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Do emerging markets matter in the world oil pricing system? Evidence of imported crude by China and India

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ABSTRACT

This paper provides empirical evidence on the changing structure of world oil price system by identifying an additional driver-emerging market factor. We choose China and India as a representative of emerging markets to examine if the quantity of crude oil imported by China and India is significant in the existing oil pricing system (Kaufmann et al., 2004). Our data starts from January 2002 and ends in March 2010, which includes the oil shock of 2007–2008. We utilize cointegration and error correction model framework developed by Engle–Granger (1987) and Gregory–Hansen (1996) in the analysis. Our results indicate that demand from emerging markets has become a significant factor in the world oil pricing system since 2003. This result is significant as it lends empirical support to the widely held conjecture that the oil shock of 2007–2008 is a demand-led shock (Hamilton, 2009). Our result also has significant policy implications that go beyond the oil shock. The emerging market factor is there to stay and reflects the changing power between emerging and developed economies in the world economic system as a result of decades of fast economic development in the former. It will certainly influence policy issues related to oil and beyond.

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1. Introduction

World oil markets have experienced rapid changes of record prices during the oil shock of 2007–2008. Various conjectures have been put forward to explain this phenomenon. One popular explanation stems from demand shocks (Hamilton, 2009). It is argued that in the short run, when supply infrastructure does not have any chances to adjust to demand changes, unexpected increases in demand could cause supply–demand imbalances, and if demand outpaces supply to a large extent, record prices could be reached as a result. If the supply is lagging behind demand for a period of time, the supply–demand imbalances could sustain over a period of time and a series of record prices could be reached.

In the case of emerging market demand, there may be a prolonged short-term supply–demand imbalances caused by the lag of expectation on true demand for imported oil from emerging economies, such as China and India. The unprecedented growth in China and India for the last 20 years has led to rapidly increased demand for imported oil, competing for its share in a pool of steady world oil supplies for the last 10 years. Market expectations of demand for crude oil from emerging economies may have consistently lagged behind actual demand, suggesting that planned supplies are not sufficient to meet

actual demand. This possible supply–demand imbalance may well be exacerbated by one of the longest post-war economic booms during the period from 2004 to 2008. As oil supply capacities take years to build up, the increased demand from China and India on imported oil may have tilted market supply–demand balance over time and contributed to record oil prices.

A closer look at the demand for imported oil from China and India has revealed that China started to import crude oil since 1996 after decades of self-sufficiency on this primary commodity and its volume of oil imports accelerated since. Similarly the volume of crude imported by India has increased rapidly since late 1990s. The increased demand for imported oil from both countries are fuelled by their fast economic development in recent decades and have increasingly become a significant factor in the competition for limited resources in the world oil market. Their competition for imported oil in the world markets can be illustrated in Fig. 1. OECD share of total world imported oil has decreased for the period under investigation from 79% to 70% while the share of China and India (Chindia) out of total world imported oil has increased from 9% to 19%. Fig. 2 displays the actual volume of Chindia imports, together with OECD imports and total world oil imports (million barrels per day). The imports of oil by China and India have increased with the total world demand for imported oil while OECD total imported oil has decreased during the period under investigation.

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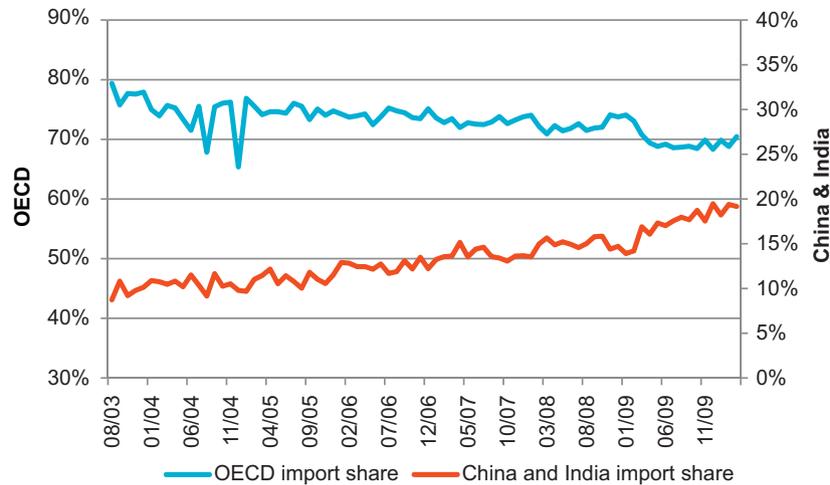


Fig. 1. Monthly OECD imported crude oil share vs. combined share of China and India for imported crude oil.

