

PORTFOLIO RISK AND MARKET UNCERTAINTY CASE STUDY OF THE INDONESIAN STOCK MARKET

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ABSTRACT

This study examines the effect of Market Uncertainty on Portfolio Risk in the Indonesian stock market. Using a quantitative explanatory research design, the study employs daily secondary time-series data of the Indonesia Composite Stock Price Index (IDX Composite/IHSG) over the period from January 1, 2016, to December 31, 2025. Portfolio risk is measured using the conditional variance generated from a GARCH(1,1) model, while Market Uncertainty is incorporated as an explanatory variable in the conditional variance equation. The empirical analysis consists of descriptive statistics, the Augmented Dickey-Fuller (ADF) stationarity test, the ARCH-LM test, GARCH(1,1) estimation, and residual diagnostic tests. The estimation results show that Market Uncertainty has a positive and statistically significant effect on Portfolio Risk, with a coefficient of 0.0138 and a probability value of 0.0049. This finding indicates that increasing market uncertainty is associated with higher portfolio risk in the Indonesian stock market. Furthermore, the ARCH coefficient of 0.1264 and the GARCH coefficient of 0.8427 are statistically significant, indicating the presence of volatility clustering and strong volatility persistence. The combined ARCH and GARCH coefficients of 0.9691 demonstrate that market shocks have persistent effects on portfolio risk. These findings highlight the importance of monitoring market uncertainty as an early-warning indicator in portfolio risk management and investment decision-making.

Keywords : Portfolio Risk; Market Uncertainty; Return Volatility

ABSTRAK

Penelitian ini bertujuan untuk menganalisis pengaruh Market Uncertainty terhadap Portfolio Risk pada pasar saham Indonesia. Penelitian menggunakan pendekatan kuantitatif dengan desain eksplanatori dan data sekunder berbentuk time-series harian Indeks Harga Saham Gabungan (IHSG) selama periode 1 Januari 2016 sampai 31 Desember 2025. Risiko portofolio diukur menggunakan conditional variance yang dihasilkan dari model GARCH(1,1), sedangkan Market Uncertainty dimasukkan sebagai variabel penjelas dalam variance equation. Tahapan analisis meliputi statistik deskriptif, uji stasioneritas Augmented Dickey-Fuller (ADF), uji ARCH-LM, estimasi GARCH(1,1), dan uji diagnostik residual. Hasil estimasi menunjukkan bahwa Market Uncertainty berpengaruh positif dan signifikan terhadap Portfolio Risk, dengan koefisien sebesar 0,0138 dan probabilitas 0,0049. Temuan ini menunjukkan bahwa peningkatan ketidakpastian pasar diikuti oleh peningkatan risiko portofolio pada pasar saham Indonesia. Selain itu, koefisien ARCH sebesar 0,1264 dan koefisien GARCH sebesar 0,8427 terbukti signifikan, yang menunjukkan adanya volatility clustering dan persistensi volatilitas yang tinggi. Jumlah koefisien ARCH dan GARCH sebesar 0,9691 menunjukkan bahwa guncangan pasar memiliki dampak yang bertahan terhadap risiko portofolio. Temuan penelitian menegaskan pentingnya pemantauan Market Uncertainty sebagai indikator peringatan dini dalam pengelolaan risiko portofolio dan pengambilan keputusan investasi.

Kata kunci : Risiko Portofolio; Ketidakpastian Pasar; Volatilitas Pengembalian

INTRODUCTION

Global financial markets have experienced increasing uncertainty due to persistent inflation, monetary policy tightening, geopolitical conflicts, and slowing economic growth. These conditions have intensified market volatility and influenced investors' decisions regarding asset allocation and portfolio management (Razak & Meiden, 2024). As an emerging market, the Indonesian capital market is highly exposed to both domestic and international economic shocks. Fluctuations in the Indonesia Composite Index (IDX Composite) indicate that changes in market conditions significantly affect investment performance and increase portfolio risk, making effective risk management an essential concern for investors (Handoko et al., 2025).

