. and Stevens, E., 1996. The 1986–88 stock market: Investor sentiment or fundamentals?. *Managerial and Decision Economics*, *17*(3), pp.319-329.

Beirne, J., Caporale, G. M., Schulze-Ghattas, M., & Spagnolo, N. (2013). Volatility Spillovers and Contagion from Mature to Emerging Stock Markets. *Review of International Economics*, 21(5), 1060-1075.

Bekaert, G. and Harvey, C.R., 2003. Emerging markets finance. Journal of empirical finance, 10(1-2), pp.3-55.

Bekaert, G., & Hoerova, M. (2014). The VIX, the Variance Premium and Stock Market Volatility. *Journal of Econometrics*, 183(2), 181-192.

Bekaert, G., Ehrmann, M., Fratzscher, M., & Mehl, A., 2014. The Global Crisis and Equity Market Contagion. *Journal of Finance*, 69(6), 2597-2649.

Bekaert, G., Hoerova, M., & Duca, M. L. (2013). Risk, Uncertainty, and Monetary Policy. Journal of Monetary Economics, 60(7), 771-788.

Bekaert, G., Hoerova, M., & Lo Duca, M. 2011. Risk, uncertainty, and monetary policy. *Journal of Monetary Economics*, 60(7), 771-788.

Black, F. (1986). Noise. Journal of Finance, 41(3), 528-543.

Black, F., 1976. Studies of stock market volatility changes. 1976 Proceedings of the American statistical association bisiness and economic statistics section.

Blasco, N. and Corredor, P., 2016. When and Where Are Informed Traders? What Is Their Relationship with Analysts in the Price Discovery Process?. *Journal of Behavioral Finance*, *17*(4), pp.352-364.

Brown, G.W. and Cliff, M.T., 2004. Investor sentiment and the near-term stock market. *Journal of empirical finance*, *11*(1), pp.1-27.

Brown, G.W., 1999. Volatility, sentiment, and noise traders. Financial Analysts Journal, 55(2), pp.82-90.

Cagli, E.C., Ergün, Z.C. and Durukan, M.B., 2020. The causal linkages between investor sentiment and excess returns on Borsa Istanbul. *Borsa Istanbul Review*, 20(3), pp.214-223.

Chandra, A. and Thenmozhi, M., 2013. Investor sentiment, volatility and stock return comovements. *Volatility* and Stock Return Comovements (October 17, 2013).

Chang, C.-L., Hsieh, T.-L., & Wang, Y.-H. (2013). Investor sentiment and international stock markets' volatility spillover. *International Review of Economics & Finance*, 29, 463-482.

Chau, F., Deesomsak, R., & Wang, J. (2014). Political Uncertainty and Stock Market Volatility in the Middle East and North African (MENA) Countries. *Journal of International Financial Markets, Institutions and Money*, 28, 1-19.

Chen, Z., Liang, C. and Umar, M., 2021. Is investor sentiment stronger than VIX and uncertainty indices in predicting energy volatility?. *Resources Policy*, 74, p.102391.

Da Silva, C. B., De Faria, A. C., & Da Costa Jr., N. C. A. (2018). Investor sentiment and stock returns: Evidence from the Brazilian market. *Revista Brasileira de Finanças*, 16(2), 1-33.

Daniel, K., Hirshleifer, D. and Teoh, S.H., 2002. Investor psychology in capital markets: Evidence and policy implications. *Journal of monetary economics*, 49(1), pp.139-209.

Dash, S.R. and Maitra, D., 2018. Does sentiment matter for stock returns? Evidence from Indian stock market using wavelet approach. *Finance Research Letters*, *26*, pp.32-39.

De Long, J.B., Shleifer, A., Summers, L.H. and Waldmann, R.J., 1990. Positive feedback investment strategies and destabilizing rational speculation. *the Journal of Finance*, 45(2), pp.379-395.

Engle, R. F. (1982). Autoregressive Conditional Heteroskedasticity with Estimates of the Variance of United Kingdom Inflation. *Econometrica*, 50(4), 987-1007.

Ergun, Z.C. and Durukan, B., 2017. Investor sentiment in the crisis periods: evidence from Borsa Istanbul. *Journal of Business Economics and Finance*, 6(4), pp.309-317.

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance*, 25(2), 383-417.

Foster, F.D. and Viswanathan, S., 1990. A theory of the interday variations in volume, variance, and trading costs in securities markets. *The Review of Financial Studies*, *3*(4), pp.593-624.

Foster, F.D. and Viswanathan, S., 1993. Variations in trading volume, return volatility, and trading costs: Evidence on recent price formation models. *The Journal of Finance*, *48*(1), pp.187-211.

