



# Oil price volatility and interdependency of GCC economies and North East Asian economies

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## ABSTRACT

We investigate the role of oil price, oil price volatility and real exchange rate on bilateral trade flow between GCC and Northeast Asia countries for the period 1980–2014 by using the gravity model. Estimated results indicate that traditional variables of gravity model including income, and distance have expected signs. Oil price volatility leads to decrease 4–7% NEA's exports to GCC countries and 1% increase in oil price would lead to reduce 24% Northeast Asia Export to GCC. The elasticity of exports of Northeast Asian economies (NAE)<sup>1</sup> to Gulf Cooperation Council (GCC) countries with respect to real exchange rate is ranging from 7 to 14%. Oil consumption in NEA countries has significant positive impact on of GCC's exports to Northeast Asia. The own export income elasticity of NEA countries is lower than the elasticity of export with respect to GCC income, while the own export population elasticity is higher than the elasticity of export with importer population.

## 1. Introduction

Northeast Asian economies (NAE) have experienced rapid economic growth along with high energy demand in recent years and this region is dependent on energy imports, particularly from GCC<sup>2</sup> countries. Fast growing energy demand in Northeast Asia has made this region extremely influential in the global energy market and simultaneously.<sup>3</sup> GCC countries reliance on Northeast Asia's for manufacturing goods. Therefore, the economies of these two regions are highly interconnected via bilateral trade. Substantially growing trade relationship between GCC and Asia in last few years have replaced for trade between the GCC and the United States and Europe [1]. However Oil and gas is the centerpiece of trade between GCC and NEA (Newendorp, 2011, and [20]). There is a widespread concern among policy makers and researcher about the large fluctuations in the real oil price and its ultimate consequences for both oil exporting and oil importing economies. The highly volatile nature of oil prices ultimately affects a wide range of economic activities in the oil importing countries. Policy makers in oil exporting countries also face serious challenges to deal with volatility of oil price for smooth functioning of their economies. It is perceived that the real price of oil experienced frequently large and persistent fluctuation since 1973. In recent literature, we observed a radical change

regarding the nature of oil price shock and its consequences for the global economic activities. It was generally believed that political unrest in Middle East was considered as the significant cause of oil supply disruptions and ultimately cause high price [17]. This has little empirical support. Kilian further argues that demands shocks and speculative trading activities were mainly responsible for surge in real oil price in some historical episodes, instead of supply shocks [18] conclude that with the exception of 1990, the major oil price shocks were driven by oil demand shocks.

## 2. Effects of high and volatile oil price

There are direct and indirect effects of high and volatile oil price for the economies of oil importing countries. The economies of oil importing countries are negatively affected by high oil prices at both macroeconomic and microeconomic level. At the macroeconomic level, oil prices directly affect the aggregate economy through deteriorating trade balance, government finances and balance of payments channels and indirectly through inflationary effects, fiscal deficit country competitiveness [30]. At the microeconomic level, oil prices affect the economy through consumer's utilities, diminishing household savings, consumers purchasing power as higher oil prices are passed on to consumers.

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<sup>1</sup> Northeast Asian economies comprise China, Japan, and South Korea.

<sup>2</sup> Gulf Cooperation Council comprise Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates).

<sup>3</sup> See for example [26] and [25] for detail.

According to [9] volatile oil prices lead to uncertainty in the macroeconomic environment and this uncertainty adversely affects the current spending and lowers aggregate income. Oil price volatility is the main force that depresses aggregate demand, owing to the transfer of income from net oil importing to net oil exporting nations [9]. The uncertainty because of oil price volatility not only adds risk to investment decision in infrastructure but also directly impact energy sector planning which is essential for a long term growth process.

A number of studies investigate the impact of oil price on economic activities of oil importing countries. Some influential studies in this regard are [14,16,17,22,23]. [23] argues that rising oil price hurt the economic growth through increasing energy expenditure, reducing consumer demand, harming the balance of payment, and through inflationary pressures. [14] found a statistically significant relationship between oil price hikes and economic recessions during the period between 1948 and 1981. [22] found asymmetric impacts of oil price increase on GDP. [17] showed that the source of an oil price hike is a crucial to its impact on output and inflation. However, literature suggests that oil price volatility matters fundamentally more in terms of economic output than the level of oil price. According to [27] oil price volatility has a significant impact on the economies of oil importing countries [9] and [7] found a strong negative link between oil price volatility and economic activities. [9] argues that oil price shocks may have an adverse impact on the economic activities as it increase the level of oil prices and oil price volatility. According to [3] oil price volatility transmitted into the economy through uncertainty channel. Highly volatile energy prices have detrimental effects on economic growth in net oil importing countries [11].

Oil price volatility has serious implication for rapidly growing economies of Northeast Asia, as the region is massively depending on external resources for energy demand. The NEA economies are largely dependent on energy imports from GCC countries and at the same time GCC countries are benefited from Northeast Asia's low-cost manufacturing industries [10]. Trade is the core of the developing links between NEA economies and GCC economies. In recent years, Northeast Asia has become the GCC's most important trading partner accounting for nearly 60% of its total foreign trade [1]. GCC economies to be the top energy exporter to Northeast Asian region and Northeast Asia export manufacturing goods to GCC countries.