According to Modern Portfolio Theory (MPT) developed by Markowitz, portfolio risk can be reduced through diversification by combining assets with low correlations (Patil & Saware, 2024). However, during periods of high market uncertainty, correlations among financial assets tend to increase, reducing the benefits of diversification and exposing investors to greater portfolio risk. Therefore, understanding the relationship between market uncertainty and portfolio risk is essential for developing effective investment strategies and improving portfolio performance (Ginting, 2020).

Previous studies have examined the impact of market uncertainty on portfolio risk; however, their findings remain inconclusive. Some studies report that higher market uncertainty increases portfolio risk through greater market volatility, while others argue that appropriate diversification and portfolio rebalancing can mitigate these effects (Sasmito, 2023). Moreover, most existing studies focus on developed financial markets, leaving limited empirical evidence from emerging economies such as Indonesia. In addition, prior research on the Indonesian stock market has primarily emphasized stock returns or market volatility rather than portfolio risk as the main outcome of market uncertainty (Lyu et al., 2025).

This study aims to examine the effect of market uncertainty on portfolio risk in the Indonesian stock market. The novelty of this research lies in its focus on portfolio risk within the context of an emerging market, providing empirical evidence from Indonesia where studies on this topic remain limited. The findings are expected to enrich the literature on portfolio management and offer practical implications for investors, portfolio managers, and policymakers in developing more resilient investment strategies under uncertain market conditions.

LITERATURE REVIEW AND RESEARCH FOCUS

Portfolio Risk

Portfolio risk refers to the uncertainty associated with the returns generated from a combination of financial assets within an investment portfolio. It represents the possibility that

the actual return earned by investors will differ from the expected return because of fluctuations in market conditions and asset prices (Kristanti et al., 2022). According to Modern Portfolio Theory (MPT), introduced by Harry Markowitz (1952), investors should evaluate risk and return at the portfolio level rather than focusing on individual assets. The theory argues that rational investors can construct an efficient portfolio that maximizes expected returns for a given level of risk or minimizes risk for a given expected return through diversification. Diversification reduces unsystematic risk by combining assets with imperfect or low correlations, thereby improving the portfolio's overall risk-return profile (Surianshah et al., 2017).

Portfolio risk consists of systematic and unsystematic risk. Systematic risk arises from macroeconomic factors such as inflation, interest rate changes, exchange rate movements, political instability, and market uncertainty (Varadigna & Suhadak, 2017). Since these factors affect nearly all securities, systematic risk cannot be eliminated through diversification. Conversely, unsystematic risk is firm-specific and originates from internal factors such as management performance, operational efficiency, and financial conditions. This type of risk can be substantially reduced by holding a diversified portfolio (Amaanullah et al., 2023). In empirical studies, portfolio risk is commonly measured using portfolio variance, standard deviation of portfolio returns, beta, or other volatility indicators. Higher portfolio risk reflects greater uncertainty in future returns and a higher probability that realized returns will deviate from investors' expectations (Vijayalakshmi, 2017).

Market Uncertainty

Market uncertainty refers to a condition in which market participants face difficulties in predicting the future direction of asset prices, investment returns, and overall economic conditions due to the continuous flow of dynamic information (Harper et al., 2020). This uncertainty arises because investors do not possess complete or perfect information about the factors influencing financial markets, including monetary policy, inflation, interest rates, exchange rates, economic growth, and geopolitical risks (Connelly et al., 2025). Under such conditions, investors experience greater uncertainty regarding future returns, making investment expectations less reliable and decision-making more cautious. As a result, investors tend to adjust their portfolio allocation strategies, which may increase trading activity and contribute to higher market volatility. Consequently, market uncertainty plays a significant role in influencing investment behavior, asset pricing, and overall financial market performance (Lee et al., 2021).

Empirically, market uncertainty is commonly measured using market return volatility. Market return volatility reflects the degree of variation or deviation of market returns from their average value over a given period. Higher market return volatility indicates greater uncertainty

faced by investors, as stock price movements become increasingly unpredictable and difficult to forecast. Elevated volatility generally reflects unstable market conditions resulting from changes in macroeconomic fundamentals, monetary policy, political events, or shifts in investor sentiment (Eugster & Wang, 2023).

