

From pandemic uncertainty to economic recovery: Does investor sentiment still matter for stock returns?

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ABSTRACT

The relationship between investor sentiment and market dynamics is a highly intriguing research topic for both academics and the financial industry. By using Spearman rank correlation analysis, this paper aims to explore investors' decision-making behavior (rational and irrational) on stock returns during and after the COVID-19 outbreak. While irrational factors of the study were measured by the Google Search Volume Index and trading volume, rational factors were measured by profitability and size. The study used three different characteristics of subsectors manufacturing industry namely Food and Beverage, Pharmacy, and Cigarettes that are listed in the Indonesia Stock Market. To the best of our knowledge, our study is the first to examine and compare the level of rationality of investors in a wide range of industries and sectors during and after the COVID-19 pandemic. Our finding supports the notion that both sentiments have an effect on stock returns indicating that cognitions, emotions, and the noise of traders still have an impact on the market. While overall rational sentiment has a more significant correlation with stock returns during the economic recovery phase, there was a highly significant correlation between irrational factors and stock returns during pandemic uncertainty conditions. Moreover, investors tend to be irrational and overreact when making investment decisions in Cigarette sectors during the COVID-19 pandemic. In contrast, after the pandemic, the correlation of rational sentiment of investors toward the Pharmacy industry is still higher than others.

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Introduction

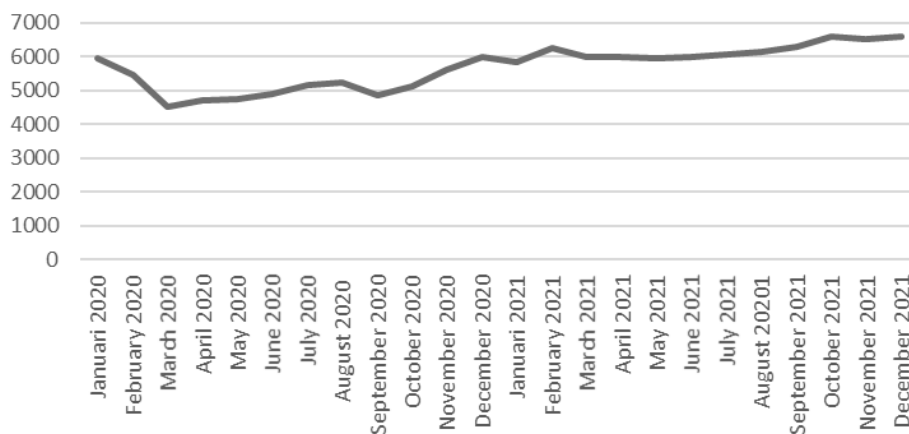
The emergence of the COVID-19 pandemic in early 2020 precipitated a global catastrophe. The multifaceted consequences transcended the realm of public health, imparting extensive strain on the socio-economic structures of nations globally. Countries found themselves cornered. Governments were confronted with the formidable task of policy prioritization, oscillating between public health and economic stability. Each choice bore detrimental ramifications for the broader society. Elevating economic considerations would inadvertently fuel the proliferation of the virus, thereby undermining public health. Conversely, anchoring policies on health imperatives necessitated restrictions on societal activities, culminating in economic downturns with dire consequences for the populace.

In navigating this intricate dynamic, the Indonesian government adopted a phased approach to policy prioritization, calibrated in accordance to the prevailing contours of viral transmission and economic stability. Initial stages of the pandemic were characterized by a heightened focus on curtailing viral spread through the implementation of community activity restrictions. This phase witnessed a contraction in economic activities, particularly in sectors like tourism, hospitality, cottage industries, and education. The Central Bureau of Statistics of Indonesia reported a 2.07% contraction in the nation's economic growth in 2020 as a direct ramification of the pandemic.

However, in response, a suite of comprehensive fiscal, monetary, and substantial APBN fund allocations were implemented for economic rejuvenation (Nainggolan, 2020). As public health metrics improved, reflecting a decline in the virulence of the pandemic, restrictions were relaxed. This recalibration of policies fueled a resurgence in socio-economic activities. By the second quarter of 2021, the Indonesian economy burgeoned, registering a 7.07% growth—a zenith not attained in the preceding 16 years (Moegiarso, 2021). Parallel developments were evident within the Indonesian financial milieu. Existing literature corroborates the profound impacts of the pandemic on stock market trajectories (Shehzad et al., 2020; Erdem, 2020; Topcu & Gulal, 2020; Harjoto & Rossi, 2023; Mili et al., 2022). Bai et al. (2020) specifically underscored its significant positive bearings on the permanent volatility of international stock markets, albeit with variations in impact magnitude (Topcu & Gulal, 2020; Erdem, 2020).

A visual representation encapsulating the evolution of Indonesia's economic landscape, commencing from the pandemic's onset to the ongoing economic rejuvenation phase, is delineated in Figure 1, showcasing the oscillations in capital market activity from 2020-2021.

