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## Does oil price volatility matter for Asian emerging economies?

Shuddhasattwa Rafiq<sup>a</sup>, Ruhul Salim<sup>b,\*</sup>

<sup>a</sup> Deakin Graduate School of Business, Faculty of Business & Law, Deakin University, 221 Burwood Highway, Melbourne, Victoria 3125, Australia

<sup>b</sup> School of Economics and Finance, Curtin Business School, Curtin University, Perth, WA 6845, Australia

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### ABSTRACT

This article investigates the impact of oil price volatility on six major emerging economies in Asia using time-series cross-section and time-series econometric techniques. To assess the robustness of the findings, we further implement such heterogeneous panel data estimation methods as Mean Group (MG), Common Correlated Effects Mean Group (CCEMG) and Augmented Mean Group (AMG) estimators to allow for cross-sectional dependence. The empirical results reveal that oil price volatility has a detrimental effect on these emerging economies. In the short run, oil price volatility influenced output growth in China and affected both GDP growth and inflation in India. In the Philippines, oil price volatility impacted on inflation, but in Indonesia, it impacted on both GDP growth and inflation before and after the Asian financial crisis. In Malaysia, oil price volatility impacted on GDP growth, although there is notably little feedback from the opposite side. For Thailand, oil price volatility influenced output growth prior to the Asian financial crisis, but the impact disappeared after the crisis. It appears that oil subsidization by the Thai Government via introduction of the oil fund played a significant role in improving the economic performance by lessening the adverse effects of oil price volatility on macroeconomic indicators.

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## 1. Introduction

An impressive body of literature demonstrates that oil price shocks exert adverse impacts on economies from both the supply and demand sides (Hamilton, 1983; Loungani, 1986; Mory, 1993; Brown and Yucel, 2002; Jimenez-Rodriguez, 2008; Jbir and Zouari-Ghorbel, 2009). Alternatively, large increases or decreases in oil price variability (*i.e.*, oil price volatility) might adversely affect the economy in the short run by delaying business investment by raising uncertainty (Bernanke, 1983) or by inducing costly sectoral resource reallocation (Hamilton, 1988). Hence, previous research on oil prices and economic activities primarily investigates two different aspects of the relationship between oil price and economic activities: the impact of oil price shocks and the impact of oil price volatility. These two approaches differ in the manner in which they incorporate oil price into their models. The first approach takes oil prices at their levels, and the second approach employs different volatility measures to capture the oil price uncertainty.

\* Corresponding author. Tel.: +61 8 9266 4577; fax: +61 8 9266 3026.

E-mail addresses: [Shuddhasattwa.Rafiq@deakin.edu.au](mailto:Shuddhasattwa.Rafiq@deakin.edu.au) (S. Rafiq), [Ruhul.Salim@cbs.curtin.edu.au](mailto:Ruhul.Salim@cbs.curtin.edu.au) (R. Salim).

In contrast to the large number of studies that analyze the impact of oil price shocks, papers that investigate the impact of oil price volatility on economic activities are rather limited and originate from the increase in oil price volatility that occurred in the mid-1980s. Furthermore, studies that identify the impact of oil price volatility in the context of developing nations are almost non-existent in the literature. One exception is the work of Rafiq et al. (2009) in which the authors analyze the impact of oil price volatility on the Thai economy. Nevertheless, in light of increasing demand for oil from developing nations, comprehensive studies on the impact of oil price volatility on major developing economies are warranted. This paper attempts to fill this research gap in the oil price–output literature. Although Rafiq et al. (2009) address only the Thai economy, this study analyzes the impact of oil price volatility on six emerging Asian economies, namely, China, India, Indonesia, Malaysia, the Philippines, and Thailand.

The remainder of the paper is organized as follows. Section 2 elaborates on two different channels through which oil price volatility may impact the macro-economy. Section 3 presents a critical review of earlier literature followed by description of an analytical framework in Section 4. Empirical results from the estimation are presented in Section 5, and conclusions and policy implications are offered in the final section.