In finance research, market return volatility is one of the most widely used proxies for measuring market uncertainty because it effectively captures the overall level of risk and instability in financial markets. An increase in market volatility signals a more uncertain investment environment, leading investors to become more cautious in their portfolio allocation and investment decisions (Kristanti et al., 2022). Consequently, market return volatility has been extensively employed in empirical studies examining the relationship between market conditions and portfolio risk, asset pricing, investment behavior, and financial market performance. Therefore, higher market return volatility indicates a greater degree of market uncertainty, which may increase investment risk and influence portfolio management strategies (Dai et al., 2023).

RESEARCH METHODOLOGY

This study employs a quantitative approach with an explanatory research design to examine the effect of *Market Uncertainty* on *Portfolio Risk* in the Indonesian stock market. The object of the study is the Indonesian capital market, represented by the Indonesia Composite Stock Price Index (IDX Composite/IHSG). The study uses secondary daily time-series data covering the period from January 1, 2016, to December 31, 2025. This ten-year period was selected because it provides sufficient observations to capture changes in market volatility and uncertainty, including relatively stable market conditions and periods of significant economic and financial turbulence.

The study does not employ purposive sampling because the data constitute a continuous secondary time-series dataset. Data selection is based on availability, completeness, continuity, and consistency of observations throughout the study period. Daily IHSG data are obtained from reliable financial-market sources, such as the Indonesia Stock Exchange (IDX), Yahoo Finance, investing.com or established financial databases.

The dependent variable is Portfolio Risk, measured by the conditional variance generated from the GARCH(1,1) model:

$$\sigma = \sqrt{\frac{\sum_{t=1}^n (R_t - R)^2}{n - 1}}$$

The independent variable is Market Uncertainty (Yu & Huang, 2021)

$$R_{IHSG,t} = \ln \left(\frac{IHSG_t}{IHSG_{t-1}} \right)$$

where represents the closing IHSG value at time , and represents the closing value on the previous trading day.

The empirical analysis consists of several sequential procedures, including descriptive statistics, the Augmented Dickey-Fuller (ADF) stationarity test, the ARCH-LM test, GARCH(1,1) estimation, and residual diagnostic tests. Since the dataset is a single time-series rather than panel data, panel regression is not applied.

The GARCH(1,1) variance equation is specified as (Bollerslev, 1986):

$$\sigma_t^2 = \omega + \alpha \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2 + \gamma MU_t$$

where γ represents the effect of Market Uncertainty on Portfolio Risk. The hypothesis is supported when the coefficient has the expected positive sign and its p-value is below 0.05. All empirical analyses are conducted using EViews.

RESULTS AND DISCUSSION

Descriptive Statistics

The descriptive statistics indicate that the IHSG return has a mean of 0.00031 and a standard deviation of 0.01380. The maximum and minimum values of 0.10210 and -0.13900, respectively, indicate substantial fluctuations in stock market returns during the observation period. The kurtosis value of 8.214 suggests that the return distribution exhibits pronounced fat tails, indicating a higher probability of extreme return movements than would be expected under a normal distribution. In addition, the negative skewness indicates that the distribution is asymmetric and tends to be skewed to the left, reflecting a greater tendency toward extreme negative returns. The Jarque-Bera test produces a probability value of 0.0000, leading to the rejection of the null hypothesis of normality. Overall, these characteristics indicate the presence of substantial volatility and extreme movements in the Indonesian stock market. The evidence of non-normality, fat-tailed behavior, and asymmetric distribution provides an empirical justification for proceeding with ARCH/GARCH modeling to capture time-varying volatility and volatility clustering in IHSG returns.

Augmented Dickey-Fuller (ADF) Stationarity Test

The Augmented Dickey-Fuller (ADF) test results indicate that all variables in the study have probability values below the 5% significance level. The IHSG Return has an ADF statistic of -32.451 with a probability value of 0.0000, while the Portfolio Return has an ADF statistic of -30.827 with a probability value of 0.0000. Market Uncertainty also exhibits an ADF statistic of -8.214 with a probability value of 0.0000. Therefore, the null hypothesis stating that the variables contain a unit root is rejected. These results confirm that all variables are stationary at the level form. This stationarity condition satisfies an important prerequisite for proceeding with

time-series analysis and GARCH modeling, particularly for examining the dynamics and volatility of returns over time.

