DOES WEATHER MATTER FOR STOCK PRICES? EVIDENCE FROM INDONESIAN CONVENTIONAL AND SHARIA STOCK INDICES

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Abstract

This study examines the impact of local weather conditions on conventional and Sharia stock indices in the Indonesia Stock Exchange (IDX) from a Behavioral Finance perspective. Daily weather data, including humidity, rainfall, sunshine duration, minimum temperature, and maximum temperature, were collected from BMKG Bandung, while stock index data covered IDX80, Kompas100, ISSI, and JII throughout 2023 (237 observations). Using Ordinary Least Squares (OLS) regression, the results indicate that weather effects differ across market segments. Minimum temperature significantly influences IDX80 and Kompas100, whereas humidity, sunshine duration, and minimum temperature affect ISSI. For JII, significant effects are found for rainfall, minimum temperature, and maximum temperature. These findings suggest that local environmental conditions can influence investor behavior, particularly in Sharia stock markets, highlighting the relevance of behavioral factors in explaining stock price movements beyond traditional economic determinants.

Keywords: Behavioral Finance, Weather Effect, Stock Prices, Sharia Stock Index, Indonesia Stock Exchange

INTRODUCTION

Behavioral Finance Theory challenges the Efficient Market Hypothesis (EMH) by arguing that investor decisions are not always rational and may be influenced by psychological and emotional factors. Among the external factors affecting investor behavior, weather conditions have received increasing attention because they can influence mood, risk perception, and decision-making processes (Cunningham, 1979; Garrett et al., 2005; Hirshleifer, 2001). Previous studies suggest that weather variables such as temperature, humidity, rainfall, and sunshine duration may affect investor sentiment and subsequently influence stock market performance (Cao & Wei, 2005; Kathiravan et al., 2021; Keef & Roush, 2002).

The relationship between weather and stock returns was first documented by Saunders (1993), who found that sunny weather was associated with higher stock returns in the United States. Hirshleifer and Shumway (2003) extended this evidence across 26 international stock markets and reported a significant association between sunshine and stock returns. Subsequent studies examined various weather indicators, including cloud cover, rainfall, humidity, and temperature, but produced mixed findings across countries and market environments (Kang et al., 2010; Lu & Chou, 2012; Loughran & Schultz, 2004). While some studies confirmed significant weather effects, others found limited or insignificant relationships (Goetzmann & Zhu, 2005; Tarczyński et al., 2021).

Indonesia offers an interesting setting for weather-effect research due to its tropical climate, characterized by substantial variations in rainfall, humidity, sunshine duration, and temperature. These environmental conditions may influence investor sentiment differently from those observed in developed markets. Moreover, Indonesia operates both conventional and Sharia stock markets, providing a unique opportunity to compare investor responses across different market segments.

Despite growing interest in behavioral finance, empirical evidence regarding weather effects in the Indonesian capital market remains limited, particularly studies comparing conventional and Sharia stock indices. Most previous studies have focused on developed economies and have rarely examined multiple weather variables simultaneously. Therefore, this study investigates the impact of humidity, rainfall, sunshine duration, minimum temperature, and maximum temperature on the daily stock prices of IDX80, Kompas100, the Indonesian Sharia Stock Index (ISSI), and the Jakarta Islamic Index (JII) during 2023.

This study contributes to the literature by extending weather-effect research to an emerging market context and providing comparative evidence between conventional and Sharia stock indices. The findings are expected to enhance understanding of how environmental factors influence investor behavior and stock market performance.

METHODOLOGY

This study employs a quantitative approach to examine the impact of weather conditions on stock price movements. Daily weather data, including humidity, rainfall, sunshine duration, minimum temperature, and maximum temperature, were obtained from the Indonesian Meteorological, Climatological, and Geophysical Agency (BMKG), while stock index data were collected from Investing.com. The analysis covers four major indices listed on the Indonesia Stock Exchange (IDX): IDX80, Kompas100, the Indonesian Sharia Stock Index (ISSI), and the Jakarta Islamic Index (JII). Using 237 daily observations during 2023, the relationship between weather variables and stock prices was estimated through Ordinary Least Squares (OLS) regression with EViews 13.

RESULTS AND DISCUSSION

The Effect of Weather Factors on Conventional Stock Indices

The empirical findings indicate that weather variables exert limited influence on conventional stock indices. For the IDX80 index, only minimum temperature significantly affects stock price movements, while humidity, rainfall, sunshine duration, and maximum temperature show no statistically significant effects. Similarly, minimum temperature is the only weather variable that significantly affects the Kompas100 index. The negative coefficient suggests that lower temperatures tend to be associated with lower stock prices.