Figure 1. Development of Composite Stock Price Index in Indonesian



Source: Indonesia Stock Exchange (2022)

The graph delineates a pronounced dichotomy in the behavioral pattern of the Indonesian capital market during the initial two years of the pandemic. The market witnessed precipitous stock price oscillations from 2020 through early 2021 and a transition to relative stability from March 2021 onwards. A significant correction in stock prices characterized the early phase of 2020, triggered by the surfacing news of the pandemic's outbreak in China. The JCI plummeted from a benchmark of 6,300 in January to approximately 3,900 in March 2020, corresponding with the official declaration of the first COVID-19 case in Indonesia on March 2, 2020 (Fadly, 2021). Consequently, March 2020 was marked by unprecedented stock volatility, attributable to investors' navigation through uncharted territories occasioned by the pandemic's global incursion (Zhang et al., 2020).

The capital market's dynamics exhibited a shift towards stability in March 2021. Numerous scholarly inquiries have sought to decipher the underlying determinants of these market dynamics amidst the pandemic. Two pivotal elements have been identified as instrumental in stock price movements: fundamental and sentiment values (Agustin, 2021; Thampanya et al., 2020; Zulfikar & Mayvita, 2017). The fundamental value is hinged on the investment decisions of rational, information-driven investors who, motivated by wealth maximization, take into account macroeconomic indicators, financial ratios, and intrinsic corporate values (Baker et al., 1977).

Empirical studies conducted during this period underscore this narrative. Ali (2023) established a positive correlation between accounting income and concurrent stock returns, suggesting the continued relevance of accounting earnings in shaping investment decisions during the pandemic. Similarly, Loang & Ahmad (2023) disclosed a diminished influence of analyst information, including target prices, EPS forecasts, and revenue predictions on

herding behavior, particularly during the pandemic. Abbas & Nainggolan (2022) contributed to this discourse by revealing a positive association between cumulative abnormal returns (CARs) around workplace closure dates and current ratios, while observing an inverse relationship with long-term debt ratios.

On the other hand, sentiment values are pivotal in guiding stock market trajectories, primarily steered by investors' sentiments which are shaped by their beliefs concerning future cash flows and associated investment risks (Baker & Wurgler, 2007). From this vantage point, investors, as decision-makers, are endowed with an array of potential psychological attributes. They often pursue satisfactory outcomes rather than optimal solutions, exhibit mutable preferences which might be crystallized during the decision-making process itself, and are inherently adaptive (Olsen, 1998). Baker & Wurgler (2007) propounded that the significance of investor sentiment is heightened during tumultuous periods, especially when market outcomes are unpredictable. Research focusing on stock returns during the pandemic highlighted the sway of investor behaviors such as risk aversion, herding effect, disposition effect, ambiguity, overconfidence, and fear on stock market dynamics. Nonetheless, existing explanations regarding investor behavior during the pandemic appear fragmented and lack comprehensiveness. As asserted by Chou et al. (2012), solely relying on either rational or behavioral theories is insufficient to expound on industry returns, cautioning against the reductionist tendency of attributing asset-pricing anomalies to a singular driving force.

Several studies have concurrently explored both rational and irrational investor behaviors. Notably, Verma et al. (2008) posited that while rational sentiments have a pronounced impact on stock market returns, irrational sentiments manifest their effects more swiftly and vividly. Chou et al. (2012) expounded on the duality of industries, emphasizing their integration of both rational and behavioral dimensions. Sullivan et al. (2019) accentuated the roles of both rational and irrational sentiment risks in influencing stock returns, delineating the dominance of rational sentiment in a broad spectrum of stocks. Pornpikul & Nettayanun (2022) articulated that even though rational elements often underpin return volatility, irrational elements magnify their influence, especially during financial crises. Thampanya et al. (2020) highlighted the differential influences of rational and irrational factors on asset returns across countries, contingent on the developmental stage of their respective markets.

The condition of the COVID-19 pandemic is an "extraordinary" condition in the sense that this disaster is a disaster that has hit the entire world globally, affecting all aspects of human life, even changing human behavior. These conditions make behavior during

Pandemic very interesting to study. Milovidov (2023) shows that the pandemic has changed the behavior of investors in making investment decisions. This study add to the scant literature on understanding the impact of COVID-19 pandemic on investor behavior. We enriched the results of previous research, by studying 2 factors simultaneously and by adding the variable type of industry as a control variable. Baek et al. (2020), Harjoto & Rossi (2023) and Ali (2023) show that the pandemic has different impacts on the industrial scale.

The results of this study hopefully will contribute to all stock market stakeholder, i.e. investors, traders, stock exchange and government. Investors and traders increasingly understand their own behavior, especially irrational behavior. Managers make better decisions in their investment decisions by considering irrational factors in certain investment conditions. Decision makers in the capital market will be able to make policy adjustments when investors are dominated by irrational attitudes.

