



Dynamics of crude oil and gold price post 2008 global financial crisis – New evidence from threshold vector error-correction model



Kakali Kanjilal^a, Sajal Ghosh^{b,*}

^a *Qualitative Techniques & Operations Management, IMI, B-10, Qutab Institutional Area, Tara Crescent, New Delhi 110016, India*

^b *Economics, MDI, Mehrauli Road, Sukhrali, Gurgaon 122001, Haryana*

ARTICLE INFO

Keywords:

Threshold cointegration
Threshold vector error correction
Non linearity
Regime dependent
Gold price
Oil price

ABSTRACT

The study investigates the dynamic relationship of global crude oil and gold price in a two-regime vector error-correction model with a single cointegrating vector and a threshold effect on error-correction terms as proposed by Hansen and Seo (2002). The study is conducted with weekly spot prices of Brent crude oil and gold for the period January 2, 2009 to November 20, 2015. The empirical results suggest the effectiveness of threshold cointegration model over a linear cointegration model signifying non-linearity in long-term relationship between gold and oil price. It also establishes different long-run and short-run dynamics of gold and oil in two regimes, termed as 'typical' and 'extreme' regimes based on the threshold parameter. The study reveals a lead lag relationship between gold and oil price suggesting 'gold' as investors' safe haven against inflation. This phenomenon, however, exists only in a typical regime. In contrast, in an extreme regime, with gold price dominating the market, investors' are found to switch between gold and oil in order to diversify the portfolio risk. This indicates that the relationship between gold and oil price is non-linear and asymmetric. The study surpasses previous studies by establishing the fact that the relationship between gold and oil is regime dependent, and hence does not remain constant during the entire period of the study. The findings have important implications for policy makers and investors. The study also demonstrates robustness in empirical findings by maintaining profound statistical congruency.

1. Introduction

Historically liquid fuel, primarily comprising of crude oil, has been the largest source of world's primary energy and would continue to maintain its dominance in future. It is, however, expected that the share of liquid fuel would fall from 33% in 2012 to 30% in 2040 according to the projection made by US Energy Information Administration (EIA) in its International Energy Outlook 2016 (www.eia.gov).¹ World oil market is oligopolistic in nature. As on 2014, 81% of world's oil reserve remains with OPEC (Organization of the Petroleum Exporting Countries) countries. Oil, the most traded commodity in the world, has historically been exhibiting a volatile price feature.² Oil has achieved an important position in the investment portfolio of traders and institutional investors (Tiwari and

Sahadudheen, 2015) since the beginning of its volatile price regime in 1973. The swing in oil price has severe consequences on oil importing and exporting countries. Prior empirical studies establish that oil price movements are caused by demand-supply mismatch, refining capacity, geopolitics, exchange rate and speculation among others. According to Kesicki (2010) oil price crises in 1973, 1979–1980 and 2003–2008 were caused by high demand growth, low investments in new oil fields and a weak US dollar in addition to OPEC cartelization which were prominent in 1973 and 1979–1980. Kesicki (2010) concludes that speculation had played a limited and temporary role in accelerating price movements during 2003–2008. Shafiee and Topal (2010a) predicts that nominal and real oil (and natural gas) prices will have an increasing trend and the fossil fuel prices will stay in jump for the next years with a reverting trend to the long-term historical trend

* Correspondence to: Management Development Institute (MDI), Room No C-10, Scholar Building, Mehrauli Road, Sukhrali, Gurgaon 122001, India.

E-mail addresses: kakali@imi.edu (K. Kanjilal), sghosh@mdi.ac.in, sajalg@yahoo.com (S. Ghosh).

¹ Global economy relies heavily on petroleum products derived from crude oil for their rampant use in production, transportation and other energy related activities. According to EIA, consumption of liquid fuels in transportation would increase by an average of 1.1% per year from 2012 to 2040 as there would possibly be no substitute to offset petroleum fuels despite advances in non-liquids based transportation technologies. Most of the remaining liquid fuels would be consumed in industrial sector.