French, K.R. and Roll, R., 1986. Stock return variances: The arrival of information and the reaction of traders. *Journal of financial economics*, *17*(1), pp.5-26.

Friedman, M., 1953. The Methodology of Positive Economics. *Essays in Positive Economics (Chicago: Univ. of Chicago Press, 1953)*.

Grossman, S.J. and Stiglitz, J.E., 1980. On the impossibility of informationally efficient markets. *The American economic review*, *70*(3), pp.393-408.

Haritha, P.H. and Rishad, A., 2020. An empirical examination of investor sentiment and stock market volatility: evidence from India. *Financial Innovation*, 6(1), pp.1-15.

Ho, C. and Hung, C.H., 2009. Investor sentiment as conditioning information in asset pricing. *Journal of Banking & Finance*, *33*(5), pp.892-903.

Hong, H., & Stein, J. C. 1999. A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets. *Journal of Finance*, 54(6), 2143-2184.

Huang, D., Jiang, F., Tu, J., & Zhou, G. (2015). Investor Sentiment Aligned: A Powerful Predictor of Stock Returns. *Review of Financial Studies*, 28(3), 791-837.

Jegadeesh, N., & Titman, S. 1993. Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *Journal of Finance*, 48(1), 65-91.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2), 263-291.

Kahneman, D., & Tversky, A. 1979. Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47(2), 263-291.

Kim, K.A. and Nofsinger, J.R., 2008. Behavioral finance in Asia. *Pacific-Basin Finance Journal*, *16*(1-2), pp.1-7.

Kling, G. and Gao, L., 2008. Chinese institutional investors' sentiment. *Journal of International Financial Markets, Institutions and Money*, *18*(4), pp.374-387.

Kumar, A., & Persaud, A. 2002. Pure Contagion and Investors' Shifting Risk Appetite: Analytical Issues and Empirical Evidence. International Finance, 5(3), 401-436.

Kumari, J. and Mahakud, J., 2015. Does investor sentiment predict the asset volatility? Evidence from emerging stock market India. *Journal of Behavioral and Experimental Finance*, 8, pp.25-39.

Kumari, J., 2019. Investor sentiment and stock market liquidity: Evidence from an emerging economy. *Journal of Behavioral and Experimental Finance*, 23, pp.166-180.

Lee, C. M. C., Shleifer, A., & Thaler, R. H. (1991). Investor Sentiment and the Closed-End Fund Puzzle. *Journal of Finance*, 46(1), 75-109.

Lee, W.Y., Jiang, C.X. and Indro, D.C., 2002. Stock market volatility, excess returns, and the role of investor sentiment. *Journal of banking & Finance*, 26(12), pp.2277-2299.

Lesmond, D.A., 2005. Liquidity of emerging markets. Journal of financial economics, 77(2), pp.411-452.

Lim, K.P. and Brooks, R., 2011. The evolution of stock market efficiency over time: A survey of the empirical literature. *Journal of Economic Surveys*, 25(1), pp.69-108.

Lu, X., Ma, F., Wang, J. and Zhu, B., 2021. Oil shocks and stock market volatility: New evidence. *Energy Economics*, 103, p.105567.

```
(PRINT) ISSN :1110-225X
```

Lutz, C. (2014). The Impact of Investor Sentiment on the German Stock Market. Zeitschrift für die gesamte Staatswissenschaft / Journal of Institutional and Theoretical Economics, 170(1), 120-144.

Lux, T. (1995). Herd Behaviour, Bubbles and Crashes. Economic Journal, 105(431), 881-896.

Maitra, D. and Dash, S.R., 2017. Sentiment and stock market volatility revisited: A time-frequency domain approach. *Journal of Behavioral and Experimental Finance*, *15*, pp.74-91.

Narayan, P.K. and Smyth\*, R., 2005. Are OECD stock prices characterized by a random walk? Evidence from sequential trend break and panel data models. *Applied Financial Economics*, *15*(8), pp.547-556.

Narayan, P.K. and Smyth, R., 2007. Mean reversion versus random walk in G7 stock prices evidence from multiple trend break unit root tests. *Journal of International Financial Markets, Institutions and Money*, *17*(2), pp.152-166.

Neal, R. and Wheatley, S.M., 1998. Do measures of investor sentiment predict returns? *Journal of Financial and Quantitative Analysis*, *33*(4), pp.523-547.

Ofek, E., & Richardson, M. (2003). DotCom Mania: The Rise and Fall of Internet Stock Prices. *Journal of Finance*, 58(3), 1113-1137.