Literature Review

Financial Behavior: Rational and Irrational Sentiment

Stock price dynamics are fundamentally influenced by the series of investment decisions made by a diverse array of investors. Financial studies categorize investor characteristics into two predominant camps: one that views investors as solely rational decision-makers (rooted in traditional/standard finance paradigms) and another that acknowledges the influence of non-rational factors (as posited in behavioral finance paradigms). In the realm of standard finance, humans are posited to be entirely rational, optimizing their utility given a fixed level of income or wealth, invariably opting for higher returns at a given risk level. Rational investors abide by foundational financial principles, structuring their investment strategies grounded in risk-return analyses and attentive considerations of fundamental aspects such as macroeconomic indicators and companies' intrinsic values (Baker et al., 1977). Macroeconomic variables, as barometers of economic conditions, exert systematic influences on stock market returns. These returns are intricately linked to firms' capacities to generate cash flows and future dividends, encapsulating risk premiums integral to stock market performance (Maysami & Koh, 2000). Financial ratios, emblematic of firms' financial performance, are pivotal in determining the intrinsic values of stocks, with corporate metrics such as liquidity, solvability, and profitability being pivotal. Bekaert et al. (2010) accentuated the supremacy of corporate variables as decisive determinants of aggregate idiosyncratic volatility. In a similar vein, Fama & French (2015) introduced a model encapsulating patterns

of size, value, profitability, and investment as explanatory variables for average stock returns, aligning with the rational investor's behavior.

Contrastingly, behavioral finance extends the contours of the discourse, offering a more expansive vista of investor characteristics. It abstains from rigidly delineating "rational" conducts or branding decision-making trajectories as biased or erroneous; rather, it endeavors to decipher and prognosticate the systematic financial market reverberations of psychological decision modalities (Olsen, 1998). Statman (1999) offers a succinct delineation, drawing a distinction between the "rational" individuals of standard finance and the "normal" actors in behavioral finance. Here, "normal" encapsulates the notion of investors as ordinary individuals, swayed by sentiments and psychological biases. In this schema, the differentials in expected returns are ascribed to factors extending beyond mere variations in risk (Statman, 2014).

Behavioral finance emphasizes the influence of psychological biases on decision-making, shedding light on behaviors that are often irrational, guided by emotions, and demonstrate limitations in information processing, leading to potential biases (Prosad et al., 2015). Several theories have been foundational in behavioral finance research, most notably Prospect Theory (Kahneman & Tversky, 1979), Bounded Rationality (Simon, 1995), and Cumulative Prospect Theory (Tversky & Kahneman, 1992). Simon's (1995) exploration highlights that while individuals are inclined towards rational decision-making, they often grapple with cognitive constraints. These constraints arise from inherent limitations such as time constraints, information scarcity, and the innate human capacity to process and analyze data comprehensively.

Both Prospect Theory and Cumulative Prospect Theory accentuate the perceptual nature of risk, positing that an individual's risk attitude is shaped by various factors, including past experiences and expectations. The academic landscape has witnessed a burgeoning interest in this domain. To illustrate, Nofsinger (2005) delved into the interplay between social mood and financial economics; Bijl et al. (2016) examined the correlation between Google searches and stock returns; Griffith et al. (2020) explored emotional dimensions within stock markets; and Chivianti & Sukamulja (2021) analyzed the impact of Google Search Volume Index on underpriced IPOs and the divergence of opinions. A growing body of literature continues to explore the nexus between irrational sentiment and stock returns.

Hirshleifer (2001) proposed a nuanced perspective, associating expected returns not only with risks but also with investor mistaken evaluation, bridging the dichotomy between rational and irrational sentiments in the context of stock return explication. This perspective

intimates that stock returns are a complex amalgamation of both sentiments, suggesting a scenario where bullish or bearish investor predisposition can be interpreted as either rational anticipations of future economic landscapes, manifestations of irrational exuberance, or a synthesis of both.

H₁: Rational sentiment and Irrational sentiment has significant relation to stock return.

Uncertainty and Financial Behavior

Decisions are frequently rooted in beliefs regarding the probabilities of uncertain outcomes, as outlined by Tversky & Kahneman (1974). Consequently, it is logical that many behavioral studies within decision-making contexts emphasize scenarios marked by high uncertainty as a critical variable, contrasting such settings with more stable conditions. Chiu & Wu (2011) characterize decisions under uncertainty as situations where individuals must gauge the probabilities of ambiguous outcomes, leading to subjective assessments of event likelihoods.