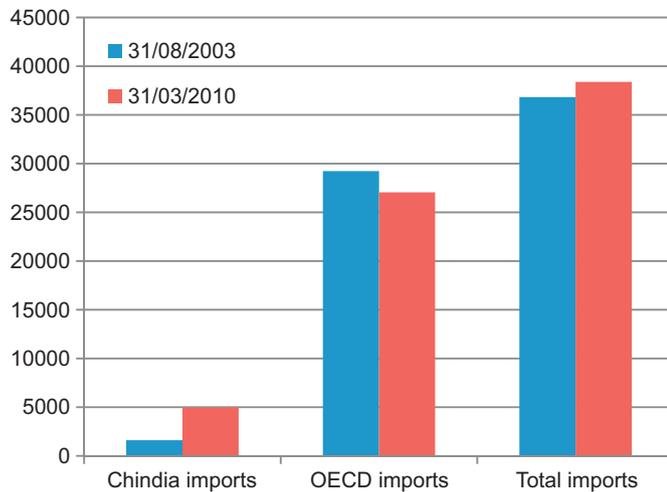


Fig. 2. Chindia, OECD imports and total world oil imports.

This study attempts to provide empirical evidence on the impact of crude oil imports by China and India on world oil prices for the period during 2002–2010. This is the first attempt, to the best knowledge of our knowledge that such empirical analyses have been carried out to cover the time span of the oil shock of 2007–2008. The result will shed some light on conjectures whether the oil shock is caused by demand shocks (Hamilton, 2009) or other factors such as speculation (Kaufmann, 2011).

Our empirical investigation is underpinned by the price rule set out by Kaufmann et al. (2004) and carried out in the framework of the residual-based cointegration analysis originally proposed by Engle and Granger (1987) and subsequently extended by Gregory and Hansen (1996) to control for the structural break in the series. Not only our results would help provide empirical evidence on recent oil price shock, it would also uncover whether emerging markets' demand for oil in the world oil markets is a significant factor in oil pricing. The implication of the latter, if found significant, would go far beyond the oil shock and have profound economic implications which may affect future policies.

The rest of the paper is organized as follows: Section 2 gives a brief review on the literature on factors influencing world oil prices and the China and India phenomenon; Section 3 discusses methodologies adopted; Section 4 introduces the data; Section 5 examines empirical findings; and finally Section 6 concludes.

2. Literature review

2.1. Factors driving world oil prices

OPEC is the biggest single supplier of crude oil in international oil markets, hence a clear oil price driver. A large volume of research has devoted to how OPEC behaves and how it influences oil prices. The literature in this area is abundant and we only indicatively mention some of them. Hypotheses are being tested on whether OPEC behaves as a Cartel (Loderer, 1985; Gülen, 1996; Alhajji and Huettner, 2000), a dominant producer, or a fringe producer (Griffin, 1985). Despite a lot of research output, there is no consensus as how OPEC behaves (Kaufmann et al., 2004). This may be due to the intricacy of OPEC behaviour given the hugely complex oil markets. It may also be due to the underlying fundamentals that have been evolving over time. For example the reliance on imported OPEC crude has been reducing over the years after the two oil shocks in the 1970s. Non-OPEC energy production has increased substantially due to energy security concern, technology innovations, and high oil prices which make additional investments in production viable.

Despite there is no consensus on OPEC behaviour, there is evidence that OPEC impacts world oil prices and this influence may be time-varying and price-dependent (Lin and Tamvakis, 2010). More specifically, influences of OPEC on oil prices can be further broken down to its production capacity, capacity utilization, production quotas and the degree of which OPEC production exceeds these quotas, or Cheat (Kaufmann et al., 2004).

The time-varying and price-dependent influence from OPEC suggests that there are other factors driving oil prices. Since the oil shocks in the 1970s, vast majority of the oil exports are designated to OECD¹ countries with USA at the top of league table for imported crude. Their collective demand for oil imports has been modelled in the oil pricing system of Kaufmann et al. (2004). As underlying OECD countries' oil consumptions fluctuate with their individual economic cycles and their domestic oil productions, their collective demand for imported oil also fluctuate over time. This time-varying demand for imported oil may interact with the relative stable oil supply and causing oil price to fluctuate.

More factors have been put forward to explain the rise of oil prices in recent years. Kaufmann et al. (2008) identifies the role of US refinery and nonlinear plays in the world oil pricing system up till 2006. Speculation is another factor being put forward to

¹ See JODI.org for details.

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