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Abstract

This paper aims to examine the dynamic linkages among the gold market, US dollar and crude oil market. The analysis also delves more deeply into the effect of the global financial crisis on the short-term relationship. We use fractional cointegration to analyze the long-term memory feature of these volatility processes to investigate whether they are tied through a common long-term equilibrium. The DCC-MGARCH model is employed to investigate the time-varying long-term linkages among these markets. The Krystou–Labys non-linear asymmetric Granger causality method is used to examine the effect of the financial crisis. We find that i) there is clearly a long-term dependence among these markets; ii) the dynamic gold-oil relationship is always positive and the oil-dollar relationship is always negative; and iii) after the crisis, we can observe evidence of a positive non-linear causal relationship from gold to US dollar and US dollar to crude oil, and a negative non-linear causal relationship from US dollar to gold. Investors who want to construct their optimal portfolios and policymakers who aim to make effective macroeconomic policies should take these findings into account.

Keywords: Fractional cointegration; DCC-MGARCH; Non-linear asymmetric Granger causality; Gold market; US dollar; Crude oil market

1. Introduction

Oil prices have been regarded as a leading index in the world economy [1]. When oil prices rise, corporations will suffer the loss of benefits. Such an increase can also lead to declining disposable income and cause inflation, which hampers a steady economic growth [2]. Nevertheless, looming inflation will raise gold prices because investors believe that gold can hedge against inflation.

The US dollar is the main currency in the international oil market and the volatility of the US dollar exchange rates will have a direct impact on oil-exporting countries. In the short run, oil-exporting countries are worried that the US dollar index

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