² The trading in oil was restricted to the producers and consumers for more than 100 long years in the past due to the physical delivery/settlement characteristics of the products. The trading of crude oil has changed dramatically since the oil crisis of 1973. The physical delivery/settlement type trading in crude oil had given some leverage to oil producing countries to restrict oil shipments, leading to oil price shocks and price volatility in the oil market. This volatility feature created the need for oil producers and consumers to hedge future oil prices. As a consequence, oil traders created a short-term physical trading market for the buying and selling of oil. Thus, trading in oil has been opened for the investors in general.

line until 2018. Chen et al. (2016) empirically establish that OPEC supply has become the key factor followed by China's oil consumption share with respect to world's oil consumption to determine oil prices since 2009. Liu et al. (2016) establishes that the contribution of speculation did not exceed 10% of oil price variations during sample period spanning from January 2000 to December 2014.

Unlike oil, gold has evolved with human civilizations. At first it was valued for their exquisiteness and over the time it has been used for trading and is exchanged for other goods and commodities. Scarcity of gold across the world coupled with its high density and the way it could be easily melted and shaped – made it a natural trading asset. It is obvious that gold has been recognized as a globally accepted currency, which maintains its purchasing power even in the face of wearing down of the monetary or banking systems (Białkowski et al., 2015). Lili and Chengmei (2013) establish that gold price is influenced by gold reserve, prices of energy products, financial market indices and global macro-economic indicators. Shafiee and Topal (2010b) reviewed the world gold market and the historical trend of gold prices from January 1968 to December 2008. They also established a relationship between gold price, oil price and global inflation and predicted that the gold price would stay abnormally high up to the end of 2014. After that, the price would revert to the long-term trend until 2018.

Recently, the relationship between gold and oil has received much attention amongst researchers possibly due to their historic 'high and low' price episodes in the past few years. Gold and oil are two strategic commodities which represent the commodity markets to a large extent in terms of mostly traded commodities, volume of trading, high liquidity, harmonization of movements and popular economic indicators (Tiwari and Sahaduddeen, 2015). There is a common belief that the commodity markets, in general, move in unison as they are influenced by common macroeconomic factors such as interest rates, exchange rates and inflation (Hammoudeh et al., 2008). The commodity markets also react strongly to geo-political and financial tensions (Stigler, 2011). Oil price changes and political unrest are significant determinants of movement in gold price (Melvin and Sultan, 1990). Empirically, a great amount of evidence suggests that the price of oil and gold have evolved through a path of close connection over the years. For instance, a boom period has reigned in the commodity market, especially in oil and gold markets where the oil price has soared to 147\$ per barrel and gold price has crossed over 1000 \$ per troy ounce. The historical price movements of gold and oil market post global financial crisis as depicted in Fig. 1 clearly shows that gold market has seen a steady increase in price till August 2011, when gold price reaches all time high of US\$ 1852.08 per troy Ounce. Gold price starts falling subsequently after reaching its second peak of US\$ 1770.5 in September 2012. During the same period oil price starts increasing but after June 2014 it witnesses a slump. Gold prices seem to have moved in tandem with oil prices during this period too. This definitely leads the question: is there a dynamic relationship between these two markets? It should be noted that like any other historical variables, gold and oil markets have also experienced some unprecedented rise and slump regimes in the past few years. This paper aims to encapsulate regime dependent long-term and short-term dynamic relationship between gold and oil prices in the aftermath of financial

crisis of 2008.

The price movements of gold and oil have important economic and financial implications (Reboredo, 2013). The impact of price changes of these two commodities is directly apparent in consumption, industrial production and investment activities (Gokmenoglu and Fazlollahi, 2015). Price changes in commodity market are of crucial importance to the investors because the only way investors' generate returns from commodity investments is by betting on its price directions. Gold has been a consistent lead on inflation expectations over many years (Greenspan, 1994³). Although, investors prefer to invest in gold as hedge against inflation (Adrangi et al., 2003; Worthington and Pahlavani, 2007; Blose, 2010; Narayan, et al., 2010) and dollar (Capie et al., 2005; Sjaastad, 2008; Tully and Lucey, 2007; Zagaglia and Marzo, 2013) due to its store value, they often switch between oil and gold or combine them to diversify their portfolios (Soytas et al., 2009).