Investor sentiment within financial markets is in constant flux, oscillating between relative optimism and pessimism. This sentiment can stem from both rational deliberations and external noise. The former encompasses components that inform future market return predictions and are integrated into an investor's information set for decision-making. In contrast, the latter represents factors that lack utility in forecasting market returns and can be deemed as uninformed or "noisy" sentiments (Sullivan et al., 2019). These sentiments, whether rational or irrational, manifest distinct patterns in their influence on stock returns. Verma et al. (2008) documented that while stock market returns exhibit immediate positive reactions to irrational sentiment, these reactions are subsequently adjusted. However, the imprint of rational sentiment remains more pronounced than its irrational counterpart. Similar conclusions are drawn by Pornpikul & Nettayanun (2022) and Thampanya et al. (2020), highlighting the potency of both rational and irrational investor behaviors in explaining stock return dynamics. Though both factors can elucidate stock returns, their efficacy varies across conditions. Generally, rational behavior provides a more comprehensive explanation for stock return fluctuations compared to irrational behavior. However, in situations characterized by heightened uncertainty, irrational behavior assumes a more dominant role. This predilection arises from the amplified subjectivity investors employ when estimating the probabilities of uncertain events, often leading to biases (Tversky & Kahneman, 1974). Amidst profound uncertainty, the deluge of information, coupled with time constraints, predisposes decision-

makers to heuristic biases, such as diminished sensitivity to prior outcome probabilities, sample sizes, and predictability.

Industry-specific uncertainties undeniably play a pivotal role in shaping investor reactions to stock returns. Chou et al. (2012) posited that industry inherently exhibit a combination of rational and behavioral attributes. This is supported by observations of covariance risk and mispricing in stock returns. Sullivan et al. (2019) further emphasized this by highlighting the significant influence of both rational and irrational sentiment risks on stock returns.

In the milieu of the FTSE All Shares stocks, an interesting paradox emerges. Both rational and irrational sentiments are conspicuously evident, painting a complex narrative of investor behavior. Yet, a closer scrutiny reveals a more pronounced resonance of rational sentiment risk within intricate subsets - a phenomenon conspicuously observable in the FTSE 250. This intriguing revelation accentuates the indispensability of a more nuanced, industry-specific analytical lens. In this context, the seminal work of Peng et al. (2023) assumes profound significance. They determined that the extent to which investor behavior affects stock prices is not uniform, but instead varies substantially across industries. The underlying cause of this variation is the differential sensitivity and stability that each industry demonstrates in response to investor behavior.

The dynamics of each industry's prospects are intricately tied to specific contextual conditions and temporal phases, which dictate both return and risk metrics for investors. Consequently, investors face different levels of uncertainty across various industries. Kumari & Mahakud (2015) noted that stocks susceptible to complex valuation processes and speculative movements tend to be swayed by sentiments, treating them as systematic risk factors that influence stock prices. During the pandemic, there was a consensus among analysts highlighting the Pharmacy industry as a more lucrative option compared to the Cigarette industry. In contrast, the Food and Beverage industry, due to its essential nature, consistently showed stable prospects both before and after the pandemic.

Reflecting on prior research that highlighted the association between the rational and irrational behaviors of investors and the levels of uncertainty and risk they encounter, three hypotheses can be drawn in correlation with industry types. In the Food and Beverage industry, where prospects have remained relatively stable throughout the pandemic and recovery periods, investors are confronted with consistent levels of uncertainty and risk. As a result, both rational and irrational behaviors are deemed to possess equal explanatory power over stock price variations during these times.

H₂: Rational sentiment and irrational sentiment have significant correlation with stock return in Food and Beverage industry.

Amid the epidemic, industries have been subjected to varying degrees of volatility, as evidenced by studies conducted by Baek et al. (2020) and Mazur et al. (2020). Based on Sun et al. (2021) observations, the pharmaceutical industry dominated the top 10 stocks in terms of cumulative excess returns during the event window, attributed primarily to the surging demand for pharmaceutical products. Subsequently, in the post-event window, the food industry garnered heightened attention, a shift likely prompted by the food shortage warnings issued by the UN. Drawing further insights from the pharmaceutical sector, the performance of specific stocks, particularly those involved in vaccine development and distribution, stood out. For instance, Moderna and Pfizer, two pharmaceutical giants, became focal points in the stock market during the COVID-19 outbreak. Piñeiro-Chousa et al. (2022) added that market sentiment has played a significant role during the COVID crisis. While it influenced Moderna's returns in the pre-COVID era, its impact was felt more distinctly by Pfizer during the pandemic, but in a negative way. Prior to the COVID-19 era, Pfizer's returns were predominantly influenced by the technology market and overall market volatility. However, as the pandemic unfolded, market sentiment also began playing a pivotal role in shaping the company's returns. This shift indicates that despite prevailing negative market sentiment and heightened volatility, investors were drawn to Pfizer, viewing its vaccine development initiatives as a compelling incentive to invest. Conversely, before the pandemic, Moderna's returns were shaped by factors including the technology market, market sentiment, and volatility. Interestingly, during the pandemic, only the technology market influenced its returns. These patterns suggest that, given its vaccine development endeavors, investors perceived Moderna as a prime investment opportunity during the COVID-19 era, irrespective of market volatility or prevailing sentiment. It's also pertinent to note the structural differences between the two companies. Pfizer, an established behemoth with a diverse portfolio, contrasts starkly with Moderna, a younger, smaller firm primarily focused on COVID-19 vaccine development. This distinction offers further insight into why market sentiment and volatility had a diminished impact on Moderna during the pandemic. In concluding the examination of these dynamics, it becomes evident that while both rational and irrational factors exert influence on investment decisions within the pharmaceutical sector, rational considerations seem to dominate, particularly during times of unprecedented global events like the COVID-19 pandemic. The trajectories of Moderna and Pfizer elucidate

