Decomposing the links between oil price shocks and macroeconomic indicators: Evidence from SAARC region

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**ABSTRACT**

This study examines the impact of oil price shocks on key macroeconomic variables (i.e., real GDP, interest rate, inflation and exchange rate) for five SAARC countries (i.e., India, Pakistan, Bangladesh, Sri Lanka and Bhutan). For this purpose, we adopt contemporary macroeconomic policy modeling tool called impulse response function (IRF) and forecast error variance decomposition method (FEVDM) in the structural vector autoregression (SVAR) setting using time series data over the extended period from 1982 to 2014. In addition, Johansen (1991) co-integration method is applied for long-run relationship. The results of cointegration test confirms the long-run equilibrium relationship between all the underlying variables. However, the empirical findings of IRF explained significant variation among all underlying macroeconomic variables in response to exogenous oil price shocks at different time horizons. It means the macroeconomic factors are sensitive to even small oil price shocks and possess various socio-economic implications in the region. The results of FEVDM evidence that each country in a study group responds differently to oil price shocks, it corresponds their independent policies, macroeconomic fundamentals, sector constructions and heterogeneity across the countries. The findings help governments to reform public policies in the region by controlling macroeconomic fluctuations due to oil price shocks.

1. Introduction

The oil crisis was the major cause of 1970’s recession which mainly affected the western economies. Since then, there is a plethora of literature studying the effect of oil price shocks on macroeconomic variables. Yet, the debate on this front is ongoing due to contrasting empirical findings and overall macroeconomic implications of oil price shocks both in developed and developing countries (Morana, 2017). For example; many researchers have examined the causal links between oil price shocks and key macroeconomic indicators, and found that effect significantly varies across the countries (Iwayemi and Fowowe, 2011). Nonetheless, majority of the studies conclude that the oil price shocks are detrimental to economic growth (see: Van-de-ven and Fouquet, 2017; Rafiq and Bloch, 2016). For instance; Hamilton (1983) and Mork (1989) conclude that the oil price shocks originate economic downturn. Furthermore, their results explain that the oil price shocks affect real economic output from both the supply side and as well as the demand side. The supply side effect comes from the production side when market supply diminishes due to rising resource (oil) prices and shifts the market equilibrium downward. Whereas, the demand side impact is associated with the spending and consumption pattern of the families. The increasing oil prices reduce the purchasing power of households because the demand for oil is inelastic. Consequently, the soaring oil prices result in lowering demand for other consumer products and services. Moreover, high oil prices have direct impact on other consumer goods and services which cause uncertainty in the future. This notion generally compel both firms and households to reduce their consumption and investments activities (Sill, 2007). Increase in oil prices negatively affects short-run economic performance as it distracts spending on large ticket intake and capital goods (Bernerke, 1983).

Nevertheless, the soaring oil prices not only impede economic growth but, also cause the general increase in the price level in the economy. Since the crude oil is extensively used as a common input for the production and as well as the distribution of goods, the increasing oil prices directly affect cost of the production and indirectly affect the delivery cost of goods and services. Besides, the oil price volatility directly influence the exchange rate volatility; however, the direction of change depends upon whether the country is net exporter or an importer (Amano and Van Norden, 1998; Hamilton, 1996; Issa et al., 2008; Richard and Michael, 1980). Purchasing Power Parity (PPP)

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theory suggests that if demand for currency of the country increases, this will cause currency of that country to appreciate. Similarly, inflated oil prices increase the value of currency of an oil-exporting realm because the demand for its currency increases in foreign market. Contrarily, higher oil prices cause to decrease value of currency of an oil-importing country as its currency’s supply increases in the international market. Moreover, some studies found that the actions by monetary authorities are likely to elucidate the effect of changing oil price on an economy (Clarida et al., 1997; Tatom, 1988; Shabbaz et al., 2017). As oil price shocks affect real economy and overall price level, central banks generally face policy challenges in stabilizing the price level and output, simultaneously. For example: if the central banks try to maintain the growth rate, the common practice they follow is to decrease the interest rates to neutralize the incurring losses in the real GDP; however, it may lead to increasing inflationary stress. Alternatively, the government may also adopt a bendable inflation targeting approach in response to exogenous supply side shock by raising the interest rate to avoid the adverse impact on the output (Bernanke et al., 1997).

However, most of the prior studies that examined the impact of oil prices on economic undertakings have been conducted in developed countries such as US and European countries. Whereas, Asian countries are given less attention despite of their growing importance in oil consumption. Eichengreen (2008) argued that since the advent of globalization, Asia’s share in global GDP has significantly increased. In 1950, GDP share of Asia to World GDP was around 20% and it is expected to be more than 40% by 2030. It is also projected that the share of Asia in global economy is anticipated to be greater than that of US, European Union or G-7 by 2030 (IMF, 2012). Such an astounding current and future economic growth prospects in Asia are pursued by increasing oil demand in Asian economies. In this connection, according to one of the world’s leading oil and gas companies mentioned in its report that the oil demand in OECD countries has declined by 5.9% over the last half decade, whereas in non-OECD countries oil demand has enlarged by 20.3%, especially spurred by China and other Asian countries (“BP Statistical Review of World Energy”, 2012).

