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# The relationship between Asian equity and commodity futures markets



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## ABSTRACT

In this paper, we test spillover effects between Asian equity market volatility and the volatility of the two most dominant commodities, namely, crude oil and gold futures. We consider a total of 14 Asian markets. We find that volatility shocks in established and mature equity markets, such as the Japanese market, spill over to the crude oil and gold futures markets, while immature markets tend to have spillover effects from commodity futures to equity markets. We also report evidence of increased bi-directional volatility transmission during the recent global financial crisis period. Like the volatility of crude oil futures, the volatility of gold futures matters to the equity market. As far as equity market volatility is concerned, the impact of volatility shocks from the gold futures market is as important as the volatility shocks from the crude oil futures market.

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## 1. Introduction

The role of commodity markets in influencing financial markets has been an active area of research in financial economics. This literature was re-invigorated in light of the rise in commodity prices, particularly the price of gold and crude oil, over the last half-decade. Recent studies, for instance, have documented that oil price is both a determinant and predictor of stock returns (Driesprong, Jacobsen, & Maat, 2008; Narayan & Sharma, 2011) and that gold is referred to as a “safe haven asset” (Baur & Lucey, 2010; Baur & McDermott, 2010). Baur and McDermott (2010) define haven as “a place of safety or refuge. . . a safe haven asset must, therefore, be an asset that holds its value in ‘stormy weather’ or adverse market conditions. Such an asset offers investors the opportunity to protect wealth in the event of negative market conditions” (Baur & McDermott, 2010, p. 1886). Oil market volatility has received research attention from different perspectives. Narayan and Narayan (2007), examining oil price volatility across the various sub-samples, conclude that price behaviour in crude oil is dominated by regime switching behaviour. Hayat and Narayan (2011) examine supply and demand shocks to explain the patterns of US volatility of oil stock. They find supply and demand factors contribute to about 70% of the variation in the growth of crude oil stock.

The literature closest to our work considers volatility spillover from crude oil to the equity market. Studies which find significant volatility spillover between oil and stock markets are Arouri, Jouini, and Nguyen (2011), Malik and Hammoudeh

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(2007), Malik and Ewing (2009), and Tansuchat, McAleer, and Chang (2009). Malik and Hammoudeh (2007) examine the volatility and shock transmission mechanism between the US equity, global crude oil market, and Gulf equity markets (Saudi Arabia, Kuwait and Bahrain). They document that, in all cases, volatility spillover is from the oil market to equity markets except in the case of Saudi Arabia, where volatility spillover is from the equity market to the oil market. Malik and Ewing (2009) apply a bivariate GARCH model to simultaneously estimate the mean and conditional variance between the five US sectoral indices, namely, financials, industrials, consumer services, health care and technology, and the oil prices. They find significant evidence of transmission of shocks and volatility between oil prices and financials, industrials, consumer services, health care, and technology sectors.

Moreover, the most recent study by Arouri et al. (2011) examines the extent of volatility transmission between oil and stock markets in Europe and the US at the sector level. They apply a generalised VAR-GARCH approach and discover volatility spillover between oil and sector stock returns. They also document that the spillover is uni-directional, from oil markets to stock markets in Europe, but bi-directional in the US.

Most studies examining the relationship between commodity prices and financial markets use spot price series to understand price movements (see, inter alia, Arouri et al., 2011; Baur & McDermott, 2010; Ferson & Harvey, 1994; Narayan & Narayan, 2010). In this paper we use futures series to examine the second order linkages between major commodities and equity markets in the Asian region. Futures series are used because empirical evidence reveals that price discovery takes place in the futures market (Garbade & Silber, 1983; Kavussanos & Nomikos, 2003; Kavussanos & Visvikis, 2004). Given the relationship between commodity markets and equity markets (see Narayan & Sharma, 2011, for instance), we expect that any volatility shocks resulting from the commodity futures market<sup>3</sup> will, potentially, have implications for the equity market, and vice versa.

From this literature, we learn that oil price volatility spillover exists and mostly emerges from the oil market and affects the equity market. Yet, the literature is incomplete in that it only considers oil market volatility. Other commodities, such as gold, also affect the performance of stock markets, therefore, what about gold market volatility? In other words, is the spillover from the gold market also statistically significant, and is it relatively more important than oil price volatility spillover? These questions have not been addressed by the literature and are important for the following reasons. Baur and McDermott (2010) examine the role of gold in the global financial system. They find that gold is both a hedge and a safe haven for major European stock markets and the US. They also argue that gold may act as a stabilising force for the financial system by reducing losses in the face of extreme negative market shocks. In addition, they also report that gold was a strong safe haven for most developed markets during the peak of the recent Global Financial Crisis (GFC).<sup>4</sup>

Baur and Lucey (2010) investigate gold as a hedge and a safe haven by examining the constant and time-varying relations between the US, the UK, and German stock and bond returns and gold returns. They document that gold served as a hedge against equity and a safe haven in extreme stock market conditions. They also perform a portfolio analysis and find that the safe haven is short-lived. Lucey, Tully, and Poti (2006) examine the seasonality in the conditional and unconditional mean and variance of daily gold and silver contracts. They find that there is a negative Monday effect in both gold and silver cash and futures markets.

Capie, Mills, and Wood (2005) examine the role of gold as a hedge against the dollar. They document that gold served as a hedge because it is unlike a homogenous asset and, therefore, is easily traded in a continuously open market. They also show that gold has served as a hedge against fluctuations in the foreign exchange value of the dollar.

Moreover, Faugere and Van Erlach (2006) develop a gold asset pricing theory that treats gold as a store of wealth. They demonstrate a theoretical and empirical link between gold price, inflation, and foreign exchange rates and the general valuation of the stock market. They show that the real price of gold varies inversely with the stock market price-earnings ratio.

In this paper, we take the literature on equity market volatility and commodity market volatility forward by testing the following hypotheses:

- (1) That the volatility spillover from the oil market and the gold market to the equity market is statistically significant; and
- (2) That the oil and gold price volatility spillover to equity markets was statistically different during the recent GFC compared to the pre-crisis period.

We test these hypotheses for a total of 14 Asian countries, namely, Indonesia, India, Singapore, Malaysia, the Philippines, Vietnam, Taiwan, Japan, China, South Korea, Pakistan, Thailand, Sri Lanka, and Hong Kong.<sup>5</sup> Our data set is daily and spans the period 05 July 2005–14 December 2011. Briefly, foreshadowing the main results, we find that volatility shocks from developed equity markets, such as the Japanese market, spillover to the crude oil and gold futures markets, while immature

<sup>3</sup> See Narayan, Narayan, and Zheng (2010) for efficiency of gold and oil futures. They found these two markets were jointly inefficient, at least during their sample period – 1995 to 2009.

<sup>4</sup> Other examples of studies that examine the financial characteristics of gold include Baur and Lucey (2010), McCown and Zimmerman (2006), Lucey et al. (2006), Faugere and Van Erlach (2006), Capie et al. (2005), and Sherman (1982).

<sup>5</sup> Examining stock return response to US exchange rate and short-rate, Narayan and Narayan (2012) find majority of Asian countries in their study responded to exchange rate depreciation in the long run, while all of the countries responded to short-rate in the short run.

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