The Autoregressive Conditional Heteroskedasticity - Lagrange Multiplier (ARCH-LM) Test

The ARCH-LM test results indicate the presence of an ARCH effect in portfolio returns. The Obs*R-squared value of 27.932, with a probability value of 0.0000, is lower than the 5% significance level. Therefore, the null hypothesis stating that there is no ARCH effect is rejected. These findings indicate that the variance of the residuals changes over time and that there is evidence of volatility clustering in portfolio returns. Consequently, the use of a GARCH(1,1) model is considered appropriate for estimating conditional volatility, which is subsequently used as a measure of Portfolio Risk.

Garch (1,1) Estimation Results

The Estimated conditional variance equation is:

$$\sigma_t^2 = 0,00001 + 0,126400\varepsilon_{t-1}^2 + 0,842700\sigma_{t-1}^2 + 0,013800MU_t$$

The Market Uncertainty variable has a coefficient of 0.0138, with a *z-statistic* of 2.816 and a probability value of 0.0049. Since: Market Uncertainty has a positive and statistically significant effect on Portfolio Risk. The positive coefficient of 0.0138 indicates that an increase in Market Uncertainty is associated with an increase in portfolio risk. In other words, the greater the uncertainty in market conditions, the higher the volatility and risk faced by investors. Empirically, these findings support the research hypothesis:

H1: Market Uncertainty has a positive and significant effect on Portfolio Risk.

Therefore, H1 is accepted. The finding indicates that Market Uncertainty is an important factor in explaining the dynamics of portfolio risk in the Indonesian stock market.

Discussion

The GARCH(1,1) estimation results provide empirical evidence that *Portfolio Risk* in the Indonesian stock market is dynamic and influenced by changes in market uncertainty. The main finding indicates that Market Uncertainty has a positive and statistically significant effect on Portfolio Risk, with a coefficient of 0.0138 and a probability value of 0.0049. Since the probability value is below the 5% significance level, the hypothesis stating that Market Uncertainty positively affects Portfolio Risk is supported. This result indicates that higher levels of market uncertainty are associated with greater risk faced by investors in stock portfolios.

From an economic perspective, an increase in *Market Uncertainty* reflects a situation in which market participants face increasingly unpredictable information and expectations. Uncertainty regarding economic conditions, government policies, market prospects, and external developments may increase investors' sensitivity to new information (Soeprajitno et al.,

2023). Under such circumstances, investors are more likely to adjust their investment positions rapidly. These behavioral adjustments may increase trading pressure and amplify stock price fluctuations. Consequently, greater price fluctuations lead to higher return volatility and Portfolio Risk. Therefore, the findings demonstrate that market uncertainty represents an important source of investment risk dynamics.

The findings can also be explained from the perspective of portfolio theory. Portfolio risk is not only determined by the characteristics of individual assets but is also affected by systematic risk arising from overall market conditions (Puspita & Yuliari, 2019). When market uncertainty increases, the correlation among asset movements may change, potentially reducing the benefits of diversification (Maruddani & Astuti, 2021), (Liu et al., 2024). Therefore, diversification may not fully eliminate risk when the underlying source of uncertainty is systematic. Under these circumstances, increases in Market Uncertainty can be transmitted into higher portfolio risk.

In addition to the effect of Market Uncertainty, the estimation results show that the ARCH coefficient is 0.1264 and the GARCH coefficient is 0.8427, both of which are statistically significant. The ARCH coefficient indicates that shocks to returns in the previous period affect current volatility. Meanwhile, the relatively large GARCH coefficient indicates that past volatility has a strong influence on current volatility. This finding represents an important characteristic of financial market data, commonly referred to as volatility clustering, whereby periods of high volatility tend to be followed by periods of high volatility, while periods of low volatility tend to be followed by relatively low volatility. The value of 0.9691, which is close to one, indicates a very high degree of volatility persistence in Portfolio Risk. This means that when a shock occurs in the Indonesian stock market, its impact on portfolio risk does not disappear immediately but may persist into subsequent periods. This finding is particularly important for investors because increases in risk associated with market uncertainty may continue beyond the period in which the initial shock occurs.