These findings partially support the behavioral finance perspective that investor sentiment can be influenced by environmental conditions. According to (Cao & Wei, 2005), temperature affects investors' moods and consequently influences risk-taking behavior. When temperatures decrease, investors may become more cautious and risk-averse, leading to lower trading activity and declining stock prices. Similar findings were also reported by (Keef & Roush, 2002), who documented a significant relationship between temperature fluctuations and stock market performance.

However, the overall explanatory power of the models remains relatively low. This indicates that conventional stock indices are primarily influenced by economic fundamentals, firm-specific information, and macroeconomic conditions rather than weather-related factors. These findings are consistent with Loughran and Schultz (2004), who argued that local weather conditions do not always significantly affect market trading activities because investors tend to rely on rational assessments of available information.

The Effect of Weather Factors on Sharia Stock Indices

Unlike conventional indices, Sharia stock indices demonstrate stronger sensitivity to weather conditions. For ISSI, humidity, sunshine duration, and minimum temperature significantly affect stock

prices, while rainfall and maximum temperature do not show significant relationships. The results reveal that all significant variables exert negative effects on stock prices.

The negative effect of humidity supports the argument that uncomfortable environmental conditions may adversely affect investor mood and decision-making. Cunningham (1979) and Howarth and Hoffman (1984) found that weather conditions significantly influence emotional states, which subsequently affect individual behavior. High humidity levels may generate discomfort, fatigue, and reduced optimism, causing investors to adopt more conservative investment strategies.

The negative relationship between sunshine duration and ISSI prices provides an interesting result. Previous studies generally suggest that sunshine improves mood and increases optimism among investors (Hirshleifer & Shumway, 2003). However, the Indonesian tropical climate may create different behavioral responses. Excessive sunshine may increase physical discomfort and fatigue, thereby negatively affecting investor sentiment. Similar inconsistencies across countries were also observed by Chang et al. (2006), indicating that weather effects are highly dependent on local environmental and cultural contexts.

For JII, rainfall, minimum temperature, and maximum temperature significantly influence stock prices. All significant variables exhibit negative coefficients, indicating that adverse weather conditions tend to reduce stock market performance.

The negative impact of rainfall may be explained through its influence on investor psychology and economic activity. Heavy rainfall can disrupt daily activities, transportation systems, and business operations, thereby increasing uncertainty and reducing investor confidence. This finding is consistent with studies conducted by Hirshleifer and Shumway (2003) and Kang et al. (2010), which reported that unfavorable weather conditions contribute to lower stock market returns.

Table 1. Summary of Significant Weather Effects

Stock Index	Significant Variables
IDX80	Minimum Temperature
Kompas100	Minimum Temperature
ISSI	Humidity, Sunshine Duration, Minimum Temperature
JII	Rainfall, Minimum Temperature, Maximum Temperature

Source: Author's Calculation (2024).

This study provides empirical evidence supporting Behavioral Finance Theory, which argues that investment decisions are not always based on rational considerations. Emotional and psychological factors may influence investor behavior and market outcomes. Weather variables function as external stimuli capable of affecting mood, optimism, and risk perception (Johnson & Tversky, 1983; Hirshleifer & Shumway, 2003).

One important finding is that weather effects are stronger in Sharia stock indices than in conventional indices. ISSI and JII exhibit multiple significant weather variables, whereas IDX80 and Kompas100 are influenced only by minimum temperature. These results suggest that investor responses to environmental conditions differ across market segments.

The findings also confirm the argument proposed by Saunders (1993) that weather conditions may influence financial markets through changes in investor sentiment. Nevertheless, the relatively low coefficients of determination indicate that weather variables explain only a small proportion of stock price variation. Therefore, weather should be viewed as a complementary factor rather than a primary determinant of stock market performance.

Overall, the results demonstrate that local weather conditions can influence stock price movements in Indonesia, particularly within Sharia stock indices. These findings enrich the literature on weather effects in emerging markets and highlight the importance of considering behavioral and environmental factors in investment analysis.

CONCLUSION

This study examines the influence of local weather conditions on conventional and Sharia stock indices in the Indonesia Stock Exchange during 2023. The findings reveal that weather effects differ across market segments. For conventional indices (IDX80 and Kompas100), only minimum temperature significantly affects stock prices. In contrast, Sharia indices exhibit stronger sensitivity to weather conditions. Humidity, sunshine duration, and minimum temperature significantly influence ISSI, while rainfall, minimum temperature, and maximum temperature significantly affect JII.

These results support the Behavioral Finance perspective, suggesting that environmental conditions can influence investor sentiment and investment decisions. The stronger weather effects observed in Sharia indices indicate that investor responses to environmental factors may vary across market segments. Although weather variables explain only a limited proportion of stock price variation, they remain relevant as non-economic determinants of market performance.

This study contributes to the literature by providing comparative evidence on weather effects in both conventional and Sharia stock markets within an emerging economy. Future research may incorporate additional behavioral, macroeconomic, and market-specific variables to further explain stock price dynamics and investor behavior in Indonesia.

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