Pagano, M. and Röell, A., 1996. Transparency and liquidity: A comparison of auction and dealer markets with informed trading. *The Journal of Finance*, *51*(2), pp.579-611.

Pandey, P. and Sehgal, S., 2019. Investor sentiment and its role in asset pricing: An empirical study for India. *IIMB Management Review*, *31*(2), pp.127-144.

Patel, S.A. and Sarkar, A., 1998. Crises in developed and emerging stock markets. *Financial Analysts Journal*, 54(6), pp.50-61.

Poterba, J.M., 2000. Stock market wealth and consumption. Journal of economic perspectives, 14(2), pp.99-118.

Qadan, M. and Nama, H., 2018. Investor sentiment and the price of oil. Energy Economics, 69, pp.42-58.

Qiao, Z., Li, Y., & Wong, W. K. (2019). Investor Sentiment and Stock Market Volatility: Evidence from China. *Journal of Behavioral Finance*, 20(1), 115-124.

Rozeff, M. S., & Kinney, W. R. (1976). Capital Market Seasonality: The Case of Stock Returns. *Journal of Financial Economics*, 3(4), 379-402.

Ryu, D. and Yang, H., 2019. Who has volatility information in the index options market?. *Finance Research Letters*, *30*, pp.266-270.

Sánchez-Granero, M.A., Balladares, K.A., Ramos-Requena, J.P. and Trinidad-Segovia, J.E., 2020. Testing the efficient market hypothesis in Latin American stock markets. *Physica A: Statistical Mechanics and its Applications*, 540, p.123082.

Schmeling, M., 2009. Investor sentiment and stock returns: Some international evidence. *Journal of empirical finance*, *16*(3), pp.394-408.

Schwert, G.W., 1989. Margin requirements and stock volatility. *Journal of Financial Services Research*, *3*(2), pp.153-164.

Shiller, R. J. (1981). Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends? *American Economic Review*, 71(3), 421-436.

```
(PRINT) ISSN :1110-225X
```

Shiller, R. J. (1984). Stock Prices and Social Dynamics. Brookings Papers on Economic Activity, 1984(2), 457-498.

Shiller, R.J., 2003. From efficient markets theory to behavioral finance. *Journal of economic perspectives*, *17*(1), pp.83-104.

Shleifer, A. (2000). Inefficient Markets: An Introduction to Behavioral Finance. Oxford University Press.

Shleifer, A. and Vishny, R.W., 1997. The limits of arbitrage. The Journal of finance, 52(1), pp.35-55.

Simon, D.P. and Wiggins III, R.A., 2001. S&P futures returns and contrary sentiment indicators. *Journal of Futures Markets: Futures, Options, and Other Derivative Products*, 21(5), pp.447-462.

Spyrou, S., 2012. Sentiment changes, stock returns and volatility: evidence from NYSE, AMEX and NASDAQ stocks. *Applied Financial Economics*, 22(19), pp.1631-1646.

Tetlock, P. C. (2007). Giving Content to Investor Sentiment: The Role of Media in the Stock Market. *Journal of Finance*, 62(3), 1139-1168.

Tversky, A. and Kahneman, D., 1974. Judgment under uncertainty: Heuristics and biases. *science*, *185*(4157), pp.1124-1131.

Van Hoang, T.H. and Syed, Q.R., 2021. Investor sentiment and volatility prediction of currencies and commodities during the COVID-19 pandemic. *Asian Economics Letters*, *1*(4), p.18642.

Verma, R. and Verma, P., 2007. Noise trading and stock market volatility. *Journal of Multinational Financial Management*, *17*(3), pp.231-243.

Wang, W., Su, C. and Duxbury, D., 2021. Investor sentiment and stock returns: Global evidence. *Journal of Empirical Finance*, 63, pp.365-391.

Wang, Y.H., Keswani, A. and Taylor, S.J., 2006. The relationships between sentiment, returns and volatility. *International Journal of Forecasting*, 22(1), pp.109-123.

Whaley, R. E. (2000). The Investor Fear Gauge. Journal of Portfolio Management, 26(3), 12-17.

Yu, J. and Yuan, Y., 2011. Investor sentiment and the mean-variance relation. *Journal of Financial Economics*, 100(2), pp.367-381.

Yu, J., & Yuan, Y. (2011). Investor Sentiment and the Mean-Variance Relation. Journal of Financial Economics, 100(2), 367-381.

Zouaoui, M., Nouyrigat, G. and Beer, F., 2011. How does investor sentiment affect stock market crises? Evidence from panel data. *Financial Review*, *46*(4), pp.723-747.