The rest of the paper is organized as follows. The next section provides the theoretical linkage between gold and oil. Section 3 gives a survey of extant literature along with the rationale and unique contributions of the study. Section 4 describes estimation methodology and details out data. Section 5 presents estimation results and analysis. Conclusion and interpretations are put forward in Section 6.

2. Theoretical linkage

The theoretical linkages between gold and oil prices have primarily been described by two channels in extant literature; a) inflation channel for oil importing countries (OICs) and b) revenue channel for oil exporting countries (OECs) (Zhang and Wei, 2010; Narayan et al., 2010; Tiwari and Sahaduddeen, 2015; Jain and Biswal, 2016 among others). For OICs, when international crude oil price goes up, general price levels in the economy also rises due to the increase in transportation and production costs, thereby creating an inflationary pressure. Investors increase their gold holdings in anticipation of further rise in inflation as gold has been considered as a hedge against inflation. On the other hand, rise in oil price increases oil export revenues thereby increasing the gold demand further as OECs invest additional oil revenues in gold due to its risk mitigating characteristics. Furthermore, an increase in oil price also adversely impact gold production and, hence, restricts the supply of gold in the global market.⁴ So, ceteris paribus, increase in oil price leads to an increase in gold demand globally leading to an increase in gold price due to restricted supply of gold. The linkage between gold and oil price are mostly researched and discussed in the literature from inflation and revenue channels (Zhang and Wei, 2010; Narayan et al., 2010; Tiwari and Sahaduddeen, 2015; Jain and Biswal, 2016). There are very limited studies (Soytas et al., 2009; Sari et al., 2010) which have analyzed the relationship between gold and oil price through the prism of investors' perspective.

Since the inception of electronic trading of oil and exchange traded funds (ETFs) across all commodity markets in 2006, investors' demand in oil and other commodities have surged tremendously.⁵ Investment diversification strategies have taken a new dimension since 2006. In addition to holding stocks and bonds, investors have started investing in oil and other commodity ETFs. This changing role of commodity markets from a pure raw material to an investment avenue has unfurled a variety of investment options and portfolio diversification strategies. In this backdrop of financialization process of commodity

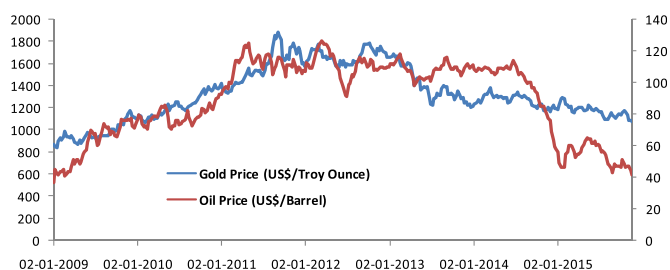


Fig. 1. Graphical plot of data.

³ Quoted in "Greenspan Takes the Gold". The Wall Street Journal, Feb 28, 1994.

⁴ Diesel has been consumed extensively in gold mining. Diesel consumption per ounce of gold produced has increased more than doubled from 12.7 gallons per ounce in 2005 to 25.8 gallons per ounce in 2013 (Source: <https://srsroccoreport.com/gold-mining-industry-fuel-costs-explode-in-a-decade/>)

⁵ World.Watch, Jan-Feb,2006, Vol 19(1). Also, the type of trading has changed from physical delivery/settlement to ETFs. This background is discussed briefly in footnote 2.

Download English Version:

<https://daneshyari.com/en/article/5104223>

Download Persian Version:

<https://daneshyari.com/article/5104223>

[Daneshyari.com](https://daneshyari.com)