



# The troika of business cycle, efficiency and volatility. An East Asian perspective

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## HIGHLIGHTS

- Asian Stock market data is multifractal in nature.
- Asian markets tend to show better efficiency in booms as compared to recessions.
- The volatility for all investors tends to be lower in every succeeding boom.
- Long term volatility impacts the long term efficiency significantly.

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## ABSTRACT

The EMH has been the subject of much debate over the past few decades, with a recent surge in interest in Asian markets. Asian markets which traditionally comprise of many emerging markets are more volatile and speculative in nature. The heart of our study focuses on the East Asian economies, which have experienced massive capital inflows. This begs the question of whether or not the stock markets are efficient enough for further investment and development. Our paper differs from existing literature as it focuses on deriving weak form efficiency rankings during different business cycle phases. We endeavour further to assess the volatility and business cycle phases. Taking Malaysia, Indonesia, Singapore and South Korea owing to their economic and financial development, we use MF-DFA to derive efficiency rankings and find firstly, the overall efficiency has improved over the past two decades and secondly, markets are more efficient in growth phases in comparison to its preceding decline. Similarly, employing wavelet decomposition in conjunction with EGARCH, we obtain volatility of stock markets in two distinct time horizons, i.e. short term and long term. We find the markets to be more stable during economic boom than its preceding bust. Our results confer with mainstream literature.

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## 1. Introduction

A growing web of interdependence often attributed to financial integration has spurred an escalating transfer of capital flows to emerging markets over the past decade. Some argue that capital flows to emerging markets are pro-cyclical and highly volatile [1] consequently increasing financial instability and output volatility. As recently witnessed during the global crisis, investors in developed markets responded with a flight to quality resulting in a contraction of domestic credit supply

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and output losses. Crises provide a unique opportunity to investigate the dynamic interrelationship between the financial and economic growth of a country, which have vital implications for policymakers when insulating the economy.

Furthermore, it is contended that with liberalization, emerging stock markets became more attractive to foreign investors for portfolio diversification, and are able to increase liquidity and informational transparency leading to higher degrees of efficiency. Since its introduction by Fama [2], the weak form efficiency hypothesis has been tested for several emerging markets with rather inconclusive results. Some conclude that emerging market returns are not autocorrelated, thus supporting the hypothesis [3,4]. Meanwhile, rejecting the hypothesis, others have found evidences of non-random stock price behaviour [5–8].

In the same light, the relation between stock markets and growth of the economy has received much attention in literature, and a strong consensus has materialized on its implication in a country's economy (see Refs. [9–11]). The key connection between financial markets and macroeconomic volatility is predominantly explained based on the financial market imperfection model. Bernanke and Gertler [12] postulated a hypothesis known as the 'balance sheet view', which says that nominal and real shocks to an economy are augmented by a 'financial accelerator'. Empirically, the stock market volatility proved to be counter-cyclical; where it was greater in recessionary periods than in expansions [13,14].

Arriving at the heart of our study, East Asia has assumed a more significant role in the global arena, against the backdrop of rapid expansions in trade and financial flows across borders, progressing at an impressive speed, contributing to 40% of the world's GDP growth [15]. An underwriting factor to the prominence of East Asia's growth is its significant emphasis on intra-industry trade allowing for a change in growth dynamics and degree of synchronization within the region and with the rest of the world. This also led to an increase in the inflow of FDI to East Asia, only affected during the various crisis periods, i.e. 1997 Asian crisis, 2000 dot com crisis, and the recent 2008 global crisis [16].

Consequently, the massive amounts of FDIs coming into East Asia and the emerging nature of its stock markets, which are more prone to volatility begs the question of whether or not the stock markets are efficient and how they perform during different business phases. The objective of this paper is twofold; firstly, we attempt to cultivate the weak-form efficiency ranking of four major East Asian markets and relate the rankings derived with the stage of business cycle movement. Secondly, we endeavour to examine the relationship between the stock market volatility and business cycle and its effect on short-term traders and long-term investors. Our study takes a sample of four countries, namely, Malaysia, Singapore, Indonesia and South Korea covering a period from January 1990–July 2013. The countries are selected based on their economic development stage, market size and exposure to crisis, both local and international in the past two decades. We find, in terms of market and economic development, these four countries to be a better fit for the scope our study.

The motivation and significance behind this research arises from the economic eminence of these four East Asian economies as a global shift from the west to the east is witnessed. Bearing in mind the emerging nature of these countries, the potential for growth and development is substantial. Furthermore, considering the crucial role of intra-industry trade and capital flows, our study lends credibility to the economic prominence of East Asia, providing policymakers with precarious details to avoid extensive misallocation of resources that may have a negative impact on long-term economic growth. Likewise, understanding the relations of efficiency and volatility of a market with the different phases of the economy will allow investors to make more informed investment decisions.

Moreover, this paper contributes to literature on EMH in two specific angles: (1) to derive the weak-form efficiency of East Asian economies, in different economic states over 2 decades, and (2) relating the efficiency and volatility nexus for East Asia. Both of these angles are addressed in a split process of short term and long term investor perspective, which adds value for informed industry application and policy making. As per the author's knowledge, there is no existing study, which focuses on the efficiency and volatility nexus in these countries, over multiple economic cycles and different investment horizon nature.

The subsequent sections are as follows; Section 2 highlights existing literature on efficiency and volatility and the business cycle. This is trailed by a brief account on the data and methodology employed. Section 5 discusses the results and its economic implications. Lastly, we present the conclusion, taking account for limitations in the present study.

## 2. Literature on efficiency

The Efficient Market Hypothesis (EMH) has been the interest of many researches for a better understanding and promoting the quality of financial markets. Several studies have been conducted to allow for indulgent testing of the EMH by factoring in the adjustments of market prices of assets for all available information. However, there have been limited research on the application of the random walk model in stock markets and financial time series (see Refs. [17–19]). Furthermore, much of available literature on testing the weak form efficiency focuses on developed markets [20–23,2] with limited studies on East Asian markets.

The random walk model in financial markets, where the returns are not based on its own past, can be examined through the stock return's correlation. Lo and MacKinlay [24] verified the random walk by using variance ratio test under the assumption that the variance of the returns adopt a linear relationship with holding period. With the focus being on the serial dependence of test in the weak form efficiency of markets, we find impetus from the seminal works of Kendall [21] and Fama [2] who did not find any correlation amongst the returns, thereby reiterating the weak form EMH.

Analysing the monthly stock returns for 18 stock markets, Poterba and Summers [25] found presences of positive serial correlation in short term and negative serial correlation in the long term horizon. They base their justification on the presence

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