Asian Journal of Economic Modelling
ISSN(e): 2312-3656
ISSN(p): 2313-2884
DOI: 10.55493/5009.v14i1.5899
Vol. 14, No. 1, 149-180.

URL: www.aessweb.com

Do cryptocurrencies and gold hedge against market risks? A wavelet coherence analysis of ASEAN+2 and G5 countries

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Article History
Received: 24 November 2025
Revised: 26 January 2026
Accepted: 5 February 2026
Published: 11 February 2026

Keywords
ASEAN+2
Cryptocurrencies
G5
Gold
Stocks
Wavelet coherence.

JEL Classification:
E31; G11.

ABSTRACT

Stock market volatility, economic shocks, and geopolitical tensions have intensified recently, resulting in heightened uncertainty and disruptions in global financial markets with ASEAN+2 and G5. Identifying reliable hedging and safe haven assets is therefore critical for risk management. Moreover, effective hedging and safe haven strategies are important to reduce the risk of a portfolio for investors and help keep the market stable by lowering market contagion and boosting investor confidence. Therefore, this study examines the hedge and safe-haven properties of various cryptocurrencies, Bitcoin, Bitcoin Cash, Cardano, Chainlink, Dogecoin, Ethereum, Ripple, and Tron, and gold against stock markets in ASEAN+2 (Indonesia, Malaysia, Singapore, Thailand, Vietnam, China, and Russia) and G5 countries (France, Germany, Japan, the United Kingdom, and the United States) over the period 2017–2024. The findings, derived from wavelet coherence analysis, reveal that these properties are not uniform but vary significantly by market, investment horizon (particularly beyond 128 days), and period (e.g., during crises vs. stability). This study underscores the limitation of static correlation-based methods and highlights the importance of wavelet coherence in revealing short-, medium-, and long-term correlations that traditional methods may overlook. The results provide crucial insights for investors and policymakers to enhance financial stability through better anticipation of market dynamics.

Contribution/ Originality: This study contributes to existing research by exploring the time-frequency correlation between eight cryptocurrencies and gold with the stock markets of ASEAN+2 and G5 countries through wavelet coherence analysis. It provides new insights into how these assets co-move with stock markets across different investment horizons and market regimes, thereby enhancing understanding of their hedging, diversification, and safe haven properties during periods of market turmoil and stability.

1. INTRODUCTION

Cryptocurrencies are digital assets that have grown in importance in the global investing scene. They have been claimed as digital gold and serve as an alternative to gold as a store of value due to their decentralized (Arnone, 2024). Even though cryptocurrencies are relatively new, people continue to use them to store wealth and hedge against portfolio risk (Singh, Singh, & Ansari, 2024). However, increasing market volatility and the magnification of financial shocks by various crises create a need to seek true assets that can mitigate investment risk (Manzli, Alnafisah, & Jeribi, 2024).

Liquidity risk always affects the stock market, impacting asset pricing and portfolio returns, especially during financial and health crises. Diversification remains a useful approach to reducing risk during such times (Demirci, Ferreira, Matos, & Sialm, 2022). Investors seek risk mitigation solutions against market downturns. Therefore, assessing whether cryptocurrency can protect against market declines, like gold, is crucial.

The outbreak of COVID-19 and the Russia-Ukraine war have both significantly affected the stock market by causing a sharp decline (Tarchella, Khalfaoui, & Hammoudeh, 2024). The COVID-19 pandemic has triggered the largest turbulence in global financial markets since the 1930s (Liu & Yuan, 2024; Tarchella et al., 2024). Investors seek to reduce their portfolio risk during market turbulence. Since then, scholars have continued to focus on this financial contagion (Matos, Costa, & Da Silva, 2021; Shen, Feng, & Sun, 2024). Likewise, cryptocurrencies and gold emerged as favored hedging and haven instruments during market turbulence (Riahi, Bennajma, Jahmane, & Hammami, 2024).

Cryptocurrencies have become popular investments owing to their decentralised nature and high return (Liu & Yuan, 2024). According to Yarovaya, Matkovskyy, and Jalan (2022), cryptocurrency recovered faster after a crisis than other financial assets, suggesting it may be a potential alternative investment during crises. However, debate exists on whether cryptocurrencies are investments or speculative assets (Liu & Yuan, 2024). Likewise, there are studies that concluded that gold does not exhibit safe haven characteristics (Cheema, Faff, & Szulczyk, 2022). Still, there are studies that have concluded that gold is still a better hedge in contrast to gold (Ameur, Jamaani, & Alfoul, 2024; Dutta, Das, Jana, & Vo, 2020; Long, Pei, Tian, & Lang, 2021). As such, it is vital to determine the potential of digital assets such as cryptocurrencies for diversification purposes (Cheema et al., 2022; Corbet, Hou, Hu, Oxley, & Xu, 2021).

Following the past literature, there are limited studies focusing on the correlation between cryptocurrencies and major stock indices (Singh et al., 2024). According to Bhuiyan, Mukherjee, Tarique, and Zhang (2025), most previous research concentrates on Bitcoin and developed stock markets. Therefore, this study will examine more cryptocurrencies beyond Bitcoin. Additionally, few studies focus on emerging financial markets such as ASEAN+2. Consequently, this research will include both emerging and advanced markets to offer a more comprehensive analysis. Furthermore, there is no consensus on the hedge and safe haven abilities of cryptocurrencies and gold in the stock market (Manzli et al., 2024; Stensås, Nygaard, Kyaw, & Treepongkaruna, 2019). The hedge and safe haven abilities of cryptocurrencies and gold are found to be time-varying and market-dependent (Kakinuma, 2022; Karim, Abdul-Rahman, Hwang, & Kadri, 2021; Ustaoglu, 2023). Additionally, cryptocurrencies are not homogeneous, and their hedging and safe haven abilities differ (Majumder, 2022). Overall, the properties of cryptocurrencies in the stock market are still debated. This study aims to contribute insights into this ongoing discussion, providing up-to-date information through 2024.

Additionally, most of the past literature has utilized regression models to determine the relationship between cryptocurrency and stocks without capturing the time-varying behavior of cryptocurrency and gold against the stock market. Given the time-varying nature of interactions between financial assets, it is imperative to utilize methods that can capture both the temporal dynamics and frequency-specific attributes of co-movement simultaneously. Wavelet coherence is especially appropriate for this objective, as it offers a localized assessment of correlation in the time-frequency domain and facilitates the investigation of scale-dependent relationships that conventional time series might miss. Likewise, the phase difference information from wavelet coherence allows the identification of lead-lag relationships, which are not available in conventional regression. Thus, this study will contribute insights into both the time-frequency domain, which is overlooked by conventional methods in previous studies.

This study offers several novel contributions to the existing literature. Firstly, it determines whether various cryptocurrencies share common power in the time-frequency space. Secondly, it compares cryptocurrencies with gold to inform better investment decisions. Thirdly, the study employs wavelet coherence to analyze the magnitude and strength of hedge and safe haven abilities of cryptocurrencies and gold against the stock market in ASEAN+2 and