this conclusion. Investors, while not entirely immune to the sway of market sentiment, placed a more substantial emphasis on tangible aspects such as direct involvement in vaccine development, potential returns, and a company's foundational robustness. This weightage towards rational factors is further underscored by the observation that Moderna, with its concentrated focus on COVID-19 vaccine development, remained largely insulated from market sentiment fluctuations, despite being a younger entity. Meanwhile, Pfizer, with its vast portfolio, felt the pull of irrational sentiments but was still primarily guided by its tangible contributions towards pandemic mitigation. Hence, in the broader schema of pharmaceutical investments during the pandemic, rational factors indisputably took precedence, driving the decisions of the majority of investors (Sun et al., 2021).

H₃: Rational sentiment has significant relation to stock return in Pharmacy industry.

Contrasting the promising outlook of the Pharmacy industry during the pandemic, the Cigarette industry faced challenges. Existing literature indicates that SIN stocks, defined as stocks issued by firms involved in socially or morally contentious activities such as alcohol, tobacco, and gambling, experience market neglect due to various reasons. While sin stocks can offer superior returns and higher financial reporting quality, the multifaceted influences of ethical considerations, social norms, personal values, stigma, regulatory restrictions, and psychological biases compel many investors to neglect these stocks. They are willing to bear a financial cost to uphold ethical standards, societal expectations, and personal values, reflecting a more holistic approach to investment that incorporates non-financial criteria in portfolio construction (Kim & Venkatachalam, 2011). More explicitly, El Ghoul et al. (2011) disclose that companies operating within controversial industries, such as the tobacco sector, are subject to higher corporate risks compared to those in other industries. As a consequence, stock prices of this sector can often be influenced more by public sentiment and emotional reactions than by the companies' financial fundamentals or growth prospects. Investors, swayed by news headlines and public opinion, may make hurried buying or selling decisions, leading to price fluctuations that aren't always aligned with intrinsic values.

H₄: Irrational sentiment has significant relation to stock return in Cigarette industry.

Methods

This study is designed to delineate the comparative dynamics of the correlations between investors' rational and irrational factors and stock market returns across two distinct periods: the pandemic and the recovery phase. We are motivated by the conviction that the pandemic era not only epitomized an abnormal condition but also ushered in a 'new normal' phase,

characterized by distinct attributes diverging markedly from conventional norms. In this context, the standard assumptions underpinning regression analysis, particularly concerning data distribution, are potentially misaligned with the emergent financial landscape sculpted by the pandemic's far-reaching impacts.

Employing Spearman Rank Correlation analysis, we meticulously scrutinize the interrelationships involving these factors and their subsequent impacts on stock market returns. We assert that correlation analysis offers a more adept analytical tool in this environment. It transcends the constraints of normal distribution requirements, rendering it especially pertinent for evaluating financial dynamics in periods marked by pronounced anomalies and systemic shifts.

Furthermore, in this study, we adapt and refine the framework of rational and irrational factors articulated by Pornpikul & Nettayanun (2022), tailoring it to the specific context of Indonesia. While the original study integrated five rational (such as the market risk premium, the size risk, the value risk, the profitability factor, and the investment factor) and five irrational factors (such as SVI, TRIN, the volatility index, AAI sentiment index, and NYSE trading volume), our analysis is constrained to two respective factors from each category due to data availability challenges, particularly pertaining to irrational factors, in the Indonesian setting. Consequently, we focus on Google Search Volume Index (GSVI) and Trading Volume (TV) as representatives of irrational factors, and Profitability and Size for rational factors. Our approach to measuring GSVI deviates from that of Pornpikul & Nettayanun (2022). We aim to encapsulate the entirety of search results associated with the official names of the companies throughout the research duration. Consequently, GSVI is quantified based on the aggregate number of search results yielded for each official company name within specific temporal brackets. Trading Volume is evaluated based on the total number of shares exchanged during designated periods. In the realm of rational factors, Profitability is assessed through Earnings per Share (EPS), while Size is gauged via market capitalization, calculated as the product of stock price and the total number of shares outstanding. Stock Return is quantified through the differential in stock prices between two successive periods. This test was carried out in 2 stages, first, the overall test, which tested all data during the observation period, and second, the separated test, which tested data from each industry, during and after the pandemic period. A separate test conducted to compare the results of the correlation values between during the pandemic and during the recovery period. To test all hypothesis, the test conducted separately between two different factors (rational and irrational) in two

levels, based overall data (to answer hypothesis 1), each sub sectors data (to answer hypothesis 2, 3 and 4)

