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A Comparative Study on the Effects of Oil Price Changes on Inflation

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Abstract

In this study, empirical analyses are performed to study the effects of oil price changes on inflation in two groups of countries, namely the high versus low oil dependency groups. In addition, we also compare the relative effect of oil price with other types of shocks such as real exchange rate, domestic output and exporters' production cost. We model the pass-through equation in an autoregressive distributed lag (ARDL) format and the model is estimated using pooled mean group method. Our results reveal that oil price change has its direct effect on domestic inflation in low oil dependency group but its impact is indirect on affecting the domestic inflation in the high oil dependency group through changes on the exporter's production cost. The main determinants of domestic inflation are real exchange rate and exporter's production cost (high oil dependency group) and domestic output and exporter's production cost (low oil dependency group). We suggest the policymaker to stabilize the effects of these shocks through monetary policy accommodate.

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1. Introduction

Changes in crude oil price are the global phenomena that felt by each country in the world. The oil price impact is in particular influential in determining the economies of emerging countries as these economies are not financially stable and are weak to the influences of external shocks. One of the main impacts from oil price changes is on inflation rate/ changes on prices. Fluctuation in inflation or price levels may further lead to economic changes which will affect the economic performance in overall. Due to this reason, inflation rate is seen as the main economic

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indicator to imply the economic condition/ performance. Hence, price stability and low inflation is also the main policy objectives that targeted by policymaker.

In this paper, we conduct empirical analyses to study how influential the oil price change/ shock on determining the domestic inflation in two groups of economies, i.e. the high oil dependency group versus the low oil dependency group. In addition, we also compare the effect of oil price shock relative to the effects of other shocks on determining the inflation. Applying panel data analyses, our results show that oil price change is influential on determining the inflation in these two groups of countries although its impact may not be the largest one. Oil price change has its direct effect on domestic inflation in low oil dependency group, but its impact is indirect on determining the inflation in the high oil dependency group through increasing the exporters' production cost. The main determinants of inflation differ across groups of countries. Our results reveal that the main determinants to domestic inflation in high oil dependency group are real exchange rate and exporters' production cost. However, in the low oil dependency group, domestic output and exporters' production cost appear to be the main factors. The remaining paper is organized as follows: section two provides the review of literature; section three explain the data; section four summarizes the methodology; section five discusses the findings and the last section concludes.

2. The Concept of Pass-Through

The analysis on the pass-through effect of oil price changes on domestic consumer prices is originated from the concept of exchange rate pass-through. We modify the exchange rate pass-through (ERPT) equation to include the oil price variable so that our analyses permit interpretation on the effect of oil price changes on domestic inflation/ price changes. The oil price pass-through rate measures the percentage changed in domestic consumer prices led by a one percentage changed in the oil price.

ERPT equation is used to measure the effect of exchange rate changes on domestic inflation centred on the concept of law of one price (see Sek and Kapsalyamova, 2008). This concept says that the price of import denominated in the domestic importing country's currency P_t^{im} should equal to the import price denominated in the domestic importing country's currency P_t^{ex} after multiplying by the currency exchange rate of importing country E_t , so that $P_t^{im} = P_t^{ex} \cdot E_t$ (1)

It is assumed that P_t^{ex} is the product of mark-up λ_t multiplying by the marginal cost of production C_t , which is $P_t^{ex} = \lambda \cdot C_t$. (2)

Substituting (2) into (1), we then obtain the import price denominated in the importing country's currency as $P_t^{im} = \lambda_t \cdot C_t \cdot E_t$. Using log transformation, we have

$$P_t^{im} = \alpha_1 \lambda_t + \alpha_2 C_t + \alpha_3 E_t \text{ or} \quad (3)$$

$$CPI_t = \alpha_1 GDP_t + \alpha_2 PPI_t^{us} + \alpha_3 REER_t \quad (4)$$

where CPI is the proxy for import price of domestic, GDP as the proxy for the markup; producer price index (PPI) of U.S. is used to represent the production cost of foreign producer and real effective exchange rate (REER) is used to represent the exchange rate variable. The pass-through of exchange rate is indicated by α_3 , as the measure of partial elasticity of import price with respect to exchange rate. The ERPT is written in the ARDL form to include the oil price variable for the purpose of analyses on the effect of oil price shock on inflation (see section 5).

3. Literature Review

Many studies report that oil price have significance impact on determining the consumer price inflation as oil is the direct input for many consumer productions and it is used as the direct input in almost every consumer product. The impact of oil price on inflation is in particular very strong during the oil price shocks in the 1970s and the 1990s. Historical data show that oil price rose from \$3 per barrel before 1973 to close \$40 per barrel in 1979. Oil price also recorded a high increases from \$15 a barrel in 1998 to almost \$140 a barrel in 2008. The consumer price index (1982 base year) compiled by Bureau of Labour Statistics, U.S. also showed the same high jump from 41.10 (January 1972) to 86.30 (end of 1980) and then increased from 164.30 (January 1999) to 214.82 (April 2008).

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