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# An analysis of the spillover effects of exchange-traded funds

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## Abstract

This article used the Generalized Autoregressive Conditional Heteroscedasticity-Autoregressive Moving Average (GARCH-ARMA) and the exponentially Generalized Autoregressive Conditional Heteroscedasticity-Autoregressive Moving Average (EGARCH-ARMA) models to study the impact of the spillover and the leverage effects on returns and volatilities of stock index and Exchange Trade Fund (ETF) for developed and emerging markets. Previous unexpected returns for developed and emerging markets which have an opposite influence pattern on ETFs' returns were identified. The spillover effects from returns are excellent for Hong Kong, followed by Singapore. Meanwhile, Taiwan's stock index return was recorded to have a strong negative impact on ETF return. Notably, this article shows that the spillover effects on stock index and ETF volatilities existed with bilateral influences. Despite a strong positive asymmetric

volatility effect in Korea's ETF market, the leverage effect appears to play important roles in the explanation of both stock index and ETF returns.

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# Notes

[1]The first ETF was offered by the Vanguard Investment Company in the United States in 1976. Its existence was the longest in history. This company had the biggest management asset ETF. Because its product still partly had a drawback, the investment organization corrected the defaults in the ETF and combined the stock characteristics, releasing it in 1993 to track the S&P 500 index Standard and Poor's Depositary Receipts (SPDF) of ETF. Later, it was called the spider and appeared on the American Stock and Options Exchange (AMEX).

[2]The iShares Malaysia fund is an ETF that trades on the AMEX and its index tracks the MSCI Malaysia Index.

[3]Azman-Saini et al. (2002) revealed that there exist potential gains from international portfolio diversification within the context of the ASEAN-5 (i.e. Singapore, Malaysia, Indonesia, the Philippines and Thailand) equity markets due to increasing financial integration.

[4]In related articles, Bollerslev (1986), Akgiray (1989) and Lamoureux and Lastrapes (1990) revealed that GARCH (1, 1) was used to give significant explanatory power to time-series data and control stock returns volatility. Another measure of the spillover effect conducted by French et al. (1987) and Poon and Taylor (1992) indicated that GARCH(1, 1)-MA(1) was constructed to examine the residuals with first order moving average as a necessary assumption.

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