The analysis is anchored on data extracted from companies enlisted under three distinct subsectors within the manufacturing industry on the Indonesian Stock Exchange (IDX), namely, the Food and Beverage, Pharmacy, and Cigarettes industries. The dataset encompasses daily closing prices, trading volumes, earnings, and the number of shares outstanding for companies listed from January 1, 2020, to September 30, 2022. Given that earnings data is disseminated on a quarterly basis, we have adapted all other data variables to align with this temporal structure. Thus, daily data encompassing returns, GSVI, trading volume, and market capitalization are consolidated into quarterly averages to ensure consistency and comparability. Our dataset comprises information derived from 72 companies spanning the food and beverage, pharmacy, and cigarettes sub-industries that are listed on the IDX. These companies collectively contribute to a total of 463 sets of quarterly data. It is essential to acknowledge that due to inconsistencies in the completeness between rational and irrational factor data, the volume of processed data for each varies. Specifically, we have 463 datasets for rational factors, while for irrational factors, the count is slightly reduced to 460.

Result and Discussion

The correlation analysis conducted over the entire study period reveals a noteworthy pattern: rational sentiment exhibits a significant correlation with stock returns, while irrational sentiment does not wield a substantial impact. A closer examination of the rational factors uncovers that Earnings per Share (EPS) is prominently correlated (with a significance level of 0.00) with stock returns. However, a nuanced analysis segmented by distinct periods unveils that this significant correlation (at a 0.01 significance level) is pronounced during the post-pandemic recovery era. These findings echo the insights from previous research such as Sullivan et al. (2019) and Pornpikul & Nettayanun (2022), asserting that rational sentiment possesses an expansive explanatory breadth for stock returns and is particularly potent during relatively stable periods, as also supported by Loang & Ahmad (2023). Conversely, these outcomes do not align with Ali's (2023) assertion that earnings retained their value relevance amidst the pandemic. Thus, the influence of rational sentiment on stock returns, while consistent with much of the prevailing literature, varies in its magnitude and relevance depending on the market conditions and specific periods under analysis.

Table 1. Correlations of Rational Factors with Stock Return of All Industries, Before and After the COVID-19 Pandemic

		EPS	MC	RET
Earning Per Share (EPS)	Correlation Coef.	1.000	0.193	0.131
	Sig.	-	0.000	0.005
Market Cap (MC)	Correlation Coef.	0.193	1.000	-0.020
	Sig.	0.000	-	0.567
Stock Return (RET)	Correlation Coef.	0.131	-0.020	1.000
	Sig.	0.005	0.567	-

Table 2. Correlations of Irrational Factors with Stock Return of All Industries, Before and After the COVID-19 Pandemic

		GSVI	TV	RET
Google Search Volume Index (GSVI)	Correlation Coef.	1.000	-0.049	0.072
	Sig.	-	0.293	0.126
Trading Volume (TV)	Correlation Coef.	-0.049	1.000	0.041
	Sig.	0.293	-	0.384
Stock Return (RET)	Correlation Coef.	0.072	0.041	1.000
	Sig.	0.126	0.384	-

The analysis of the correlation coefficients presented in Tables 1 and 2 elucidates the relationship between rational and irrational factors with stock returns of all industries during and after the COVID-19 pandemic. In Table 1, a significant positive correlation is observed between Earnings Per Share (EPS) and stock returns, denoted by a correlation coefficient of 0.131 and a significance level of 0.005. This implies a meaningful association, where an increase in EPS corresponds with enhanced stock returns. The relationship between EPS and Market Cap (MC) is also significant (0.193) at a 0.000 significance level, suggesting an interdependent relationship between these two rational factors. Contrarily, Table 2, which pivots on the correlations of irrational factors with stock returns reveals that the correlation coefficient between Google Search Volume Index (GSVI) and stock returns stands at 0.072 with a significance level of 0.126, indicating a weaker, non-significant association. The relationship between Trading Volume (TV) and stock returns is also characterized by a low

correlation coefficient of 0.041, substantiated by a significance level of 0.384, further underscoring the marginal impact of these irrational factors on stock returns during the referenced periods.

Building on these analytical insights, it becomes evident that our initial postulations merit some re-evaluation. From these findings, we partially support Hypothesis 1, which posits that both rational and irrational sentiments have a significant relationship with stock returns, can be dissected by examining the distinct behavioral and statistical patterns observed in the data. On one hand, rational sentiment, embodied by factors like Earnings Per Share (EPS) and Market Cap (MC), exhibits a notable correlation with stock returns, as detailed in the preceding analysis. This is in line with Chou et al. (2012), Verma et al. (2008), and Sullivan et al. (2019), suggesting that investors, when influenced by rational sentiment, rely on tangible and quantitative metrics such as a company's earnings, growth projections, and market position. The robustness of rational factors in the study is highlighted by their resilience and consistency in swaying investment decisions across different market conditions, including the tumultuous periods of the COVID-19 pandemic. Contrarily, the influence of irrational sentiment, represented by factors like Google Search Volume Index (GSVI) and Trading Volume (TV), paints a divergent picture. The correlation coefficients and significance levels indicate a relatively marginal and non-significant impact on stock returns. It's plausible that while irrational factors can sway short-term market fluctuations, their sustained impact over the long term is overshadowed by the foundational metrics and rational factors that investors traditionally prioritize. Thus, in weighing both these influences, while rational sentiments conclusively showcase their significance in relation to stock returns, the role of irrational sentiments remains less definitive.

