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# Asymmetric Volatility Spillovers Between Crude Oil and International Financial Markets

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## Abstract

In this paper, we examine asymmetric volatility spillovers between oil and international stock markets in a vector autoregression framework using a directed acyclic graph (DAG) technique. We provide evidence that bad total volatility spillovers dominate the system and change over time, suggesting that a pessimistic mood and uninformed traders who tend to increase volatility dominate in markets. Positive spillovers of oil markets dominated from 2006 to mid-2009, but reversed after mid-2009. Moreover, the spillovers from good volatilities in oil markets to bad volatilities in global stock markets were significantly positive during the economic recovery period. The recent, important economic and political events have influenced asymmetries in volatility spillovers.

*Keywords:* Volatility spillover; Asymmetry; Oil market; Stock market; VAR

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## 1. Introduction

How do changes in the volatility of oil and stock markets interact? The much clearer answer to this question can be obtained by decomposing the overall volatility into two separate components: "good" volatility and "bad" volatility. A market's return volatility can be higher because institutions in that market make it advantageous for firms to take risks that lead to greater market growth (e.g., Obstfeld 1994; Acemoglu and Zilibotti 1997). Alternatively, a market's return volatility can be high because of market-specific forces, such as political risks, that impose risks on firms that they can not shed (Bartram, Brown and Stulz 2012). In the former case, volatility is good in that it results from positive shocks that enable markets to be more productive. In contrast, the bad volatility associated with the latter case can destabilize the market and prevent its growth. As Segal et al. (2015) suggest, we can decompose the aggregate volatility into "good" and

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