Recently, Asian Development Bank reports that, “South Asia remains the fastest growing of all subregions, with growth reaching 7% in 2017 and 7.2% in 2018”. Similarly the SAARC, the union of eight South Asian nations (India, Pakistan, Bangladesh, Sri Lanka, Bhutan, Maldives, Nepal and Afghanistan), is the largest regional organization in term of population with 1.7 billion residents, 3rd largest economy in terms of gross private product (GDP) and 7th largest economy in terms GDP (Nominal), in the World. It is the World’s fastest growing economic region (Michael, 2013). In recent past, the GDP growth of SAARC nations such as India, Bangladesh, Pakistan and Sri Lanka has been increasing remarkably from 6% to 9% annually (SAARC, 2010). The ever-increasing economic growth in SAARC region has massively increased demand for oil and other energy sources. All SAARC countries mainly depend on imported oil and petroleum product (SAARC, 2010). India alone stands 3rd largest oil consumer in the world. Whereas, Pakistan ranks 33rd, Bangladesh 73rd and Sri Lanka 80th (Global Energy Year Book, 2017).

To our knowledge, no comprehensive study has been conducted for SAARC countries despite having significant share in the world economy. Few individual country specific studies are found mixed with other socio-economic indicators. For example; the study by Khan and Ahmed (2011) examined the short-run effect of oil and food prices in Pakistan, and found an affirmative association between oil price shocks and inflation. Ghosh (2011) investigates the relationship between oil prices and exchange rate for India, their findings conclude that the inflated oil prices tend to depreciate Indian currency against US dollar, and shocks in oil price found to have permanent impact on exchange

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1. Organization for Economic Co-operation and Development.  
2. South Asian Association for Regional Cooperation.

rate volatility. More recently, Timilsina (2015) suggested that an increase in oil prices tend to have adverse impact on the GDP of developed countries. Another empirical study was conducted in 45 countries (out of which 28 were developed and 17 were developing including India and Sri Lanka) find out that the both nominal and real oil price volatilities have also adverse effect on the economic development of 11 out 17 developing countries and 12 out of 28 developed countries (Narayan et al., 2014). Keeping in view the impressive economic growth and importance of region in world, this study is designed to analyze the impact of oil price shocks on the gross domestic output, inflation, exchange rate and interest rate in selected five SAARC countries (i.e., India, Pakistan, Bangladesh, Sri Lanka and Bhutan). The selection of five countries out of eight SAARC member countries is based on the availability of data. The aim of this paper is to study how these emerging South Asian economies respond to oil prices shocks over different time horizons in order to provide some important policy implications for researchers and policy makers.

Further, the section wise breakup of the study is as follows: Section 2 describes the review of relevant literature. Section 3 contains the methodological framework and data. Section 4 shows the empirical results and their discussion. Lastly, Section 5 provides conclusion and policy implications.

2. Review of relevant literature

The prominent studies on oil price shocks and economic growth nexus include Abeyesinghe (2001), Cunado and De Gracia (2005), Leduc and Sill (2004), and Bohi (1989). The study of Abeyesinghe (2001) covers twelve countries including ten Asian economies (i.e., Malaysia, Japan, Philippines, China, Thailand, Taiwan, Hong Kong, Singapore, South Korea, and Indonesia) and concluded that Malaysia and Indonesia are vulnerable to oil price hike even they are the net oil exporting countries. Furthermore, the study suggests that the long-run impact of the oil prices in their trading partner countries is not positive. Cunado and De Gracia (2005) analyze the relationship between oil price and the macroeconomic indicators of sixth Asian countries (i.e., Japan, Thailand, Malaysia, South Korea, Philippines, and Singapore) and found significant effect of oil price hikes on their macroeconomic indicators in the long-run. However, they further explained that in short-run, the effect varies mostly depending on whether the country is net oil importer or net oil exporter. Another study by Leduc and Sill (2004) provide a model of equilibrium to understand the economic behavior to the shocks of oil prices under many structures of the monetary policies. They observed that many policies related to easy inflation widen the range of negative outcome towards the positive oil shocks. In contrast, the monetary policies having proper estimation on the overall price level has no impact on oil price shocks.

Nonetheless, the role of monetary policy and macroeconomic indicators in relation to oil prices volatility has also been widely discussed. For example: the study of Bohi (1989) ranks among the seminal studies that investigate the relationship between oil price volatility and economic recessions. The study confirms that the inappropriate monetary policy to deal the oil price hike leads the country to suffer economic recession. The possible explanation of this outcome could be, the inappropriate monetary policy during the oil price shocks may transfer asymmetric information in an aggregate economy that further leads the market to recession. While, Tatom (1988) suggests that the economy receives symmetric impact during oil price shocks if appropriate monetary policy tools are placed. Moreover, the study also discusses some early findings where monetary policy had an asymmetric output to the shocks of the oil price if the monetary policy is not taken in to account.

However, there are many studies that have studied the impact of oil price fluctuations on the macro-economic behavior i.e., Pierce et al. (1974), Rasche and Tatom (1977), Mork and Hall (1980), and Darby (1982). These studies conclude that there is a negative correlation
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