Table 3. Correlations of Rational Factors with Stock Return of Food and Beverage Industries, During and After the COVID-19 Pandemic

		EPS	MC	RET
EPS	Correlation Coef.	1.000	0.353	0.211
	Sig.	-	0.000	0.001
MC	Correlation Coef.	0.353	1.000	0.024
	Sig.	0.000	-	0.707
RET	Correlation Coef.	0.211	0.024	1.000
	Sig.	0.001	0.707	-

Table 4. Correlations of Irrational Factors with Stock Return of Food and Beverage Industries, During and After the COVID-19 Pandemic

		GSVI	TV	RET
GSVI	Correlation Coef.	1.000	-0.036	0.131
	Sig.	-	0.530	0.024
TV	Correlation Coef.	-0.036	1.000	0.024
	Sig.	0.530	-	0.673
RET	Correlation Coef.	0.131	0.024	1.000
	Sig.	0.024	0.673	-

The data presented in Tables 3 and 4 provides insightful correlations between rational and irrational factors with the stock returns of the Food and Beverage industries during and after the COVID-19 pandemic. Table 3 highlights the pre-pandemic period, showcasing a positive and significant correlation between Earnings Per Share (EPS) and stock returns, as evidenced by a coefficient of 0.211 and a significance level of 0.001. Furthermore, EPS is also positively correlated with Market Cap (MC) at a coefficient of 0.353, significant at the 0.000 level. However, the correlation between MC and stock returns is marginal and non-significant, underscored by a 0.024 coefficient and a 0.707 significance level. Moreover, in the context of the pandemic and post-pandemic periods, as depicted in Table 4, the dynamics exhibit a shift. The correlation between Google Search Volume Index (GSVI) and stock returns is relatively modest but significant (coefficient of 0.131, significance at 0.024), indicating a marked influence of public interest and sentiment on stock performance during these tumultuous periods. Yet, the Trading Volume (TV) shows a negligible and non-significant correlation with stock returns, illustrated by a coefficient of 0.024 and a significance level of 0.673. Similarly, the correlation between GSVI and TV is also non-significant. Therefore, based on the provided explanation, the empirical data demonstrates that rational factors, specifically Earnings Per Share (EPS), exhibit a significant correlation with stock returns in the Food and Beverage industry, particularly in the pre-pandemic period. Conversely, while there is a discernible correlation between the irrational factor, Google Search Volume Index (GSVI), and stock returns during and post the pandemic, its influence appears less robust when juxtaposed with the rational indicators. However, it remains significant, albeit modestly.

Table 5. Correlations of Rational Factors with Stock Return of Pharmacy Industries, After the COVID-19 Pandemic

		EPS	MC	RET
EPS	Correlation Coef.	1.000	0.094	0.474
	Sig.	-	0.477	0.000
MC	Correlation Coef.	0.094	1.000	0.060
	Sig.	0.477	-	0.647
RET	Correlation Coef.	0.474	0.060	1.000
	Sig.	0.000	0.647	-

Table 6. Correlations of Irrational Factors with Stock Return of Cigarette Industries, After the COVID-19 Pandemic

		GSVI	TV	RET
GSVI	Correlation Coef.	1.000	-0.055	0.432
	Sig.	-	0.792	0.031
TV	Correlation Coef.	-0.055	1.000	0.352
	Sig.	0.792	-	0.084
RET	Correlation Coef.	0.432	0.352	1.000
	Sig.	0.031	0.084	-

Considering both these observations, Hypothesis 2, which posits that both rational and irrational sentiments have a significant correlation with stock returns in the Food and Beverage industry, can be partially accepted. While rational sentiment demonstrates a strong correlation, the influence of irrational sentiment, though present, is less dominant. The constant demand for products within the Food & Beverage (F&B) industry during both pandemic and recovery phases hasn't necessarily led investors to base their decisions on this logical assumption. Surprisingly, irrational factors seem to exert a more substantial influence on their investment decisions. It implies that investors seek additional information, as indicated by the Google index, to bridge the information gap, a concept supported by Chivianti & Sukamulja (2021), and to mitigate uncertainty through enhanced information access, as noted by Bijl et al. (2016). However, a closer inspection reveals a nuanced dynamic. When the correlation analysis spanning the entire period is segmented into two distinct phases - the pandemic and post-pandemic eras - a significant correlation between

irrational sentiment and stock returns is conspicuously absent in both periods. This pattern resonates with the phenomenon of heightened irrational influence in smaller stocks, as identified by Thampanya et al. (2020) and Pornpikul & Nettayanun (2021).