The descriptive statistics also support these characteristics. Portfolio Risk has a skewness value of 2.0170 and a kurtosis value of 8.9150. The positive skewness indicates that the distribution of portfolio risk has a relatively long right tail, while the substantially higher kurtosis than the normal value of three indicates the presence of fat tails. These characteristics suggest that the market may experience episodes of extreme increases in portfolio risk. Furthermore, the Jarque-Bera statistic of 1,754.28 with a probability value of 0.0000 indicates that Portfolio Risk is not normally distributed. These characteristics provide further justification for the application of the GARCH model, as it is designed to capture time-varying volatility in financial data. From a practical perspective, the findings have important implications for

investors, portfolio managers, and capital market regulators. Investors should monitor changes in Market Uncertainty as an important indicator in the risk management process (Surianshah et al., 2017). When uncertainty increases, investment strategies may need to be adjusted through tighter risk exposure controls, more selective diversification, and continuous volatility monitoring. For portfolio managers, information regarding volatility persistence can improve risk estimation and asset allocation decisions. Meanwhile, for regulators, increasing market uncertainty highlights the importance of information transparency and market stability to minimize the transmission of uncertainty into excessive volatility (Yahya & Jannah, 2019).

Overall, this study demonstrates that Market Uncertainty is an important determinant of Portfolio Risk in the Indonesian stock market. The contribution of this study lies in incorporating Market Uncertainty into the variance equation of the GARCH (1,1) model, allowing the relationship between market uncertainty and portfolio risk to be examined within a time-varying volatility framework. The findings confirm that portfolio risk is not constant but is influenced by past shocks, previous volatility, and prevailing market uncertainty.

CONCLUSION

This study concludes that Market Uncertainty plays an important role in determining Portfolio Risk in the Indonesian stock market. Using the GARCH(1,1) model, the findings demonstrate that portfolio risk is dynamic and changes over time in response to market conditions. Market Uncertainty has a positive and statistically significant effect on Portfolio Risk, as indicated by a coefficient of 0.0138 and a probability value of 0.0049, which is below the 5% significance level. This result confirms the hypothesis that higher market uncertainty leads to greater portfolio risk.

The GARCH estimation also reveals significant ARCH and GARCH effects, with coefficients of 0.1264 and 0.8427, respectively. The combined coefficient of 0.9691 indicates a high degree of volatility persistence, suggesting that market shocks can have prolonged effects on portfolio risk. This finding confirms that risk in the Indonesian stock market is not constant but exhibits time-varying characteristics and volatility clustering.

These findings have important implications for investors and portfolio managers. Monitoring Market Uncertainty can serve as an early-warning indicator for anticipating increases in portfolio risk and improving risk-management decisions. Overall, the study demonstrates that incorporating Market Uncertainty into the GARCH variance equation provides a more comprehensive understanding of portfolio risk dynamics in the Indonesian stock market.

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TABLE

Table 1 Descriptive Statistics

Statistics	Return IHSG	Market Uncertainty	Portfolio Risk
Mean	0,00031	0,01320	0,01150
Median	0,00052	0,01080	0,00970
Maximum	0,10210	0,08750	0,07820
Minimum	-0,13900	0,00410	0,00380
Std. Dev	0,01380	0,00970	0,00850
Skewness	-0,4210	2,1450	2,0170
Kurtosis	8,2140	9,3520	8,9150
Jarque-Bera	1.245,67	2.187,34	1.754,28
Probabilitas	0,0000	0,0000	0,0000
Observation	2.450	2.450	2.450

Table2. Stationarity Test

Variable	Return IHSG	Prob.	Keputusan
Return IHSG	-32,451	0,0014	Stasioner
Market Uncertainty	-30,827	0,0000	Stasioner
Portfolio Risk	0,10210	0,0084	Stasioner

Tabel. 3 ARCH-LM Test

Test	Statistic	Prob.
F-statistic	28,745	0,0014
Obs*R-squared	27,932	0,0000

Table. 4 GARCH(1,1) Estimation Test

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	0,000002	0,000001	2,184	0,0290
C (Variance)	0,000001	0,000000	3,125	0,0018
RESID(-1)^2	0,126400	0,018200	6,945	0,0000
GARCH(-1)	0,842700	0,021500	39,195	0,0001
Market Uncertainty	0,01380	0,004900	2,816	0,0049