Due to improvement in energy efficiency, and increasing use of renewable energy because of environmental concerns, energy mix is shifting towards, lesser carbon fuels in United States and Europe. Therefore energy consumption has substantially decreased in Europe and United States. GCC oil and gas exports have shifted towards NEA in last few years. With this background, this study intends to examine the impact of oil price and oil price volatility on trade between Northeast Asian economies and GCC. The relationship between the two regions is the energy-economic trade partnership. For this purpose, we use the gravity model of trade to explore the effect of oil price and oil price volatility on interdependency of the two regions. Two sets of equations, one for GCC exports and the other for NEA are estimated with Fixed Effects Model.

The remainder of this paper is organized as follows. Section 3 briefly reviews energy-economic trade partnership between GCC and Northeast Asia. Section 4 presents methodological framework, the econometric methodology and data sources. Section 5 presents the empirical results, and Section 6 provides the conclusion.

### 3. Trade between GCC and Northeast Asia

In recent years, the economies of Northeast Asia have emerged as the major economic players in terms of economic growth and energy consumption. The combined GDP of NEA economies comprise 21% of the world's GDP in 2014, where it was 16.5% in 2005 (World Development Indicators). China remains the largest economy accounting to 13.3% of the world GDP in 2014 while it was 3.6% of the

world GDP in 2000. The rise in economic growth has been supplemented by a dramatic increase in energy demand. China, Japan and South Korea are respectively 2nd, 3rd and 8th oil consuming nations in the world (BP Statistical Review of World Energy, June 2015).

The rapid economic growth along with the rapid energy demand in Northeast Asia has led to an upsurge of interests in expansion of economic linkages between NEA and GCC countries.

NEA economies are greatly relying on external resources for energy especially for oil while GCC countries are the major crude oil exporters to NEA. GCC economies continue to be the top energy exporters to NEA economies and NEA economies export manufacturing goods to GCC countries. Due to rapid growth of the economy, China's oil demand and ultimately oil imports have increased dramatically over the last decade. According to EIA (U.S. Administration Energy Information, 2015), China was the largest net oil importer in 2014. The Middle East is the leading exporter of crude oil to China. Four GCC countries (Saudi Arabia, Oman, United Arab Emirates and Kuwait) account for 33% of China's total crude oil imports. Saudi Arabia alone exported 16% of China's total crude oil imports in 2014 (EIA, 2015).

Japan has limited domestic resources of energy; therefore, the country largely depends on energy imports. According to EIA (2015), Japan was the third largest importer of crude oil and oil products in 2014. In 2014, Japan's imports of crude oil from GCC countries were 76% of its total crude oil imports. Saudi Arabia was the largest exporter of crude oil to Japan with 34% of the export portfolio followed by U.A.E with 24% exports portfolio, Qatar with 11% and Kuwait exports 7% of total Japan crude oil exports.<sup>4</sup>

South Korea has very limited and insufficient energy resources and the country greatly depend on external resources for energy demand. South Korea meets nearly 97% of its energy demand through imports and the country is one of the world's leading energy importers (EIA, 2015). GCC countries are the major sources of crude oil for South Korea, and they collectively export 71% of total crude oil imports of South Korea.

Northeast Asia has become the GCC's most important trading partner. Table 1 summarizes the growth rates of trade between GCC countries and Northeast Asia from 1980 to 2014. The statistics reported in Table 1 indicate that Northeast Asia's trade with GCC countries substantially increased during the last two decades, however high fluctuations were also observed in direction of trade. The high variability in oil prices may be the responsible factor for high fluctuations in pattern of trade between the two regions. The growth rates of Northeast Asia exports to GCC are higher than the growth rates of total exports to the world for the last two decades. The growth rate of Northeast Asia's exports to GCC countries were 17.8% in the year 2000, 13.4% in 2010, 22.0% in 2011 and 18% in 2012. However, Northeast Asia's exports to GCC countries were declined in 2013. Similarly, the growth rate of Northeast Asia imports from GCC countries were 7.4% in 1990, 20.6% in 2000, 34.7% in 2010 and 44.3% in 2011. After 2011, reverse trend of Northeast Asia's imports from GCC economies were observed and growth rate of imports from GCC economies became negative in 2013 and 2014. Growth rate of trade statistics reported in Table 1 indicate that GCC economies are more foreign-trade oriented as compared with Northeast Asian countries. The elasticity of imports with respect to GDP has been measured to explore the differences between GCC economies and Northeast Asian's economies.

In case of Northeast Asian economies, the elasticity of imports (income responsiveness) from GCC economies is greater than the elasticity of imports from the world while the elasticity of exports to GCC economies is less than the world exports elasticity (see Table 1). This means that Northeast Asian's imports from GCC economies will grow faster than the imports from the rest of the World and Northeast Asian's exports from GCC economies will grow slower than the exports from the rest of the World.

<sup>4</sup> Ministry of Economy, Trade and Industry (METI) Gov of Japan (2015).

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