Based on the empirical evidence derived from the post-COVID-19 data for the Pharmacy industry, it is prudent to accept Hypothesis 3, which claims a significant relationship between rational sentiment and stock returns. A significant correlation is observed between Earnings Per Share (EPS) and stock return (RET), substantiated by a robust correlation coefficient of 0.474 and a significance level of 0.000. This demonstrates that EPS, a key measure of corporate profitability, maintained a strong influence on stock return patterns in the post-pandemic phase for Pharmacy industries, highlighting the prominence of rational decision-making factors among investors within this context. On the contrary, the relationship between Market Capitalization (MC) and stock returns presents a different scenario. A correlation coefficient of 0.060 and a significance level of 0.6477 indicate a weak and non-significant association between these variables. The limited influence of market capitalization in this period suggests that the size and valuation of firms, although traditionally important, had a less pronounced influence during this period. This may indicate after the COVID-19 pandemic, the emphasis of investors shifted predominantly towards the tangible financial performance and the adaptability of companies, rather than their market size and presence. In the context of the Pharmacy industry. Mills et al. (2021) argues that the pandemic underscored the need for agility and innovation. Companies' abilities to swiftly adapt, innovate, and respond to the rapidly changing health landscape became a paramount consideration. Investors started valuing entities that demonstrated these attributes over traditionally large and well-established firms. To be precise, Kumar & Li (2016) and Hirshleifer et al (2018) conclude that innovation serves as a 'competitive moat.' It is positively correlated with subsequent cumulative stock returns, as well as future investment and profitability. The swift development, approval, and distribution of vaccines and treatments became crucial indicators of a company's capability, often overshadowing the role of size and market presence.

The empirical findings strongly support the acceptance of Hypothesis 4, attesting to the significant influence of irrational sentiment on stock returns within the Cigarette industry post-COVID-19. The data from Table 6 underscore a substantial positive correlation between Google Search Volume Index (GSVI) and stock returns, substantiating the premise that public interest and sentiment, although deemed irrational, are instrumental in driving stock

performance in this industry. With a correlation coefficient of 0.432 and a significance level of 0.031, the correlation between GSVI and stock returns is both statistically significant and indicative of the pronounced role of consumer and public sentiment in shaping the financial trajectories of companies within the Cigarette sector. Conversely, the relationship between Trading Volume (TV) and stock returns is positive but not as compellingly significant, with a correlation coefficient of 0.352 and a significance level of 0.084. While this denotes a moderate association, it does not reach a conventional threshold of statistical significance, indicating that trading volume was a less potent driver of stock returns compared to GSVI. The GSVI for firms in the Cigarette industry might not be considered a crucial indicator for investors in the post-COVID era due to several reasons. The pandemic has initiated unprecedented changes in consumer behavior, regulatory environments, and health consciousness, which have in turn influenced investment strategies. The shift in investment strategies towards ESG (Environmental, Social, and Governance) criteria has made many investors more cautious (Fatemi et al., 2018; Aydoğmuş et al., 2022; Dai et al., 2022) about investing in “sin stocks,” including the tobacco industry. Given these ethical considerations, investors might rely less on indicators like GSVI and more on comprehensive analyses that include ESG factors.

Conclusion and Suggestion

In conclusion, while rational sentiments remain integral in investment decisions, the influence of irrational factors is not uniform across industries and fluctuates in resonance with specific market and temporal contexts. Rational sentiments, anchored in quantifiable and tangible metrics like Earnings Per Share (EPS), exhibit a consistent and significant correlation with stock returns. This correlation becomes particularly pronounced during post-pandemic recovery periods, highlighting the robust nature of rational sentiments even amidst market volatilities. Conversely, irrational sentiments, represented by variables like the Google Search Volume Index (GSVI) and Trading Volume (TV), wield a less pronounced impact on stock returns. Their influence, although existent, is relatively marginal, suggesting that while these factors may sway short-term market dynamics, their long-term implications are limited.

In the Pharmacy sector's post-pandemic context, a pronounced correlation is evident between EPS and stock returns. However, the Cigarette industry poses a distinct scenario, with GSVI revealing a marked correlation with stock returns in the post-pandemic phase. These observations hint that traditional metrics, like the size and valuation of firms, might

have diminished in their influence during this timeframe. It's plausible that post the COVID-19 outbreak, investors' priorities pivoted towards tangible financial metrics and the agility of companies, rather than merely focusing on market magnitude and stature. Additionally, there's been a noticeable shift in investment sectors, with investors increasingly gravitating towards firms demonstrating a commitment to ESG (Environmental, Social, and Governance) principles.

For future research, a deeper exploration into the sector-specific dynamics of irrational sentiments and their interactions with evolving market conditions, regulatory landscapes, and global events is recommended. A comparative analysis across diverse geographical and economic contexts can also enrich the understanding of these correlations, offering a multifaceted view that captures the complexities of global investment landscapes. The integration of emerging factors such as ESG criteria and the evolving paradigms of ethical investing can further refine and expand the scope, offering nuanced perspectives that align with contemporary investment trends.

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