## 2. Macroeconomic implications of oil price volatility

Findings from studies that investigate the impact of oil price shocks on macro-economies are mixed. A large body of empirical and theoretical literature that analyze the impacts of the oil shocks of 1970s claim that oil price shocks exert adverse impacts on different macroeconomic indicators by raising production and operational costs (Hamilton, 1983; Burbridge and Harrison, 1984; Gisser and Goodwin, 1986; Mork, 1989, Chen and Chen, 2007). However, recent studies argue that the effects of oil price shocks on macroeconomic variables such as inflation are not as large and significant as they were in the 1970s because producers have continuously substituted away from oil over time (e.g. Hooker, 2002; Bachmeier and Cha, 2011; Katayama, 2013).

Alternatively, large oil price changes, *i.e.*, either increases or decreases (volatility), may affect the economy adversely because they delay business investment by raising uncertainty or by inducing costly sectoral resource reallocation. Bernanke (1983) offers a theoretical explanation for the uncertainty channel by demonstrating that if firms experience increased uncertainty relative to the future price of oil, then it is optimal for them to postpone irreversible investment expenditures. If a firm is confronted with a choice of whether to add energy-efficient or energy-inefficient capital, increased uncertainty born by oil price volatility raises the option value associated with waiting to invest. As the firm waits for more updated information, it forgoes returns obtained by making an early commitment, but the chances of making the right investment decision increase. Thus, as the level of oil price volatility increases, the option value rises, and the incentive to investment declines (Ferderer, 1996). The downward trend in investment incentives ultimately transmits to different sectors of the economy.

Hamilton (1988) discusses the sectoral resource allocation channel. In this study, by constructing a multi-sector model, the author demonstrates that relative price shocks can lead to a reduction in aggregate employment by inducing workers in the adversely affected sectors to remain unemployed while waiting for conditions to improve in their own sector rather than moving to other positively affected sectors. Lilien (1982) extends Hamilton's work further by showing that aggregate unemployment rises when relative price shocks become more variable.

## 3. Oil price volatility and the economy

In response to two consecutive oil price shocks in the early and late 1970s, a considerable number of studies examine the impact of shocks in oil price levels on economic activities. This huge list of studies is led by Hamilton (1983) and extended by Burbridge and Harrison (1984), Gisser and Goodwin (1986), Mork (1989), Mork and Olsen (1994), Cunado and Perez de Gracia (2005), Huang et al. (2005), Lardic and Mignon (2006), Chen and Chen (2007), Huntington (2007), Cologni and Manera (2008), Hamilton (2008), Chen (2009), Jimenez-Rodriguez (2009), Jbir and Zouari-Ghorbel (2009), and several others. Among the impressive body of literature on the oil price and economy relationship, studies such as Mork (1989), Jimenez-Rodriguez and Sanchez (2005) and Farzanegan and Markwardt (2009) indicate that for certain economies, this impact of oil price on economic activities is asymmetric, *i.e.*, the negative impact of oil price increases is larger than the positive impact of oil price decreases. In a recent paper, Omojolaibi (2013) finds that domestic policies rather than oil-booms should be blamed for inflation in Nigeria. This paper employs the structural vector autoregressive (SVAR) technique on inflation, output, money supply and oil prices from 1985:Q1 to 2010:Q4. Another recent trend in the oil price literature looks at structural breaks in the price data. One such paper is that of Salisu and Fasanya (2013) in which the authors implement two different structural break tests in the WTI and Brent oil prices and identify two structural breaks that occurred in 1990 and 2008 that coincidentally correspond to the Iraqi/Kuwait conflict and the global financial crisis, respectively.

In contrast to the above studies that analyze the impact of oil price shocks, articles that investigate the impact of oil price volatility on the economies are quite limited and originate from the increase in oil price volatility from the mid-1980s. Lee et al. (1995) find that oil price changes have a substantial impact on the economic activities of the US (notably GNP and unemployment) only when prices are relatively stable rather than highly volatile or erratic. Ferderer (1996) analyzes the US data spanning from 1970:01 to 1990:12 to assess whether the relationship between oil price volatility and macroeconomic

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